UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☑ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the year ended: December 31, 2018

or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____to _____

Commission File Number 001-38598

BLOOM ENERGY CORPORATION

(Exact name of Registrant as specified in its charter)

Delaware	**77-0565408**
(Sate or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)
4353 North First Street, San Jose, California	**95134**
(Address of principal executive offices)	(Zip Code)

(408) 543-1500

(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Securities Exchange Act

Title of Each Class	Name of each exchange on which registered
Class A Common Stock $0.0001 par value	New York Stock Exchange
Class B Common Stock $0.0001 par value	New York Stock Exchange

Indicate by check mark whether the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☑

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☑

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☑ Smaller reporting company ☐ Emerging growth company ☑

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☑

As of June 29, 2018, the last business day of the registrant's most recently completed second fiscal quarter, the registrant's voting stock was not publicly traded and therefore the registrant cannot calculate the aggregate market value of its voting and nonvoting common equity held by nonaffiliates as of such date. The aggregate market value of voting stock held by non-affiliates of the registrant, as of December 31, 2018, was $156.0 million (based on the closing price for shares of the registrant's Common Stock as reported by the NYSE on December 31, 2018). Shares of Common Stock held by each executive officer, director, and holder of 5% or more of the outstanding Common Stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of shares of the registrant's common stock outstanding as of February 28, 2019 was as follows:

Class A Common Stock $0.0001 par value 58,462,298 shares

Class B Common Stock $0.0001 par value 54,442,364 shares

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for the 2019 Annual Meeting of Stockholders (2019 Proxy Statement) are incorporated into Part III hereof. The 2019 Proxy Statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the registrant's year ended December 31, 2018 .

Bloom Energy Corporation
Annual Report on Form 10-K for the Years Ended December 31, 2018
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SPECIAL NOTE ABOUT FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. All statements contained in this Annual Report on Form 10-K other than statements of historical fact, including statements regarding our future operating results and financial position, our business strategy and plans and our objectives for future operations, are forward-looking statements. The words "believe," "may," "will," "estimate," "continue," "anticipate," "predict," "project," "potential," "seek," "intend," "could," "would," "should," "expect," "plan" and similar expressions are intended to identify forward-looking statements.

Forward-looking statements in this Annual Report on Form 10-K include, but are not limited to, our plans and expectations regarding future financial results, expected operating results, business strategies, the sufficiency of our cash and our liquidity, projected costs and cost reductions, development of new products and improvements to our existing products, the impact of recently adopted accounting pronouncements, our manufacturing capacity and manufacturing costs, the adequacy of our agreements with our suppliers, legislative actions and regulatory compliance, competitive position, management's plans and objectives for future operations, our ability to obtain financing, our ability to comply with debt covenants or cure defaults, if any, our ability to repay our obligations as they come due, trends in average selling prices, the success of our PPA Entities, expected capital expenditures, warranty matters, outcomes of litigation, our exposure to foreign exchange, interest and credit risk, general business and economic conditions in our markets, industry trends, the impact of changes in government incentives, risks related to privacy and data security, the likelihood of any impairment of project assets, long-lived assets and investments, trends in revenue, cost of revenue and gross profit (loss), trends in operating expenses including research and development expense, sales and marketing expense and general and administrative expense and expectations regarding these expenses as a percentage of revenue, future deployment of our Bloom Energy Servers, expansion into new markets, our ability to expand our business with our existing customers, our ability to increase efficiency of our product, our ability to decrease the cost of our product, our future operating results and financial position, our business strategy and plans and our objectives for future operations .

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Annual Report on Form 10-K primarily on our current expectations and projections about future events and trends that we believe may affect our business, financial condition, operating results and prospects. The outcome of the events described in these forward-looking statements is subject to risks, uncertainties and other factors including those discussed in ITEM 1A - Risk Factors and elsewhere in this Annual Report on Form 10-K . Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time and it is not possible for us to predict all risks and uncertainties or the extent to which any factor or combination of factors may cause actual results to differ materially from those contained in any forward-looking statements we may make in this Annual Report on Form 10-K . We cannot assure you that the results, events and circumstances reflected in the forward-looking statements will be achieved or occur. Actual results, events or circumstances could differ materially and adversely from those described or anticipated in the forward-looking statements.

The forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements made in this Annual Report on Form 10-K to reflect events or circumstances after the date of this Annual Report on Form 10-K or to reflect new information or the occurrence of unanticipated events, except as required by law. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements.

Our actual results and timing of selected events may differ materially from those anticipated in these forward-looking statements as a result of many factors including those discussed under ITEM 1A - Risk Factors and elsewhere in this Annual Report on Form 10-K .

Part I

ITEM 1 - BUSINESS

Overview

Our solution, the Bloom Energy Server, is a stationary power generation platform built for the digital age and capable of delivering highly reliable, uninterrupted, 24x7 constant power that is also clean and sustainable. The Bloom Energy Server converts standard low-pressure natural gas or biogas into electricity through an electrochemical process without combustion, resulting in very high conversion efficiencies and lower harmful emissions than conventional fossil fuel generation. A typical configuration produces 250 kilowatts of power in a footprint roughly equivalent to that of half of a standard thirty-foot shipping container, or approximately 125 times more space-efficient than solar power generation. 250 kilowatts of power is roughly equivalent to the constant power requirement of a typical big box retail store. Any number of these Energy Server systems can be clustered together in various configurations to form solutions from hundreds of kilowatts to many tens of megawatts.

Our team has decades of experience in the various specialized disciplines and systems engineering concepts embedded in this technology. We had 224 issued patents in the United States and 110 issued patents internationally as of December 31, 2018 .

Our solution is capable of addressing customer needs across a wide range of industry verticals. The industries we currently serve consist of banking and financial services, cloud services, technology and data centers, communications and media, consumer packaged goods and consumables, education, government, healthcare, hospitality, logistics, manufacturing, real estate, retail and utilities.

Some of our largest customers are AT&T, Caltech, Delmarva Power & Light Company, Equinix, The Home Depot, Kaiser Permanente and The Wonderful Company. We also work actively with financing partners, such as Southern PowerSecure Holdings, Inc. (referred to as "The Southern Company"). These finance partners purchase our systems and deploy the systems at end-customers' facilities in order to provide the electricity as a service. Our customer base included 25 of the Fortune 100 companies as of December 31, 2018 .

Industry Background

According to Marketline, the market for electric power is one of the largest sectors of the global economy with total revenues of $2.4 trillion in 2016, and is projected to grow at a compound annual growth rate of 4.3% to $2.9 trillion in 2021.

There are numerous challenges facing producers of electricity. We believe these challenges will be the foundation of a transformation in how electricity is produced, delivered and consumed. We believe this transformation will be similar to the seismic shifts seen in the computer and telecommunications industries - similar to its centralized mainframe computing and landline telephone systems' shift to the ubiquitous and highly personalized distributed technologies seen today.

Increasing capital costs to maintain and operate the existing electric grid . The electric power grid has suffered from insufficient investment in critical infrastructure as a result of complexities surrounding the ownership, operation and regulation of grid infrastructure, compounded by the challenges of large capital costs and lack of adequate innovation. We believe that U.S. electric utilities will be required to make substantial capital expenditures simply to maintain the electrical grid infrastructure.

Inherent vulnerability of existing grid design. The existing electric grid architecture features centralized, monolithic power plants and mostly above-ground transmission and distribution wires. The limits of this design, coupled with aging and underinvested infrastructure, leaves the grid vulnerable to natural disasters such as hurricanes, earthquakes, drought, wildfires, flooding and extreme temperature variations, which have increased in number and severity in recent years. This results in outages causing an annual loss to American businesses of as much as $150 billion with weather-related disruptions costing the most per event.

In addition to potential disruptions to the grid, there is also an increasing concern over the threat of cyber-attack and physical sabotage to the centralized grid infrastructure.

Intermittent generation sources such as wind and solar are negatively impacting grid stability . As the penetration of wind and solar resources increases, balancing real-time supply and demand becomes more challenging and costly. Due to these challenges, solutions are needed that provide constant base load 24x7 electric power that is reliable, clean and without the shortcomings of the existing grid infrastructure or intermittent sources such as wind and solar. This need is especially acute in the commercial and industrial customer segments, which represent 68% of global electricity consumption, according to Marketline, where cost and reliability can have a direct impact on profitability and business sustainability.

Increasing focus on reducing harmful emissions. The electric power sector, which today produces more greenhouse gases than any other sector of the global economy, is under increasing pressure to do its part to reduce such emissions. Policy

initiatives to reduce harmful emissions from power generation are widespread, including the adoption of renewable portfolio standards or mandated targets for low- or zero-carbon power generation.

Lack of access to affordable and reliable electricity in developing countries. Building a centralized grid system, in addition to its inherent limitations, can also be infeasible in developing countries due to the lack of adequate capital for upfront investment. We believe these countries are likely to develop a hybrid solution consisting of both centralized and distributed electrical power infrastructure to accelerate the availability of power.

Our Solution

The Bloom Energy Server delivers reliable, resilient, clean and affordable energy, particularly in areas of high electricity costs, through its advanced distributed power generation system that is customizable, always-on and a source of primary base load power.

The Bloom Energy Server is based on our proprietary solid oxide fuel cell technology which converts fuel into electricity through an electrochemical process without combustion. The primary input to the system is standard low-pressure natural gas or biogas from local gas lines. The high-quality electrical output of the Energy Server is connected to the customer's main electrical feed thereby avoiding the transmission and distribution losses associated with a centralized grid system. Each Bloom Energy Server is modular and composed of independent 50-kilowatt power modules. A typical configuration includes multiple power modules in a single Energy Server and can produce 250 kilowatts of power in a footprint roughly equivalent to that of half a standard 30 foot shipping container, or approximately 125 times more space-efficient than solar power generation. Any number of these Energy Server systems can be clustered together in various configurations to form solutions from hundreds of kilowatts to many tens of megawatts. The Bloom Energy Server is easily integrated into corporate environments due to its aesthetically attractive design, compact space requirement, and minimal noise profile.

Our Value Proposition

Our value proposition has five key elements which allow us to deliver a better electron: reliability, resiliency, cost savings and predictability, sustainability and personalization. We provide a complete, integrated "behind-the-meter" solution including installation, equipment, service, maintenance and, in some cases, bundled fuel. The five elements of our value proposition emphasize those areas where there is a strong customer need and where we believe we can deliver superior performance.

Reliability. Our Energy Servers deliver always-on, 24x7 base load power with very high availability of power, mission-critical reliability and grid-independent capabilities. The Bloom Energy Server can be configured to eliminate the need for traditional backup power equipment such as diesel generators, batteries and uninterruptible power systems (UPS).

Resiliency. Our Energy Servers avoid the vulnerabilities of conventional transmission and distribution lines by generating power on-site where the electricity is consumed. The system operates at very high availability due to its modular and fault-tolerant design which includes multiple independent power generation modules that can be hot-swapped. Importantly, our systems utilize the existing natural gas infrastructure which is a redundant underground mesh network.

Cost Savings and Predictability . In contrast to the rising and unpredictable cost outlook for grid electricity, we offer our customers the ability to lock in cost for electric power (other than the price of natural gas) over the long-term. In the regions where the majority of our Energy Servers are deployed, our solution typically provides a lower cost of electricity to our customers than traditional grid power. In addition, our solution provides greater cost predictability versus rising grid prices. Moreover, we provide customers with a solution that includes all of the fixed equipment and maintenance costs for the life of the contract.

Sustainability. Bloom Energy Servers provide clean power and, because they are fuel-flexible, customers can choose the fuel source that best fits their needs based on availability, cost and carbon footprint. Bloom Energy Servers deployed since 2012 running on natural gas produce nearly 60% less carbon emissions compared to the average of U.S. combustion power generation. Bloom Energy Servers can also utilize renewable biogas to generate carbon-neutral electricity. In both cases, our Energy Servers emit virtually no criteria air pollutants, including NOx or SOx. Bloom Energy Servers also use virtually no water during normal operation.

Personalization. The Bloom Energy Server is designed as a platform which can be customized to the needs of each customer to deliver the level of reliability, resiliency, sustainability, and cost predictability. For example, the Energy Server can be enhanced with uninterruptible power components to deliver higher levels of reliability and grid independent operation, and storage can be added to reduce peak power consumption and improve the predictability of economics for the customer.

We currently have installations in eleven states in the United States (California, Connecticut, Delaware, Maryland, Massachusetts, North Carolina, New Jersey, New York, Pennsylvania, Utah and Virginia) as well as in Japan, India and the Republic of Korea.

Technology

The fuel cells in our Energy Servers convert fuel, such as natural gas or biogas, into electricity through an electrochemical reaction without burning the fuel. Each individual fuel cell is composed of three layers: an electrolyte sandwiched between a cathode and an anode. The electrolyte is a solid ceramic material, and the anode and cathode are made from inks that coat the electrolyte. Unlike other types of fuel cells, no precious metals, corrosive acids or molten materials are required. These fuel cells are the foundational building block of the Bloom Energy Server. We combine a number of the fuel cells into a stack, and then combine a number of the stacks to form 50 kilowatt power modules (depending upon the generation required by the customer). Any number of these Energy Server systems can be arranged in various configurations to form solutions from hundreds of kilowatts to many tens of megawatts. Regardless of the starting size of a solution, further scaling can be accomplished after the initial solution deployment, creating on-going flexibility and scalability for the customer.

In a basic configuration, the Bloom Energy Server is interconnected to the customer's electric grid connection. By regulation, the Bloom Energy Server must stop exporting power in case of a grid outage. However, Energy Servers can be upgraded with uninterruptable power solutions as add-on options at any point in time to enable continuous operation in the event of grid interruption. When in an uninterruptable configuration, the Energy Server continually powers critical loads while the grid serves as a backup. Should there be a disruption to grid power, the critical load, which is already receiving primary power from the Energy Server, experiences no disruption. The combination of primary power from the Energy Server, utilizing the natural gas infrastructure, and secondary feed from the independent electric grid results in a very highly available and reliable solution.

Competition

We primarily compete against the utility grid based on superior reliability, resiliency, cost savings, predictability and sustainability, all of which can be customized to the needs of individual customers. The customer has no single alternative solution that provides all of these important attributes in one platform. As we are able to drive our costs down, we expect our economic value proposition to continue to improve relative to grid power in additional markets.

Other sources of competition include:

- *Intermittent solar power.* Solar power is intermittent and best suited for addressing peak power requirements, while Bloom provides stable base load generation. Storage technology is intended to address the intermittency of solar, but the low power density and efficiency of solar technology makes the combined solution impractical for most C&I customers. As a point of comparison, our Energy Servers provide the same power output in 1/125th of the footprint of solar, allowing us to serve far more of a customer's energy requirements based on a customer's available space.
- *Intermittent wind power.* Power from wind turbines is intermittent, similar to solar power. Typically wind power is deployed for utility-side, grid-scale applications in remote locations but not as a customer-side, distributed power alternative due to prohibitive space requirements and permitting issues. Remote wind farms feeding into the grid are dependent upon the vulnerable transmission and distribution infrastructure to transport power to the point of consumption.
- *Traditional co-generation systems.* These systems deliver a combination of electric power and heat. We believe that we compete favorably because of our superior electrical efficiencies, significantly less complex deployment (avoiding heating systems integration), better performance on emissions and noise, superior availability, aesthetic appeal and reliability.
- *Traditional backup equipment.* As our Energy Servers deliver always-on power, they can obviate the need for traditional backup equipment such as diesel generators. We generally compete by offering a better integrated, more reliable and cost-effective solution versus these grid-plus-backup systems.
- *Other commercially available fuel cells.* Basic fuel cell technology is over 100 years old. The Bloom Energy Server uses advanced solid oxide fuel cell technology which produces electricity directly from oxidizing a fuel. The solid oxide fuel cell has a solid oxide or ceramic electrolyte. The advantages of this technology include high efficiency, long-term stability, elimination of the need for an external fuel reformer, ability to use biogas or natural gas as a fuel, low emissions and relatively low cost. There are a variety of fuel cell technologies, characterized by their electrolyte material, including:

- *Proton exchange membrane fuel cells ("PEM").* PEM fuel cells typically are used in on-board transportation applications, such as powering forklifts, because of their compactness and ability for quick starts and stops. However, PEM technology requires an expensive platinum catalyst which is susceptible to poisoning by trace amounts of impurities in the fuel or exhaust products. These fuel cells require hydrogen as an input source of energy or an external fuel reformer, which adds to the cost, complexity and electrical inefficiency of the product. As a result, they are not an economically viable option for stationary base load power generation.

- *Molten carbonate fuel cells ("MCFC").* MCFCs are high-temperature fuel cells that use an electrolyte composed of a molten carbonate salt mixture suspended in a porous, chemically inert ceramic matrix of beta-alumina solid electrolyte. The primary disadvantages of current MCFC technology are durability and lower electrical efficiency compared to solid oxide fuel cells. Current versions of the product are built for 300 kilowatts, and they are monolithic. Smaller sizes are not economically viable. In many applications where the heat produced by these fuel cells is not useable continuously, getting rid of the heat also becomes a liability.

- *Phosphoric acid fuel cells ("PAFC").* PAFCs are a type of fuel cell that uses liquid phosphoric acid as an electrolyte. Developed in the mid-1960s and field-tested since the 1970s, they were the first fuel cells to be commercialized. PAFCs have been used for stationary power generators with output in the 100 kilowatt to 400 kilowatt range. PAFCs are best suited to combined heat and power applications which require carefully matching power and heat requirements, often making the technology difficult to implement. Further disadvantages include low power density and stability.

Manufacturing Facilities

Our primary manufacturing locations for the fuel cells and Energy Servers assembly are in Newark, Delaware and Sunnyvale, California. The 225,700 square foot manufacturing facility that we own in Newark is the first purpose-built Bloom Energy manufacturing center and was designed specifically for copy-exact duplication as we expand, which we believe will help us scale more efficiently. Additionally, we lease various manufacturing facilities in Sunnyvale and Mountain View, California. Our current leases for our Sunnyvale manufacturing facilities, entered into in April 2005, expires in 2020, and for our manufacturing facility in Mountain View, entered into in December 2011, expires in December 2020. Our California facilities comprise approximately 487,228 square feet of manufacturing space.

We believe our current manufacturing facilities are adequate to support our business for the next few years. Our Newark facility includes an additional 50 acres available for factory expansion and/or the co-location of supplier plants. Both of our two principal manufacturing facilities are powered by Bloom Energy Servers.

Supply Chain

Our Company's supply chain has been developed, since the beginning of the company, with a group of high quality suppliers that support automotive, semiconductor and other traditional manufacturing organizations. Many of the components that they produce for us are customized and have long lead time components. We have been working to mitigate these long lead times by developing second sources and have developed an active business continuity program. We also purchase long lead items, along with suppliers, to assure component supply for continuity.

Services

We offer operations and maintenance services agreements for our Energy Servers which are renewable at the election of the customer on an annual basis. The customer agrees to pay an on-going service fee and in return Bloom monitors, maintains and operates the systems on the customer's behalf.

Our in-house service organization had 108 dedicated field service personnel in 16 locations as of December 31, 2018. Standard customer contracts include service covering all on-going system operation, maintenance - including periodic refresh of power modules - and 24x7 remote monitoring and control.

Each Bloom Energy Server includes a secure connection to redundant Remote Monitoring and Control Center ("RMCC") facilities that are geographically well separated. There are two RMCC facilities which provide constant monitoring of over 500 system performance parameters and predictive factors. Using proprietary, internally developed software, the RMCC operators can optimize fleet performance remotely from either RMCC facility. As needed, operators can dispatch field services to the site to locally restore and enhance performance. The RMCC facilities communicate through a secure network and can operate together or independently to provide full services for the fleet.

We currently service and maintain all of our Energy Servers.

Customer Financing

We assist our customers by providing innovative financing options which, in addition to aiding in customer purchase, provides us an expanded addressable customer base. We have developed multiple options for our customers to acquire the power our Energy Servers produce. These offerings provide a range of options that include the purchase of our systems outright with operations and maintenance services contracts, or the purchase of electricity that our Energy Servers produce without any upfront costs through various financing vehicles including leases and power purchase agreements ("PPAs") that combine the cost of our systems, warranty and service, financing, and in some cases fuel into monthly payments based on the electricity produced.

Our largest PPA financing partner, through our Third-Party PPA Program, is the Southern Company, one of the largest utility companies in the United States. Other project financing partners include Key Bank, Wells Fargo, Credit Suisse, Constellation Energy (a subsidiary of Exelon Corporation) and WGL Energy.

Sales, Marketing and Partnerships

We market our Energy Servers primarily through a single direct sales organization supported by project finance, business development, government affairs and marketing teams. In addition to our internal resources, we work with multiple partners to generate customer leads and develop projects. Most recently, we announced our first distributorship agreement with SK Group. Pursuant to this agreement, SK Engineering and Construction will become a distributor of Bloom Energy Servers oxide fuel cell systems in the Republic of Korea.

Sustainability

Bloom systems reduce carbon emissions and save water compared to traditional power generation systems. Thus, our primary sustainability goal is to maximize sales of Bloom systems and provide the longest and most economically sustainable life cycle possible for the Bloom fuel cells through reliability enhancement programs.

We seek to minimize our environmental footprint with research and development initiatives designed to extend system operating life while reducing consumption of new material in our Energy Servers. We have an end-to-end recycling approach to recover components from end-of-life units for reuse or recycling and we have dedicated facilities in our manufacturing locations in Delaware and California to inspect and dismantle components removed during scheduled maintenance. We have an audit program to identify improvement opportunities at suppliers and also work to reduce their one-way packaging to minimize materials going to landfills.

These strategies in combination provide a robust and comprehensive sustainability strategy that looks both externally on impact on the wider environment and internally on responsible design, materials management and recycling.

Permits and Approvals

Each Bloom Energy installation must be designed, constructed and operated in compliance with applicable federal, state, international and local regulations, codes, standards, guidelines, policies and laws. To install and operate our systems, we, our customers and our partners are required to obtain applicable permits and approvals from local authorities for the installation of Bloom Energy Servers and for the interconnection systems with the local electrical utility.

Government Policies and Incentives

There are varying policy frameworks across the United States and abroad designed to support and accelerate the adoption of clean and/or reliable distributed generation technologies such as Bloom Energy Servers. These policy initiatives come in the form of tax incentives, cash grants, performance incentives and/or specific gas or electric tariffs.

The U.S. federal government provides businesses with a 30% Investment Tax Credit ("ITC") under Section 48 of the Internal Revenue Code, available to the owner of our Energy Server for systems purchased and placed into service. The credit is equal to 30% of expenditures for capital equipment and installation and the credit for fuel cells is capped at $1,500 per 0.5 kilowatt of capacity. This federal tax benefit expired on December 31, 2016 but was reinstated on February 9, 2018. For more information on the ITC, please see ITEM 7 - *Management's Discussion and Analysis of Financial Condition and Results of Operations* .

Our Energy Servers are currently installed at customer sites in eleven states in the United States, each of which has its own enabling policy framework. Some states have utility procurement programs and/or renewable portfolio standards for which our technology is eligible. Our Energy Servers currently qualify for tax exemptions, incentives or other customer incentives in many states including the states of California, New Jersey, Connecticut and New York. These policy provisions are subject to change.

Although we generally are not regulated as a utility, federal, state, international and local government statutes and regulations concerning electricity heavily influence the market for our product and services. These statutes and regulations often relate to electricity pricing, net metering, incentives, taxation, competition with utilities and the interconnection of customer-owned electricity generation. Federal, state, international and local governments continuously modify these statutes and regulations. Governments, often acting through state utility or public service commissions, change and adopt different rates for commercial customers on a regular basis. These changes can have a positive or negative impact on our ability to deliver cost savings to customers for the purchase of electricity.

To operate our systems, we obtain interconnection agreements from the applicable local primary electricity and gas utilities. In almost all cases, interconnection agreements are standard form agreements that have been pre-approved by the local public utility commission or other regulatory body with jurisdiction over interconnection agreements. As such, no additional regulatory approvals are typically required once interconnection agreements are signed.

Product safety standards for stationary fuel cell generators have been established by the American National Standards Institute ("ANSI"). These standards are known as ANSI/CSA “FC-1”. Our products are designed to meet this standard. Further, we utilize UL to certify compliance with the standard. Energy Server installation guidance is provided by NFPA 853: Standard for the Installation of Stationary Fuel Cell Power Systems. Installations at sites are carried out to meet the requirements of this standard.

Legal Proceedings

From time to time, we are involved in various legal proceedings or subject to claims arising in the ordinary course of our business. Although the results of legal proceedings and claims cannot be predicted with certainty, we are not currently party to any legal proceedings the outcome of which, in the opinion of our management, if determined adversely to us, would individually or taken together have a material adverse effect on our business, operating results, financial condition or cash flows. For a discussion of legal proceedings, see "Legal Matters" under Note 13 - *Commitments and Contingencies* , in the notes to our consolidated financial statements.

Employees

As of December 31, 2018 , we had 1,524 employees and contractors. We have not experienced any work stoppages and we consider our relationship with our employees to be good.

Corporate Facilities

Our corporate headquarters and principal executive offices are located at 4353 North First Street, San Jose, CA 95134, and our telephone number is (408) 543-1500. We entered into the lease for our new corporate headquarters, consisting of 181,000 square feet of multi-floor office space, which commenced in January 2019 and expires in December 2028. Our headquarters is used for administration, research and development, and sales and marketing.

We lease additional office space as field offices in the United States and around the world including in India, the Republic of Korea, China and Taiwan. We believe our office space is adequate to support our business for at least the next twelve months.

Available Information

Our website address is www.bloomenergy.com and our investor relations website address is https://investor.bloomenergy.com. Information contained on our website is not a part of this Annual Report on Form 10-K. Through a link on our website, we make available the following filings as soon as reasonably practicable after they are electronically filed with or furnished to the Securities and Exchange Commission (the SEC): our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act. All such filings are available free of charge. The SEC also maintains a website at www.sec.gov that contains all reports that we file or furnish with the SEC electronically.

ITEM 1A - RISK FACTORS

You should carefully consider the risks and uncertainties described below, as well as the other information in this Annual Report on Form 10-K , including our consolidated financial statements and the related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations." The occurrence of any of the events or developments described below, or of additional risks and uncertainties not presently known to us or that we currently deem immaterial, could materially and adversely affect our business, financial condition, operating results and prospects. In such an event, the market price of our Class A common stock could decline.

Risks Relating to Our Business, Industry and Sales

The distributed generation industry is an emerging market and distributed generation may not receive widespread market acceptance .

The distributed generation industry is still relatively nascent in an otherwise mature and heavily regulated industry, and we cannot be sure that potential customers will accept distributed generation broadly, or our Energy Server products specifically. Enterprises may be unwilling to adopt our solution over traditional or competing power sources for any number of reasons including the perception that our technology is unproven, they lack confidence in our business model, the perceived unavailability of back-up service providers to operate and maintain the Energy Servers, and lack of awareness of our product or their perception of regulatory or political headwinds. Because this is an emerging industry, broad acceptance of our products and services is subject to a high level of uncertainty and risk. If the market develops more slowly than we anticipate, our business will be harmed.

Our limited operating history and our nascent industry make evaluating our business and future prospects difficult.

From our inception in 2001 through 2009, we were focused principally on research and development activities relating to our Energy Server technology. We did not deploy our first Energy Server and did not recognize any revenue until 2009. As a result, we have a limited history operating our business at its current scale. Furthermore, our Energy Server is a new type of product in the nascent distributed energy industry. Consequently, predicting our future revenue and appropriately budgeting for our expenses is difficult, and we have limited insight into trends that may emerge and affect our business. If actual results differ from our estimates or if we adjust our estimates in future periods, our operating results and financial position could be materially and adversely affected.

Our products involve a lengthy sales and installation cycle and, if we fail to close sales on a regular and timely basis, our business could be harmed.

Our sales cycle is typically 12 to 18 months but can vary considerably. In order to make a sale, we must typically provide a significant level of education to prospective customers regarding the use and benefits of our product and its technology. The period between initial discussions with a potential customer and the eventual sale of even a single product typically depends on a number of factors, including the potential customer's budget and decision as to the type of financing it chooses to use as well as the arrangement of such financing. Prospective customers often undertake a significant evaluation process which may further extend the sales cycle. Once a customer makes a formal decision to purchase our product, the fulfillment of the sales order by us requires a substantial amount of time. Generally, the time between the entry into a sales contract with a customer and the installation of our Energy Servers can range from nine to twelve months or more. This lengthy sales and installation cycle is subject to a number of significant risks over which we have little or no control. Because of both the long sales and long installation cycles, we may expend significant resources without having certainty of generating a sale.

These lengthy sales and installation cycles increase the risk that an installation may not be completed. In some instances, a customer can cancel an order for a particular site prior to installation, and we may be unable to recover some or all of our costs in connection with design, permitting, installation and site preparations incurred prior to cancellation. Cancellation rates can be between 10% and 20% in any given period due to factors outside of our control including an inability to install an Energy Server at the customer's chosen location because of permitting or other regulatory issues, unanticipated changes in the cost, or other reasons unique to each customer. Our operating expenses are based on anticipated sales levels, and many of our expenses are fixed. If we are unsuccessful in closing sales after expending significant resources or if we experience delays or cancellations, our business could be materially and adversely affected. Since we do not recognize revenue on the sales of our products until installation and acceptance, a small fluctuation in the timing of the completion of our sales transactions could cause operating results to vary materially from period to period.

Our Energy Servers have significant upfront costs, and we will need to attract investors to help customers finance purchases.

Our Energy Servers have significant upfront costs. In order to assist our customers in obtaining financing for our products, we have traditional lease programs with two leasing partners who have prequalified our product and provide financing for customers through various leasing arrangements. In addition to the traditional lease model, we also offer Power Purchase Agreement Programs, including Third-Party PPAs, in which financing the cost of the Energy Server is provided by an Operating Company and funded by a subsidiary investment entity (an "Investment Company") which is financed by us and/or in combination with Equity Investors. We refer to the Operating Company and its subsidiary Investment Company collectively as a PPA Entity. In recent periods, the substantial majority of our end customers have elected to finance their purchases, typically through Third Party PPAs.

We will need to grow committed financing capacity with existing partners or attract additional partners to support our growth. Generally, at any point in time, the deployment of a portion of our backlog is contingent on securing available financing. Our ability to attract third-party financing depends on many factors that are outside of our control, including the investors' ability to utilize tax credits and other government incentives, our perceived creditworthiness and the condition of credit markets generally. Our financing of customer purchases of our Energy Servers is subject to conditions such as the customer's credit quality and the expected minimum internal rate of return on the customer engagement, and if these conditions are not satisfied, we may be unable to finance purchases of our Energy Servers, which would have an adverse effect on our revenue in a particular period. If we are unable to help our customers arrange financing for our Energy Servers generally, our business will be harmed. For example, we have been working with financing sources to arrange for additional Third-Party PPA Entities, one of which will need to be finalized in order for our customers to arrange financing so that we can complete our planned installations in the second quarter of 2019.

If we are unable to procure financing partners willing to finance such deployments, our business would be negatively impacted.

The economic benefits of our Energy Servers to our customers depends on the cost of electricity available from alternative sources including local electric utility companies, which cost structure is subject to change.

We believe that a customer's decision to purchase our Energy Servers is significantly influenced by the price, the price predictability of electricity generated by our Energy Servers in comparison to the retail price and the future price outlook of electricity from the local utility grid and other renewable energy sources. The economic benefit of our Energy Servers to our customers includes, among other things, the benefit of reducing such customer's payments to the local utility company. The rates at which electricity is available from a customer's local electric utility company is subject to change and any changes in such rates may affect the relative benefits of our Energy Servers. Even in markets where we are competitive today, rates for electricity could decrease and render our Energy Servers uncompetitive. Several factors could lead to a reduction in the price or future price outlook for grid electricity, including the impact of energy conservation initiatives that reduce electricity consumption, construction of additional power generation plants (including nuclear, coal or natural gas) and technological developments by others in the electric power industry which could result in electricity being available at costs lower than those that can be achieved from our Energy Servers. If the retail price of grid electricity does not increase over time at the rate that we or our customers expect, it could reduce demand for our Energy Servers and harm our business.

Further, the local electric utility may impose "departing load," "standby," or other charges on our customers in connection with their acquisition of our Energy Servers, the amounts of which are outside of our control and which may have a material impact on the economic benefit of our Energy Servers to our customers. Changes in the rates offered by local electric utilities and/or in the applicability or amounts of charges and other fees imposed by such utilities on customers acquiring our Energy Servers could adversely affect the demand for our Energy Servers.

In some states and countries, the current low cost of grid electricity, even together with available subsidies, does not render our product economically attractive. If we are unable to reduce our costs to a level at which our Energy Servers would be competitive in such markets, or if we are unable to generate demand for our Energy Servers based on benefits other than electricity cost savings, our potential for growth may be limited.

Furthermore, an increase in the price of natural gas or curtailment of availability could make our Energy Servers less economically attractive to potential customers and reduce demand.

We rely on net metering arrangements that are subject to change.

Because our Energy Servers are designed to operate at a constant output twenty-four hours a day, seven days a week and our customers' demand for electricity typically fluctuates over the course of the day or week, there are often periods when our Energy Servers are producing more electricity than a customer may require, and such excess electricity must be exported to the

local electric utility. Many, but not all, local electric utilities provide compensation to our customers for such electricity under “net metering” programs. Utility tariffs, interconnection agreements and net metering requirements are subject to changes in availability and terms. At times in the past, such changes have had the effect of significantly reducing or eliminating the benefits of such programs. Changes in the availability of, or benefits offered by, utility tariffs, the net metering requirements or interconnection agreements in place in the jurisdictions in which we operate could adversely affect the demand for our Energy Servers.

We currently face and will continue to face significant competition.

We compete for customers, financing partners, and incentive dollars with other electric power providers. Many providers of electricity, such as traditional utilities and other companies offering distributed generation products, have longer operating histories, have customer incumbency advantages, have access to and influence with local and state governments, and have access to more capital resources than do we. Significant developments in alternative technologies, such as energy storage, wind, solar, or hydro power generation, or improvements in the efficiency or cost of traditional energy sources, including coal, oil, natural gas used in combustion, or nuclear power, may materially and adversely affect our business and prospects in ways we cannot anticipate. We may also face new competitors who are not currently in the market. If we fail to adapt to changing market conditions and to compete successfully with grid electricity or new competitors, our growth will be limited which would adversely affect our business results.

We derive a substantial portion of our revenue and backlog from a limited number of customers, and the loss of or a significant reduction in orders from a large customer could have a material adverse effect on our operating results and other key metrics.

In any particular period, a substantial amount of our total revenue could come from a relatively small number of customers. As an example, in the year ended December 31, 2017, two customers accounted for approximately 53% of our total revenue. In 2018, two customers accounted for approximately 54% of our total revenue. One of these customers, the Southern Company, wholly owns a Third-Party PPA, and this entity purchases Bloom Energy Servers, that are then provided to various end customers under PPAs. The loss of any large customer order or any delays in installations of new Energy Servers with any large customer could materially and adversely affect our business results.

Risks Relating to Our Products and Manufacturing

Our future success depends in part on our ability to increase our production capacity, and we may not be able to do so in a cost-effective manner.

To the extent we are successful in growing our business, we may need to increase our production capacity. Our ability to plan, construct, and equip additional manufacturing facilities is subject to significant risks and uncertainties, including the following:

- The expansion or construction of any manufacturing facilities will be subject to the risks inherent in the development and construction of new facilities, including risks of delays and cost overruns as a result of factors outside our control such as delays in government approvals, burdensome permitting conditions, and delays in the delivery of manufacturing equipment and subsystems that we manufacture or obtain from suppliers.
- It may be difficult to expand our business internationally without additional manufacturing facilities located outside the United States. Adding manufacturing capacity in any international location will subject us to new laws and regulations including those pertaining to labor and employment, environmental and export import. In addition, it brings with it the risk of managing larger scale foreign operations.
- We may be unable to achieve the production throughput necessary to achieve our target annualized production run rate at our current and future manufacturing facilities.
- Manufacturing equipment may take longer and cost more to engineer and build than expected, and may not operate as required to meet our production plans.
- We may depend on third-party relationships in the development and operation of additional production capacity, which may subject us to the risk that such third parties do not fulfill their obligations to us under our arrangements with them.
- We may be unable to attract or retain qualified personnel.

If we are unable to expand our manufacturing facilities, we may be unable to further scale our business. If the demand for our Energy Servers or our production output decreases or does not rise as expected, we may not be able to spread a

significant amount of our fixed costs over the production volume, resulting in a greater than expected per unit fixed cost, which would have a negative impact on our financial condition and our results of operations.

If we are not able to continue to reduce our cost structure in the future, our ability to become profitable may be impaired.

We must continue to reduce the manufacturing costs for our Energy Servers to expand our market. Additionally, certain of our existing service contracts were entered into based on projections regarding service costs reductions that assume continued advances in our manufacturing and services processes which we may be unable to realize. While we have been successful in reducing our manufacturing and services costs to date, the cost of components and raw materials, for example, could increase in the future. Any such increases could slow our growth and cause our financial results and operational metrics to suffer. In addition, we may face increases in our other expenses including increases in wages or other labor costs as well as installation, marketing, sales or related costs. We may continue to make significant investments to drive growth in the future. In order to expand into new electricity markets (in which the price of electricity from the grid is lower) while still maintaining our current margins, we will need to continue to reduce our costs. Increases in any of these costs or our failure to achieve projected cost reductions could adversely affect our results of operations and financial condition and harm our business and prospects. If we are unable to reduce our cost structure in the future, we may not be able to achieve profitability, which could have a material adverse effect on our business and our prospects.

If our Energy Servers contain manufacturing defects, our business and financial results could be harmed.

Our Energy Servers are complex products and they may contain undetected or latent errors or defects. In the past, we have experienced latent defects only discovered once the Energy Server is deployed in the field. Changes in our supply chain or the failure of our suppliers to otherwise provide us with components or materials that meet our specifications could also introduce defects into our products. In addition, as we grow our manufacturing volume, the chance of manufacturing defects could increase. Any manufacturing defects or other failures of our Energy Servers to perform as expected could cause us to incur significant re-engineering costs, divert the attention of our engineering personnel from product development efforts, and significantly and adversely affect customer satisfaction, market acceptance, and our business reputation.

Furthermore, we may be unable to correct manufacturing defects or other failures of our Energy Servers in a manner satisfactory to our customers, which could adversely affect customer satisfaction, market acceptance, and our business reputation.

The performance of our Energy Servers may be affected by factors outside of our control, which could result in harm to our business and financial results .

Field conditions, such as the quality of the natural gas supply and utility processes which vary by region and may be subject to seasonal fluctuations, have affected the performance of our Energy Servers and are not always possible to predict until the Energy Server is in operation. Although we believe we have designed new generations of Energy Servers to better withstand the variety of field conditions we have encountered, as we move into new geographies and deploy new service configurations, we may encounter new and unanticipated field conditions. Adverse impacts on performance may require us to incur significant re-engineering costs or divert the attention of our engineering personnel from product development efforts. Furthermore, we may be unable to adequately address the impacts of factors outside of our control in a manner satisfactory to our customers. Any of these circumstances could significantly and adversely affect customer satisfaction, market acceptance, and our business reputation.

If our estimates of useful life for our Energy Servers are inaccurate or we do not meet service and performance warranties and guaranties, or if we fail to accrue adequate warranty and guaranty reserves, our business and financial results could be harmed.

We offer certain customers the opportunity to renew their operations and maintenance service agreements on an annual basis, for up to 25 years, at prices predetermined at the time of purchase of the Energy Server. We also provide performance warranties and guaranties covering the efficiency and output performance of our Energy Servers. Our pricing of these contracts and our reserves for warranty and replacement are based upon our estimates of the life of our Energy Servers and their components, including assumptions regarding improvements in useful life that may fail to materialize. We do not have a long history with a large number of field deployments, and our estimates may prove to be incorrect. Failure to meet these performance warranties and guaranty levels may require us to replace the Energy Servers at our expense or refund their cost to the customer, or require us to make cash payments to the customer based on actual performance, as compared to expected performance, capped at a percentage of the relevant equipment purchase prices. We accrue for product warranty costs and recognize losses on service or performance warranties when required by U.S. GAAP based on our estimates of costs that may be incurred and based on historical experience. However, as we expect our customers to renew their maintenance service

agreements each year, the total liability over time may be more than the accrual. Actual warranty expenses have in the past been and may in the future be greater than we have assumed in our estimates, the accuracy of which may be hindered due to our limited history operating at our current scale.

Early generations of our Energy Server did not have the useful life and did not perform at an output and efficiency level that we expected. We implemented a fleet decommissioning program for our early generation Energy Servers in our PPA I program, which resulted in a significant adjustment to revenue in the quarter ended December 31, 2015, as we would otherwise have failed to meet efficiency and output warranties. As of December 31, 2018 , we had a total of 58 megawatts in total deployed early generation servers, including our first and second generation servers, out of our total installed base of 372 megawatts. We expect that our deployed early generation Energy Servers may continue to perform at a lower output and efficiency level and, as a result, the maintenance costs may exceed the contracted prices that we expect to generate if our customers continue to renew their maintenance service agreements in respect of those servers.

Our business is subject to risks associated with construction, utility interconnection, cost overruns and delays, including those related to obtaining government permits and other contingencies that may arise in the course of completing installations.

Because we generally do not recognize revenue on the sales of our Energy Servers until installation and acceptance, our financial results are dependent, to a large extent, on the timeliness of the installation of our Energy Servers. Furthermore, in some cases, the installation of our Energy Servers may be on a fixed price basis, which subjects us to the risk of cost overruns or other unforeseen expenses in the installation process.

The construction, installation, and operation of our Energy Servers at a particular site is also generally subject to oversight and regulation in accordance with national, state, and local laws and ordinances relating to building codes, safety, environmental protection, and related matters, and typically require various local and other governmental approvals and permits, including environmental approvals and permits, that vary by jurisdiction. In some cases, these approvals and permits require periodic renewal. It is difficult and costly to track the requirements of every individual authority having jurisdiction over our installations, to design our Energy Servers to comply with these varying standards, and to obtain all applicable approvals and permits. We cannot predict whether or when all permits required for a given project will be granted or whether the conditions associated with the permits will be achievable. The denial of a permit or utility connection essential to a project or the imposition of impractical conditions would impair our ability to develop the project. In addition, we cannot predict whether the permitting process will be lengthened due to complexities and appeals. Delay in the review and permitting process for a project can impair or delay our and our customers' abilities to develop that project or may increase the cost so substantially that the project is no longer attractive to us or our customers. Furthermore, unforeseen delays in the review and permitting process could delay the timing of the installation of our Energy Servers and could therefore adversely affect the timing of the recognition of revenue related to the installation, which could harm our operating results in a particular period.

In addition, the completion of many of our installations is dependent upon the availability of and timely connection to the natural gas grid and the local electric grid. In some jurisdictions, the local utility company(ies) or the municipality has denied our request for connection or has required us to reduce the size of certain projects. Any delays in our ability to connect with utilities, delays in the performance of installation-related services, or poor performance of installation-related services by our general contractors or sub-contractors will have a material adverse effect on our results and could cause operating results to vary materially from period to period.

Furthermore, we rely on the ability of our third party general contractors to install Energy Servers at our customers' sites and to meet our installation requirements. We currently work with a limited number of general contractors, which has impacted and may continue to impact our ability to make installations as planned. Our work with contractors or their sub-contractors may have the effect of us being required to comply with additional rules (including rules unique to our customers), working conditions, site remediation, and other union requirements, which can add costs and complexity to an installation project. The timeliness, thoroughness, and quality of the installation-related services performed by some of our general contractors and their sub-contractors in the past have not always met our expectations or standards and in the future may not meet our expectations and standards.

The failure of our suppliers to continue to deliver necessary raw materials or other components of our Energy Servers in a timely manner could prevent us from delivering our products within required time frames, and could cause installation delays, cancellations, penalty payments, and damage to our reputation.

We rely on a limited number of third-party suppliers for some of the raw materials and components for our Energy Servers, including certain rare earth materials and other materials that may be of limited supply. If our suppliers provide insufficient inventory at the level of quality required to meet customer demand or if our suppliers are unable or unwilling to provide us with the contracted quantities (as we have limited or in some case no alternatives for supply), our results of

operations could be materially and negatively impacted. If we fail to develop or maintain our relationships with our suppliers, or if there is otherwise a shortage or lack of availability of any required raw materials or components, we may be unable to manufacture our Energy Servers or our Energy Servers may be available only at a higher cost or after a long delay. Such delays could prevent us from delivering our Energy Servers to our customers within required time frames and cause order cancellations. We have had to create our own supply chain for some of the components and materials utilized in our fuel cells. We have made significant expenditures in the past to develop our supply chain. In many cases, we entered into contractual relationships with suppliers to jointly develop the components we needed. These activities were time and capital intensive. Accordingly, the number of suppliers we have for some of our components and materials is limited and in some cases sole sourced. Some of our suppliers use proprietary processes to manufacture components. We may be unable to obtain comparable components from alternative suppliers without considerable delay, expense, or at all, as replacing these suppliers could require us either to make significant investments to bring the capability in-house or to invest in a new supply chain partner. Some of our suppliers are smaller, private companies, heavily dependent on us as a customer. If our suppliers face difficulties obtaining the credit or capital necessary to expand their operations when needed, they could be unable to supply necessary raw materials and components needed to support our planned sales and services operations, which would negatively impact our sales volumes and cash flows.

Moreover, we may experience unanticipated disruptions to operations or other difficulties with our supply chain or internalized supply processes due to exchange rate fluctuations, volatility in regional markets from where materials are obtained (particularly China and Taiwan), changes in the general macroeconomic outlook, global trade disputes, political instability, expropriation or nationalization of property, civil strife, strikes, insurrections, acts of terrorism, acts of war, or natural disasters. The failure by us to obtain raw materials or components in a timely manner or to obtain raw materials or components that meet our quantity and cost requirements could impair our ability to manufacture our Energy Servers or increase their costs or service costs of our existing portfolio of Energy Servers under maintenance services agreements. If we cannot obtain substitute materials or components on a timely basis or on acceptable terms, we could be prevented from delivering our Energy Servers to our customers within required timeframes, which could result in sales and installation delays, cancellations, penalty payments, or damage to our reputation, any of which could have a material adverse effect on our business and results of operations. In addition, we rely on our suppliers to meet quality standards, and the failure of our suppliers to meet or exceed those quality standards could cause delays in the delivery of our products, cause unanticipated servicing costs, and cause damage to our reputation.

We have, in some instances, entered into long-term supply agreements that could result in insufficient inventory and negatively affect our results of operations.

We have entered into long-term supply agreements with certain suppliers. Some of these supply agreements provide for fixed or inflation-adjusted pricing, substantial prepayment obligations and in a few cases, supplier purchase commitments. These arrangements could mean that we end up paying for inventory that we did not need or that was at a higher price than the market. Further, we face significant specific counterparty risk under long-term supply agreements when dealing with suppliers without a long, stable production and financial history. Given the uniqueness of our product, many of our suppliers do not have a long operating history and are private companies that may not have substantial capital resources. In the event any such supplier experiences financial difficulties, it may be difficult or impossible, or may require substantial time and expense, for us to recover any or all of our prepayments. We do not know whether we will be able to maintain long-term supply relationships with our critical suppliers or whether we may secure new long-term supply agreements. Additionally, many of our parts and materials are procured from foreign suppliers, which exposes us to risks including unforeseen increases in costs or interruptions in supply arising from changes in applicable international trade regulations such as taxes, tariffs or quotas. Any of the foregoing could materially harm our financial condition and our results of operations.

We face supply chain competition, including competition from businesses in other industries, which could result in insufficient inventory and negatively affect our results of operations .

Certain of our suppliers also supply parts and materials to other businesses including businesses engaged in the production of consumer electronics and other industries unrelated to fuel cells. As a relatively low-volume purchaser of certain of these parts and materials, we may be unable to procure a sufficient supply of the items in the event that our suppliers fail to produce sufficient quantities to satisfy the demands of all of their customers, which could materially harm our financial condition and our results of operations.

We, and some of our suppliers, obtain capital equipment used in our manufacturing process from sole suppliers and, if this equipment is damaged or otherwise unavailable, our ability to deliver our Energy Servers on time will suffer.

Some of the capital equipment used to manufacture our products and some of the capital equipment used by our suppliers have been developed and made specifically for us, are not readily available from multiple vendors, and would be

difficult to repair or replace if they did not function properly. If any of these suppliers were to experience financial difficulties or go out of business or if there were any damage to or a breakdown of our manufacturing equipment and we could not obtain replacement equipment in a timely manner, our business would suffer. In addition, a supplier's failure to supply this equipment in a timely manner with adequate quality and on terms acceptable to us could disrupt our production schedule or increase our costs of production and service.

Possible new tariffs could have a material adverse effect on our business.

Our business is dependent on the availability of raw materials and components for our Energy Servers, particularly electrical components common in the semiconductor industry, specialty steel products / processing and raw materials. Recently imposed tariffs on steel and aluminum imports have increased the cost of raw materials for our Energy Servers and decreased the available supply. Additional new tariffs or other trade protection measures which are proposed or threatened and the potential escalation of a trade war and retaliation measures could have a material adverse effect on our business, results of operations and financial condition.

Although we currently maintain alternative sources for raw materials, our business is subject to the risk of price fluctuations and periodic delays in the delivery of certain raw materials, which tariffs may exacerbate. Disruptions in the supply of raw materials and components could temporarily impair our ability to manufacture our Energy Servers for our customers or require us to pay higher prices in order to obtain these raw materials or components from other sources, which could affect our business and our results of operations. While it is too early to predict how the recently enacted tariffs on imported steel will impact our business, the imposition of tariffs on items imported by us from China or other countries could increase our costs and could have a material adverse effect on our business and our results of operations.

Risks Relating to Government Incentive Programs

Our business currently depends on the availability of rebates, tax credits and other financial incentives, and the reduction, modification, or elimination of such benefits could cause our revenue to decline and harm our financial results.

The U.S. federal government and some state and local governments provide incentives to end users and purchasers of our Energy Servers in the form of rebates, tax credits, and other financial incentives, such as system performance payments and payments for renewable energy credits associated with renewable energy generation. In addition, some countries outside the U.S. also provide incentives to end users and purchasers of our Energy Servers. We currently sell our Energy Servers in the Republic of Korea where Renewable Portfolio Standards ("RPS") are in place to promote the adoption of renewable power generation, including fuel cells. Our Energy Servers have qualified for tax exemptions, incentives, or other customer incentives in many states including the states of California, Connecticut, Massachusetts, New Jersey and New York. Some states have utility procurement programs and/or renewable portfolio standards for which our technology is eligible. Our Energy Servers are currently installed in eleven U.S. states, each of which may have its own enabling policy framework. We rely on these governmental rebates, tax credits, and other financial incentives to significantly lower the effective price of the Energy Servers to our customers in the U. S. and the Republic of Korea. Our financing partners and Equity Investors in Bloom Electrons programs may also take advantage of these financial incentives, lowering the cost of capital and energy to our customers. However, these incentives or RPS may expire on a particular date, end when the allocated funding is exhausted, or be reduced or terminated as a matter of regulatory or legislative policy.

For example, the previous federal investment tax credit ("ITC"), a federal tax incentive for fuel cell production, expired on December 31, 2016. Without the availability of the ITC benefit incentive, we lowered the price of our Energy Servers to ensure the economics to our customers would remain the same as it was prior to losing the ITC benefit, adversely affecting our gross profit. While the ITC was reinstated by the U.S Congress on February 9, 2018 and made retroactive to January 1, 2017, under current law it will phase out on December 31, 2022.

As another example, the California Self Generation Incentive Program ("SGIP") is a program administered by the California Public Utilities Commission ("CPUC") which provides incentives to investor-owned utility customers that install eligible distributed energy resources. In July 2016, the CPUC modified the SGIP to provide a smaller allocation of the incentives available to generating technologies such as our Energy Servers and a larger allocation to storage technologies. As modified, the SGIP will require all eligible power generation sources consuming natural gas to use a minimum 50% biogas to receive SGIP funds in 2019 and 100% in 2020. In addition, the CPUC provided a further limitation on the available allocation of funds that any one participant may claim under the SGIP. The SGIP will expire on January 21, 2021 absent any extension. Our billings for product accepted derived from customers benefiting from the SGIP represented approximately 4% and 12% of total billings for product accepted for the years ended December 31, 2018 and 2017 , respectively.

Changes in federal, state, or local programs or the RPS in the Republic of Korea could reduce demand for our Energy Servers, impair sales financing, and adversely impact our business results. The continuation of these programs depends upon political support which to date has been bipartisan and durable. Nevertheless, one set of political activists aggressively seeks to eliminate these programs while another set seeks to deny access to these programs for any technology that relies on natural gas, regardless of the technology's positive contribution to reducing air pollution, reducing carbon emissions or enabling electric service to be more reliable and resilient.

We rely on tax equity financing arrangements to realize the benefits provided by investment tax credits and accelerated tax depreciation and, in the event these programs are terminated, our financial results could be harmed.

We expect that any Energy Server deployments through financed transactions (including our Bloom Electrons programs, our leasing programs and any Third-Party PPA Programs) will receive capital from financing parties ("Equity Investors") who derive a significant portion of their economic returns through tax benefits. Equity Investors are generally entitled to substantially all of the project's tax benefits, such as those provided by the ITC and Modified Accelerated Cost Recovery System ("MACRS") or bonus depreciation, until the Equity Investors achieve their respective agreed rates of return. The number of and available capital from potential Equity Investors is limited, we compete with other energy companies eligible for these tax benefits to access such investors, and the availability of capital from Equity Investors is subject to fluctuations based on factors outside of our control such as macroeconomic trends and changes in applicable taxation regimes. Concerns regarding our limited operating history, lack of profitability and that we are only the party who can perform operations and maintenance on our energy servers have made it difficult to attract investors in the past. Our ability to obtain additional financing in the future depends on the continued confidence of banks and other financing sources in our business model, the market for our Energy Servers, and the continued availability of tax benefits applicable to our Energy Servers. In addition, conditions in the general economy and financial and credit markets may result in the contraction of available tax equity financing. If we are unable to enter into tax equity financing agreements with attractive pricing terms, or at all, we may not be able to obtain the capital needed to fund our financing programs or use the tax benefits provided by the ITC and MACRS depreciation, which could make it more difficult for customers to finance the purchase of our Energy Servers. Such circumstances could also require us to reduce the price at which we are able to sell our Energy Servers and therefore harm our business, our financial condition, and our results of operations.

Risks Related to Legal Matters and Regulations

We are subject to various environmental laws and regulations that could impose substantial costs upon us and cause delays in building our manufacturing facilities.

We are subject to national, state, and local environmental laws and regulations as well as environmental laws in those foreign jurisdictions in which we operate. Environmental laws and regulations can be complex and may often change. These laws can give rise to liability for administrative oversight costs, cleanup costs, property damage, bodily injury, fines, and penalties. Capital and operating expenses needed to comply with environmental laws and regulations can be significant, and violations may result in substantial fines and penalties or third-party damages. In addition, ensuring we are in compliance with applicable environmental laws could require significant time and management resources and could cause delays in our ability to build out, equip and operate our facilities as well as service our fleet, which would adversely impact our business, our prospects, our financial condition, and our operating results. In addition, environmental laws and regulations such as the Comprehensive Environmental Response, Compensation and Liability Act in the United States impose liability on several grounds including for the investigation and cleanup of contaminated soil and ground water, for building contamination, for impacts to human health and for damages to natural resources. If contamination is discovered in the future at properties formerly owned or operated by us or currently owned or operated by us, or properties to which hazardous substances were sent by us, it could result in our liability under environmental laws and regulations. Many of our customers who purchase our Energy Servers have high sustainability standards, and any environmental noncompliance by us could harm our reputation and impact a current or potential customer's buying decision. The costs of complying with environmental laws, regulations, and customer requirements, and any claims concerning noncompliance or liability with respect to contamination in the future, could have a material adverse effect on our financial condition or our operating results.

The installation and operation of our Energy Servers are subject to environmental laws and regulations in various jurisdictions, and there is uncertainty with respect to the interpretation of certain environmental laws and regulations to our Energy Servers, especially as these regulations evolve over time.

Bloom is committed to compliance with applicable environmental laws and regulations including health and safety standards, and we continually review the operation of our Energy Servers for health, safety, and environmental compliance. Our

Energy Servers, like other fuel cell technology-based products of which we are aware, produce small amounts of hazardous wastes and air pollutants, and we seek to ensure that they are handled in accordance with applicable regulatory standards.

Maintaining compliance with laws and regulations can be challenging given the changing patchwork of environmental laws and regulations that prevail at the federal, state, regional, and local level. Most existing environmental laws and regulations preceded the introduction of our innovative fuel cell technology and were adopted to apply to technologies existing at the time, namely large coal, oil, or gas-fired power plants. Currently, there is generally little guidance from these agencies on how certain environmental laws and regulations may or may not be applied to our technology.

For example, natural gas, which is the primary fuel used in our Energy Servers, contains benzene, which is classified as a hazardous waste if it exceeds 0.5 milligrams ("mg") per liter. A small amount of benzene found in the public natural gas pipeline (equivalent to what is present in one gallon of gasoline in an automobile fuel tank which are exempt from federal regulation) is collected by the gas cleaning units contained in our Energy Servers which are typically replaced once every 18 to 24 months by us from customers' sites. From 2010 to late 2016 and in the regular course of maintenance of the Energy Servers, we periodically replaced the units in our servers under a federal environmental exemption that permitted the handling of such units without manifesting the contents as containing a hazardous waste. Although at the time we believed that we operated under the exemption with the approval of two states that had adopted the federal exemption, the U.S. Environmental Protection Agency ("EPA") issued guidance for the first time in late 2016 that differed from our belief and conflicted with the state approvals we had obtained even though we had operated under the exemption since 2010. We have complied with the new guidance and, given the comparatively small quantities of benzene produced, we do not anticipate significant additional costs or risks from our compliance with the revised 2016 guidance. However, the EPA has asked us to show cause why it should not collect approximately $1.0 million in fines from us for the prior period, which we are contesting. Additionally, we paid a nominal fine to an agency in a different state under that state's environmental laws relating to the operation of our Energy Server under the exemption prior to the issuance of the revised EPA guidance.

Another example relates to the very small amounts of chromium in hexavalent form, or CR+6, which our Energy Servers emit at nanometer scale. This occurs any time a steel super alloy is exposed to high temperatures. CR+6 is found in small concentrations in the air generally. However, exposure to high or significant concentrations over prolonged periods of time can be carcinogenic. While the small amount of chromium emitted by our Energy Servers is initially in the hexavalent form, it converts to a non-toxic trivalent form, or CR+3, rapidly after it leaves the Energy Server. In tests we have conducted, air measurements taken 10 meters from an Energy Server show that the CR+6 is largely converted.

Our Energy Servers do not present any significant health hazard based on our modeling, testing methodology, and measurements. There are several supporting elements to this position including that the emissions from our Energy Servers are in very low concentrations, are emitted as nano-particles that convert to the non-hazardous form CR+3 rapidly, are quickly dispersed into the air, and are not emitted in close proximity to locations where people would be expected to have a prolonged exposure. Nevertheless, we have engineered a technology solution that we are deploying.

Several states in which we currently operate, including California, require permits for emissions of hazardous air pollutants based on the quantity of emissions, most of which require permits only for quantities of emissions that are higher than those observed from our Energy Servers. Other states in which we operate, including New York, New Jersey, and North Carolina, have specific exemptions for fuel cells. Some states in which we operate have CR+6 limits which are an order of magnitude over our operating range. Within California, the Bay Area Air Quality Management District ("BAAQMD") requires a permit for emissions that are more than 0.00051 lbs/year. Other California regulations require that levels of CR+6 be below 0.00005 $\mu g/m^3$, which is the level required by Proposition 65 and which requires notification of the presence of CR+6 unless it can be shown to be at levels that do not pose a significant health risk. We have determined that the standards applicable in California in this regard are more stringent than those in any other state or foreign location in which we have installed Energy Servers to date, therefore, deployment of our solution has been focused on California's standards.

There are generally no relevant environmental testing methodology guidelines for a technology such as ours. The standard test method for analyzing emissions cannot be readily applied to our Energy Servers because it would require inserting a probe into an emission stack. Our servers do not have emission stacks; therefore, we have to construct an artificial stack on top of our server in order to conduct a test. If we used the testing methodology similar to what the air districts have used in other large scale industrial products, it would show that we would need to reduce the emissions of CR+6 from our Energy Servers to meet the most stringent requirements. However, we employed a modified test method that is designed to capture the actual operating conditions of our Energy Servers and its distinctly different design from legacy power plants and industrial equipment. Based on our modeling, measured results and analysis, we believe we are in compliance with State of California air regulations. However, it is possible that the California Air Districts will require us to abate or shut down the operations of certain of our existing Energy Servers on a temporary basis or will seek the imposition of monetary fines.

While we seek to comply with air quality and emission standards in every region in which we operate, it is possible that certain customers in other regions may request that we provide the new technology solution for their Energy Servers to comply with the stricter standards imposed by California even though they are not applicable and even though we are under no contractual obligation to do so. We plan to satisfy these requests from customers. Failure or delay in attaining regulatory approval could result in our not being able to operate in a particular local jurisdiction.

These examples illustrate that our technology is moving faster than the regulatory process in many instances. It is possible that regulators could delay or prevent us from conducting our business in some way pending agreement on, and compliance with, shifting regulatory requirements. Such actions could delay the installation of Energy Servers, could result in fines, could require modification or replacement or could trigger claims of performance warranties and defaults under customer contracts that could require us to repurchase their Energy Servers, any of which could adversely affect our business, our financial performance, and our reputation. In addition, new laws or regulations or new interpretations of existing laws or regulations could present marketing, political or regulatory challenges and could require us to upgrade or retrofit existing equipment, which could result in materially increased capital and operating expenses.

Furthermore, we have not yet determined whether our Energy Servers will satisfy regulatory requirements in the other states in the U.S. and in international locations in which we do not currently sell Energy Servers but may pursue in the future.

As a fossil fuel-based technology, we may be subject to a heightened risk of regulation, to a potential for the loss of certain incentives, and to changes in our customers' energy procurement policies.

Although the current generation of Bloom Energy Servers running on natural gas produce nearly 50% less carbon emissions compared to the average of U.S. combustion power generation, the operation of our Energy Servers does produce carbon dioxide (CO2), which has been shown to be a contributing factor to global climate change. As such, we may be negatively impacted by CO2-related changes in applicable laws, regulations, ordinances, rules, or the requirements of the incentive programs on which we and our customers currently rely. Changes, or in some cases a lack of change, in any of the laws, regulations, ordinances, or rules that apply to our installations and new technology could make it illegal or more costly for us or our customers to install and operate our Energy Servers on particular sites, thereby negatively affecting our ability to deliver cost savings to customers, or we could be prohibited from completing new installations or continuing to operate existing projects. Certain municipalities have already banned the use of distributed generation products that utilize fossil fuel. Additionally, our customers' and potential customers' energy procurement policies may prohibit or limit their willingness to procure our Energy Servers. Our business prospects may be negatively impacted if we are prevented from completing new installations or our installations become more costly as a result of laws, regulations, ordinances, or rules applicable to our Energy Servers, or by our customers' and potential customers' energy procurement policies.

Existing regulations and changes to such regulations impacting the electric power industry may create technical, regulatory, and economic barriers which could significantly reduce demand for our Energy Servers.

The market for electricity generation products is heavily influenced by U.S. federal, state, local, and foreign government regulations and policies as well as by internal policies and regulations of electric utility providers. These regulations and policies often relate to electricity pricing and technical interconnection of customer-owned electricity generation. These regulations and policies are often modified and could continue to change, which could result in a significant reduction in demand for our Energy Servers. For example, utility companies commonly charge fees to larger industrial customers for disconnecting from the electric grid or for having the capacity to use power from the electric grid for back-up purposes. These fees could change, thereby increasing the cost to our customers of using our Energy Servers and making them less economically attractive. In addition, our project with Delmarva Power & Light Company ("Delmarva") is subject to laws and regulations relating to electricity generation, transmission, and sale such as Federal Energy Regulatory Commission ("FERC") regulation under various federal energy regulatory laws, which requires FERC authorization to make wholesale sales of electric energy, capacity, and ancillary services. Also, several of our PPA Entities are subject to regulation under FERC with respect to market-based sales of electricity, which requires us to file notices and make other periodic filings with FERC, which increases our costs and subjects us to additional regulatory oversight.

Although we generally are not regulated as a utility, federal, state, and local government statutes and regulations concerning electricity heavily influence the market for our product and services. These statutes and regulations often relate to electricity pricing, net metering, incentives, taxation, and the rules surrounding the interconnection of customer-owned electricity generation for specific technologies. In the United States, governments frequently modify these statutes and regulations. Governments, often acting through state utility or public service commissions, change and adopt different requirements for utilities and rates for commercial customers on a regular basis. Changes, or in some cases a lack of change, in any of the laws, regulations, ordinances, or other rules that apply to our installations and new technology could make it more

costly for us or our customers to install and operate our Energy Servers on particular sites and, in turn, could negatively affect our ability to deliver cost savings to customers for the purchase of electricity.

We may become subject to product liability claims which could harm our financial condition and liquidity if we are not able to successfully defend or insure against such claims.

We may in the future become subject to product liability claims. Our Energy Servers are considered high energy systems because they use flammable fuels and may operate at 480 volts. Although our Energy Servers are certified to meet ANSI, IEEE, ASME, and NFPA design and safety standards, if not properly handled in accordance with our servicing and handling standards and protocols, there could be a system failure and resulting liability. These claims could require us to incur significant costs to defend. Furthermore, any successful product liability claim could require us to pay a substantial monetary award. Moreover, a product liability claim could generate substantial negative publicity about our company and our Energy Servers, which could harm our brand, our business prospects, and our operating results. While we maintain product liability insurance, our insurance may not be sufficient to cover all potential product liability claims. Any lawsuit seeking significant monetary damages either in excess of our coverage or outside of our coverage may have a material adverse effect on our business and our financial condition.

Current or future litigation or administrative proceedings could have a material adverse effect on our business, our financial condition and our results of operations.

We have been and continue to be involved in legal proceedings, administrative proceedings, claims, and other litigation that arise in the ordinary course of business. Purchases of our products have also been the subject of litigation. For example, in 2011, an amendment to the Delaware Renewable Energy Portfolio Statute was enacted to permit the Delaware public service utility, Delmarva, to meet its renewable energy standards using energy generated by fuel cells manufactured and operated in Delaware. This statute required Delmarva to charge a tariff to its rate payers to pay for certain costs of providers of such energy generated by fuel cells. In 2012, plaintiffs FuelCell Energy Inc. and John A. Nichols filed suit against Delaware Governor Jack Markell and the Delaware Public Service Commission in the U.S. District Court for Delaware claiming that the 2011 amendment to the statute discriminated against interstate fuel cell providers and subsidized us for building a manufacturing facility in Delaware to manufacture fuel cells. We were not named as a party to this lawsuit and the litigation was ultimately settled. As another example, in July 2018, we received a Statement of Claim from two former executives of Advanced Equities, Inc. seeking to compel arbitration and alleging a breach of a confidential agreement from June 2014. This Statement of Claim sought, among other things, to void the indemnification and confidentiality provisions under the confidential agreement and to recover attorneys' fees and costs. The Statement of Claim was dismissed without prejudice on July 22, 2018. In addition, since our Energy Server is a new type of product in a nascent market, we have in the past needed and may in the future need to seek the amendment of existing regulations, or in some cases the creation of new regulations, in order to operate our business in some jurisdictions. Such regulatory processes may require public hearings concerning our business, which could expose us to subsequent litigation.

Unfavorable outcomes or developments relating to proceedings to which we are a party or transactions involving our products such as judgments for monetary damages, injunctions, or denial or revocation of permits, could have a material adverse effect on our business, our financial condition, and our results of operations. In addition, settlement of claims could adversely affect our financial condition and our results of operations.

Risks Relating to Our Intellectual Property

Our failure to protect our intellectual property rights may undermine our competitive position, and litigation to protect our intellectual property rights may be costly.

Although we have taken many protective measures to protect our trade secrets including agreements, limited access, segregation of knowledge, password protections, and other measures, policing unauthorized use of proprietary technology can be difficult and expensive. For example, many of our engineers reside in California where it is not legally permissible to prevent them from working for a competitor if and when one should exist. Also, litigation may be necessary to enforce our intellectual property rights, to protect our trade secrets, or to determine the validity and scope of the proprietary rights of others. Such litigation may result in our intellectual property rights being challenged, limited in scope, or declared invalid or unenforceable. We cannot be certain that the outcome of any litigation will be in our favor, and an adverse determination in any such litigation could impair our intellectual property rights, our business, our prospects, and our reputation.

We rely primarily on patent, trade secret, and trademark laws and non-disclosure, confidentiality, and other types of contractual restrictions to establish, maintain, and enforce our intellectual property and proprietary rights. However, our rights

under these laws and agreements afford us only limited protection and the actions we take to establish, maintain, and enforce our intellectual property rights may not be adequate. For example, our trade secrets and other confidential information could be disclosed in an unauthorized manner to third parties, our owned or licensed intellectual property rights could be challenged, invalidated, circumvented, infringed, or misappropriated or our intellectual property rights may not be sufficient to provide us with a competitive advantage, any of which could have a material adverse effect on our business, financial condition, or operating results. In addition, the laws of some countries do not protect proprietary rights as fully as do the laws of the United States. As a result, we may not be able to protect our proprietary rights adequately abroad.

Our patent applications may not result in issued patents, and our issued patents may not provide adequate protection, either of which may have a material adverse effect on our ability to prevent others from commercially exploiting products similar to ours.

We cannot be certain that our pending patent applications will result in issued patents or that any of our issued patents will afford protection against a competitor. The status of patents involves complex legal and factual questions, and the breadth of claims allowed is uncertain. As a result, we cannot be certain that the patent applications that we file will result in patents being issued or that our patents and any patents that may be issued to us in the future will afford protection against competitors with similar technology. In addition, patent applications filed in foreign countries are subject to laws, rules, and procedures that differ from those of the United States, and thus we cannot be certain that foreign patent applications related to issued U.S. patents will be issued in other regions. Furthermore, even if these patent applications are accepted and the associated patents issued, some foreign countries provide significantly less effective patent enforcement than in the United States.

In addition, patents issued to us may be infringed upon or designed around by others and others may obtain patents that we need to license or design around, either of which would increase costs and may adversely affect our business, our prospects, and our operating results.

We may need to defend ourselves against claims that we infringed, misappropriated, or otherwise violated the intellectual property rights of others, which may be time-consuming and would cause us to incur substantial costs.

Companies, organizations, or individuals, including our competitors, may hold or obtain patents, trademarks, or other proprietary rights that they may in the future believe are infringed by our products or services. Although we are not currently subject to any claims related to intellectual property, these companies holding patents or other intellectual property rights allegedly relating to our technologies could, in the future, make claims or bring suits alleging infringement, misappropriation, or other violations of such rights, or otherwise assert their rights and by seeking licenses or injunctions. Several of the proprietary components used in our Energy Servers have been subjected to infringement challenges in the past. We also generally indemnify our customers against claims that the products we supply infringe, misappropriate, or otherwise violate third party intellectual property rights, and we therefore may be required to defend our customers against such claims. If a claim is successfully brought in the future and we or our products are determined to have infringed, misappropriated, or otherwise violated a third party's intellectual property rights, we may be required to do one or more of the following:

- cease selling or using our products that incorporate the challenged intellectual property;
- pay substantial damages (including treble damages and attorneys' fees if our infringement is determined to be willful);
- obtain a license from the holder of the intellectual property right, which may not be available on reasonable terms or at all; or
- redesign our products or means of production, which may not be possible or cost-effective.

Any of the foregoing could adversely affect our business, prospects, operating results, and financial condition. In addition, any litigation or claims, whether or not valid, could harm our reputation, result in substantial costs and divert resources and management attention.

We also license technology from third parties and incorporate components supplied by third parties into our products. We may face claims that our use of such technology or components infringes or otherwise violates the rights of others, which would subject us to the risks described above. We may seek indemnification from our licensors or suppliers under our contracts with them, but our rights to indemnification or our suppliers' resources may be unavailable or insufficient to cover our costs and losses.

Risks Relating to Our Financial Condition and Operating Results

We have incurred significant losses in the past and we may not be profitable for the foreseeable future.

Since our inception in 2001, we have incurred significant net losses and have used significant cash in our business. As of December 31, 2018 , we had an accumulated deficit of $2.6 billion . We expect to continue to expand our operations, including by investing in manufacturing, sales and marketing, research and development, staffing systems, and infrastructure to support our growth. We anticipate that we will incur net losses for the foreseeable future. Our ability to achieve profitability in the future will depend on a number of factors, including:

- growing our sales volume;
- increasing sales to existing customers and attracting new customers;
- attracting and retaining financing partners who are willing to provide financing for sales on a timely basis and with attractive terms;
- continuing to improve the useful life of our fuel cell technology and reducing our warranty servicing costs;
- reducing the cost of producing our Energy Servers;
- improving the efficiency and predictability of our installation process;
- improving the effectiveness of our sales and marketing activities;
- attracting and retaining key talent in a competitive marketplace; and
- the amount of stock based compensation recognized in the period.

Even if we do achieve profitability, we may be unable to sustain or increase our profitability in the future.

Our financial condition and results of operations and other key metrics are likely to fluctuate on a quarterly basis in future periods, which could cause our results for a particular period to fall below expectations, resulting in a severe decline in the price of our Class A common stock.

Our financial condition and results of operations and other key metrics have fluctuated significantly in the past and may continue to fluctuate in the future due to a variety of factors, many of which are beyond our control. For example, the amount of product revenue we recognize in a given period is materially dependent on the volume of installations of our Energy Servers in that period and the type of financing used by the customer.

In addition to the other risks described herein, the following factors could also cause our financial condition and results of operations to fluctuate on a quarterly basis:

- the timing of installations, which may depend on many factors such as availability of inventory, product quality or performance issues, or local permitting requirements, utility requirements, environmental, health, and safety requirements, weather, and customer facility construction schedules;
- size of particular installations and number of sites involved in any particular quarter;
- the mix in the type of purchase or financing options used by customers in a period, and the rates of return required by financing parties in such period;
- whether we are able to structure our sales agreements in a manner that would allow for the product and installation revenue to be recognized up front at acceptance;
- delays or cancellations of Energy Server installations;
- fluctuations in our service costs, particularly due to unaccrued costs of servicing and maintaining Energy Servers;
- weaker than anticipated demand for our Energy Servers due to changes in government incentives and policies or due to other conditions;
- fluctuations in our research and development expense, including periodic increases associated with the pre-production qualification of additional tools as we expand our production capacity;
- interruptions in our supply chain;
- the length of the sales and installation cycle for a particular customer;
- the timing and level of additional purchases by existing customers;
- unanticipated expenses or installation delays associated with changes in governmental regulations, permitting requirements by local authorities at particular sites, utility requirements and environmental, health, and safety requirements;
- disruptions in our sales, production, service or other business activities resulting from disagreements with our labor force or our inability to attract and retain qualified personnel; and
- unanticipated changes in federal, state, local, or foreign government incentive programs available for us, our customers, and tax equity financing parties.

Fluctuations in our operating results and cash flow could, among other things, give rise to short-term liquidity issues. In addition, our revenue, key operating metrics, and other operating results in future quarters may fall short of the expectations of investors and financial analysts, which could have an adverse effect on the price of our Class A common stock.

If we fail to manage our growth effectively, our business and operating results may suffer.

Our current growth and future growth plans may make it difficult for us to efficiently operate our business, challenging us to effectively manage our capital expenditures and control our costs while we expand our operations to increase our revenue. If we experience a significant growth in orders without improvements in automation and efficiency, we may need additional manufacturing capacity and we and some of our suppliers may need additional and capital intensive equipment. Any growth in manufacturing must include a scaling of quality control as the increase in production increases the possible impact of manufacturing defects. In addition, any growth in the volume of sales of our Energy Servers may outpace our ability to engage sufficient and experienced personnel to manage the higher number of installations and to engage contractors to complete installations on a timely basis and in accordance with our expectations and standards. Any failure to manage our growth effectively could materially and adversely affect our business, our prospects, our operating results, and our financial condition. Our future operating results depend to a large extent on our ability to manage this expansion and growth successfully.

If we discover a material weakness in our internal control over financial reporting or otherwise fail to maintain effective internal control over financial reporting, our ability to report our financial results on a timely and an accurate basis may adversely affect the market price of our Class A common stock.

The Sarbanes-Oxley Act of 2002 ("Sarbanes-Oxley Act") requires, among other things, that public companies evaluate the effectiveness of their internal control over financial reporting and disclosure controls and procedures. As a recently public company and as an emerging growth company, we elected to delay adopting the requirements of the Sarbanes-Oxley Act as is our option under the Sarbanes-Oxley Act. Although we did not discover any material weaknesses in internal control over financial reporting at December 31, 2018 , subsequent testing by us or our independent registered public accounting firm, which has not yet performed an audit of our internal control over financial reporting, may reveal deficiencies in our internal control over financial reporting that are deemed to be material weaknesses. To comply with Section 404A, we may incur substantial cost, expend significant management time on compliance-related issues, and hire additional accounting, financial, and internal audit staff with appropriate public company experience and technical accounting knowledge. Moreover, if we are not able to comply with the requirements of Section 404A in a timely manner or if we or our independent registered public accounting firm identify deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, we could be subject to sanctions or investigations by the Securities and Exchange Commission ("SEC") or other regulatory authorities, which would require additional financial and management resources. Any failure to maintain effective disclosure controls and procedures or internal control over financial reporting could have a material adverse effect on our business and operating results and cause a decline in the price of our Class A common stock. For further discussion on Section 404A compliance, see our Risk Factor: *We are an "emerging growth company," and we cannot be certain if the reduced disclosure requirements applicable to emerging growth companies will make our Class A common stock less attractive to investors and may make it more difficult to compare our performance with other public companies* .

Our ability to use our deferred tax assets to offset future taxable income may be subject to limitations that could subject our business to higher tax liability.

We may be limited in the portion of net operating loss carryforwards that we can use in the future to offset taxable income for U.S. federal and state income tax purposes. Our net operating loss carryforwards ("NOLs") will expire, if unused, beginning in 2022 and 2028, respectively. A lack of future taxable income would adversely affect our ability to utilize these NOLs. In addition, under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its NOLs to offset future taxable income. Changes in our stock ownership as well as other changes that may be outside of our control could result in ownership changes under Section 382 of the Code, which could cause our NOLs to be subject to certain limitations. Our NOLs may also be impaired under similar provisions of state law. Our deferred tax assets, which are currently fully reserved with a valuation allowance, may expire unutilized or underutilized, which could prevent us from offsetting future taxable income.

Risks Relating to Our Liquidity

We must maintain customer confidence in our liquidity and long-term business prospects in order to grow our business.

Currently, we are the only provider able to fully support and maintain our Energy Servers. If potential customers believe we do not have sufficient capital or liquidity to operate our business over the long-term or that we will be unable to maintain their Energy Servers and provide satisfactory support, customers may be less likely to purchase or lease our products, particularly in light of the significant financial commitment required. In addition, financing sources may be unwilling to provide financing on reasonable terms. Similarly, suppliers, financing partners, and other third parties may be less likely to invest time and resources in developing business relationships with us if they have concerns about the success of our business.

Accordingly, in order to grow our business, we must maintain confidence in our liquidity and long-term business prospects among customers, suppliers, financing partners, and other parties. This may be particularly complicated by factors such as:

- our limited operating history at a large scale;
- our lack of profitability;
- unfamiliarity with or uncertainty about our Energy Servers and the overall perception of the distributed generation market;
- prices for electricity or natural gas in particular markets;
- competition from alternate sources of energy;
- warranty or unanticipated service issues we may experience;
- the environmental consciousness and perceived value of environmental programs to our customers;
- the size of our expansion plans in comparison to our existing capital base and the scope and history of operations;
- the availability and amount of tax incentives, credits, subsidies or other incentive programs; and
- the other factors set forth in this “Risk Factors” section.

Several of these factors are largely outside our control, and any negative perceptions about our liquidity or long-term business prospects, even if unfounded, would likely harm our business.

Our substantial indebtedness, and restrictions imposed by the agreements governing our, and our PPA Entities’, outstanding indebtedness, may limit our financial and operating activities and may adversely affect our ability to incur additional debt to fund future needs .

As of December 31, 2018 , we and our subsidiaries had approximately $741.3 million of total consolidated indebtedness, of which an aggregate of $396.8 million represented indebtedness that is recourse to us. Of this $741.3 million debt, $34.7 million represented debt under our 5% Notes, $3.2 million represented operating debt, $344.5 million represented debt of our PPA Entities, $263.3 million represented debt under our 6% Notes and $95.6 million represented debt under our 10% Notes. The agreements governing our and our PPA Entities’ outstanding indebtedness contain, and other future debt agreements may contain, covenants imposing operating and financial restrictions on our business that limit our flexibility including, among other things, to:

- borrow money;
- pay dividends or make other distributions;
- incur liens;
- make asset dispositions;
- make loans or investments;
- issue or sell share capital of our subsidiaries;
- issue guaranties;
- enter into transactions with affiliates;
- merge, consolidate or sell, lease or transfer all or substantially all of our assets;

- require us to dedicate a substantial portion of cash flow from operations to the payment of principal and interest on indebtedness, thereby reducing the funds available for other purposes such as working capital and capital expenditures;
- make it more difficult for us to satisfy and comply with our obligations with respect to our indebtedness;
- subject us to increased sensitivity to interest rate increases;
- make us more vulnerable to economic downturns, adverse industry conditions, or catastrophic external events;
- limit our ability to withstand competitive pressures;
- limit our ability to invest in new business subsidiaries that are not PPA Entity-related;
- reduce our flexibility in planning for or responding to changing business, industry, and economic conditions; and/or
- place us at a competitive disadvantage to competitors that have relatively less debt than we have.

Our debt agreements and our PPA Entities' debt agreements require the maintenance of financial ratios or the satisfaction of financial tests such as debt service coverage ratios and consolidated leverage ratios. Our and our PPA Entities' ability to meet these financial ratios and tests may be affected by events beyond our control and, as a result, we cannot assure you that we will be able to meet these ratios and tests. Upon the occurrence of events such as a change in control of our company, significant asset sales or mergers or similar transactions, the liquidation or dissolution of our company or the cessation of our stock exchange listing, holders of our 6% Notes have the right to cause us to repurchase for cash any or all of such outstanding notes at a repurchase price in cash equal to 100% of the principal amount thereof, plus accrued and unpaid interest thereon. We cannot provide assurance that we would have sufficient liquidity to repurchase such notes. Furthermore, our financing and debt agreements, such as our 6% Notes and our 10% Notes, contain events of default. If an event of default were to occur, the trustee or the lenders could, among other things, terminate their commitments and declare outstanding amounts due and payable and our cash may become restricted. We cannot provide assurance that we would have sufficient liquidity to repay or refinance our indebtedness if such amounts were accelerated upon an event of default. Borrowings under other debt instruments that contain cross-acceleration or cross-default provisions may, as a result, be accelerated and become due and payable as a consequence. We may be unable to pay these debts in such circumstances. If we were unable to repay those amounts, lenders could proceed against the collateral granted to them to secure repayment of those amounts. We cannot assure you that the collateral will be sufficient to repay in full those amounts. We cannot provide assurance that the operating and financial restrictions and covenants in these agreements will not adversely affect our ability to finance our future operations or capital needs, or our ability to engage in other business activities that may be in our interest or our ability to react to adverse market developments.

If our PPA Entities default on their obligations under non-recourse financing agreements, we may decide to make payments to prevent such PPA Entities' creditors from foreclosing on the relevant collateral, as such a foreclosure would result in our losing our ownership interest in the PPA Entity or in some or all of its assets, or a material part of our assets, as the case may be. To satisfy these obligations, we may be required to use amounts distributed by our other PPA Entities as well as other sources of available cash, thereby reducing the cash available to develop our projects and to our operations. The loss of a material part of our assets or our ownership interest in one or more of our PPA Entities or some or all of their assets, or any use of our resources to support our obligations or the obligations of our PPA Entities, could have a material adverse effect on our business, our financial condition, and our results of operations.

As of December 31, 2018 , we and our subsidiaries had approximately $ 741.3 million of total consolidated indebtedness, including $ 29.8 million in short-term debt and $ 711.4 million in long-term debt. In addition, our 10% Notes contain restrictions on our ability to issue additional debt and both the 6% Notes and 10% Notes limit our ability to provide collateral for any additional debt. Given our current level of indebtedness, the restrictions on additional indebtedness contained in the 10% Notes and the fact that most of our assets serve as collateral to secure existing debt, it may be difficult for us to secure additional debt financing at an attractive cost, which may in turn impact our ability to expand our operations and our product development activities and to remain competitive in the market.

In addition, our substantial level of indebtedness could limit our ability to obtain required additional financing on acceptable terms or at all for working capital, capital expenditures, and general corporate purposes. Any of these risks could impact our ability to fund our operations or limit our ability to expand our business, which could have a material adverse effect on our business, our financial condition, our liquidity, and our results of operations. Our liquidity needs could vary significantly and may be affected by general economic conditions, industry trends, performance, and many other factors not within our control.

We may not be able to generate sufficient cash to meet our debt service obligations.

Our ability to generate sufficient cash to make scheduled payments on our debt obligations will depend on our future financial performance, which will be affected by a range of economic, competitive, and business factors, many of which are outside of our control.

In addition, we conduct a significant volume of our operations through, and receive equity allocations from, our PPA Entities, which contribute to our cash flow. These PPA Entities are separate and distinct legal entities, do not guarantee our debt obligations, and will have no obligation, contingent or otherwise, to pay amounts due under our debt obligations or to make any funds available to pay those amounts, whether by dividend, distribution, loan, or other payments. Distributions by the PPA Entities to us are precluded under these arrangements if there is an event of default or if financial covenants, such as maintenance of applicable debt service coverage ratios, are not met even if there is not otherwise an event of default. Furthermore, under the terms of our equity financing arrangements for PPA Company II, PPA Company IIIa and PPA Company IIIb, substantially all of the cash flows generated from these PPA Entities in excess of debt service obligations are distributed to Equity Investors until the investors achieve a targeted internal rate of return or until a fixed date in the future ("Flip Date"), which is expected to be after a period of five or more years, after which time we will receive substantially all of the remaining income (loss), tax, and tax allocation attributable to the long-term customer payments and other incentives. In the case of PPA Company IV and PPA Company V, Equity Investors receive 90% of all cash flows generated in excess of its debt service obligations and other expenses for the duration of the applicable PPA Entity without any Flip Date or other time- or return-based adjustment. Moreover, even after the occurrence of the Flip Date for the PPA Entities, we do not anticipate distributions to be material enough independently to support our ongoing cash needs, and, therefore, we will still need to generate significant cash from our product sales. It is possible that the PPA Entities may not contribute significant cash to us even if we are in compliance with the financial covenants under the project debt incurred by the PPA Entities.

Future borrowings by our PPA Entities may contain restrictions or prohibitions on the payment of dividends to us. The ability of our PPA Entities to make such payments to us may be subject to applicable laws including surplus, solvency, and other limits imposed on the ability of companies to pay dividends.

If we do not generate sufficient cash to satisfy our debt obligations, including interest payments, or if we are unable to satisfy the requirement for the payment of principal at maturity or other payments that may be required from time to time under the terms of our debt instruments, we may have to undertake alternative financing plans such as refinancing or restructuring our debt, selling assets, reducing or delaying capital investments, or seeking to raise additional capital. We cannot provide assurance that any refinancing would be possible, that any assets could be sold, or, if sold, of the timing of the sales and the amount of proceeds realized from those sales, that additional financing could be obtained on acceptable terms, if at all, or that additional financing would be permitted under the terms of our various debt instruments then in effect. Furthermore, the ability to refinance indebtedness would depend upon the condition of the finance and credit markets at the time which have in the past been, and may in the future be, volatile. Our inability to generate sufficient cash to satisfy our debt obligations or to refinance our obligations on commercially reasonable terms or on a timely basis would have an adverse effect on our business, our results of operations and our financial condition.

Under some circumstances, we may be required to or elect to make additional payments to our PPA Entities or the Power Purchase Agreement Program Equity Investors.

Our six PPA Entities are structured in a manner such that other than the amount of any equity investment we have made, we do not have any further primary liability for the debts or other obligations of the PPA Entities. However, we are required to guarantee the obligations of our wholly-owned subsidiary which invests alongside other investors in the PPA Entities. These obligations typically include the capital contribution obligations of such subsidiary to the PPA Entity as well as the representations and warranties made by and indemnification obligations of such subsidiary to Equity Investors in the applicable PPA Entity. As a result, we may be obligated to make payments on behalf of our wholly-owned subsidiary to Equity Investors in the PPA Entities in the event of a breach of these representations, warranties or covenants.

All of our PPA Entities that operate Energy Servers for end customers have significant restrictions on their ability to incur increased operating costs, or could face events of default under debt or other investment agreements if end customers are not able to meet their payment obligations under PPAs or if Energy Servers are not deployed in accordance with the project's schedule. For example, under PPA Company IIIa's credit agreement, on or before February 19, 2019 PPA Company IIIa was obligated to offer its lenders an insurance policy or performance bond to mitigate the risk should we will fail to perform our obligations under our operation and maintenance obligations to PPA Company IIIa. Upon receipt of such offer, the lenders may elect to require PPA Company IIIa to obtain such insurance policy or performance bond, at PPA Company IIIa's expense, or elect to require PPA Company IIIa to prepay all remaining amounts owed under PPA Company IIIa's project debt. PPA Company IIIa has offered its lenders such an insurance policy and is awaiting the lenders' decision. If our PPA Entities

experience unexpected, increased costs such as insurance costs, interest expense or taxes or as a result of the acceleration of repayment of outstanding indebtedness, or if end customers are unable or unwilling to continue to purchase power under their PPAs, there could be insufficient cash generated from the project to meet the debt service obligations of the PPA Entity or to meet any targeted rates of return of Equity Investors. If a PPA Entity fails to make required debt service payments, this could constitute an event of default and entitle the lender to foreclose on the collateral securing the debt or could trigger other payment obligations of the PPA Entity. To avoid this, we could choose to contribute additional capital to the applicable PPA Entity to enable such PPA Entity to make payments to avoid an event of default, which could adversely affect our business or our financial condition. Additionally, under PPA Company II's credit agreement, PPA Company II is obligated to offer to repay all outstanding debt in the event that we obtain an investment grade credit rating unless we provide a guarantee of the debt obligations of the PPA Company II. Upon receipt of such offer, the lenders may elect to require PPA Company II to prepay all remaining amounts owed under PPA Company II's project debt. Under PPA Company IV's note purchase agreement, PPA Company IV is obligated to offer to repay all outstanding debt in the event that at any time we fail to own (directly or indirectly) at least 50.1% of the equity interest of PPA Company IV not owned by the Equity Investor(s). Upon receipt of such offer, the lenders may waive that obligation or elect to require PPA Company IV to prepay all remaining amounts owed under PPA Company IV's project debt. The obligations under PPA Company II and IV have not been triggered as of December 31, 2018 and 2017.

Risks Relating to Our Operations

We may have conflicts of interest with our PPA Entities.

In each of our PPA Entities, we act as the managing member and are responsible for the day-to-day administration of the project. However, we are also a major service provider for each PPA Entity in its capacity as the operator of the Energy Servers under an operations and maintenance agreement. Because we are both the administrator and the manager of our PPA Entities, as well as a major service provider, we face a potential conflict of interest in that we may be obligated to enforce contractual rights that a PPA Entity has against us in our capacity as a service provider. By way of example, the PPA Entity may have a right to payment from us under a warranty provided under the applicable operations and maintenance agreement, and we may be financially motivated to avoid or delay this liability by failing to promptly enforce this right on behalf of the PPA Entity. While we do not believe that we had any conflicts of interest with our PPA Entities as of December 31, 2018 , conflicts of interest may arise in the future which cannot be foreseen at this time. In the event that prospective future Equity Investors and debt financing partners perceive there to exist any such conflicts, it could harm our ability to procure financing for our PPA Entities in the future, which could have a material adverse effect on our business.

If we are unable to attract and retain key employees and hire qualified management, technical, engineering, and sales personnel, our ability to compete and successfully grow our business could be harmed.

We believe that our success and our ability to reach our strategic objectives are highly dependent on the contributions of our key management, technical, engineering, and sales personnel. The loss of the services of any of our key employees could disrupt our operations, delay the development and introduction of our products and services and negatively impact our business, prospects, and operating results. In particular, we are highly dependent on the services of Dr. Sridhar, our Chairman and President and Chief Executive Officer, and other key employees. None of our key employees is bound by an employment agreement for any specific term. We cannot assure you that we will be able to successfully attract and retain senior leadership necessary to grow our business. Furthermore, there is increasing competition for talented individuals in our field, and competition for qualified personnel is especially intense in the San Francisco Bay Area where our principal offices are located. Our failure to attract and retain our executive officers and other key management, technical, engineering, and sales personnel could adversely impact our business, our prospects, our financial condition, and our operating results. In addition, we do not have "key person" life insurance policies covering any of our officers or other key employees.

A breach or failure of our networks or computer or data management systems could damage our operations and our reputation.

Our business is dependent on the security and efficacy of our networks and computer and data management systems. For example, all of our Energy Servers are connected to and controlled and monitored by our centralized remote monitoring service, and we rely on our internal computer networks for many of the systems we use to operate our business generally. Although we take protective measures and endeavor to modify them as circumstances warrant, the security of our infrastructure, including the network that connects our Energy Servers to our remote monitoring service, may be vulnerable to breaches, unauthorized access, misuse, computer viruses, or other malicious code and cyber-attacks that could have a material adverse impact on our business and our Energy Servers in the field. A breach or failure of our networks or computer or data management systems due to intentional actions such as cyber-attacks, negligence, or other reasons could seriously disrupt our operations or could affect

our ability to control or to assess the performance in the field of our Energy Servers and could result in disruption to our business and potentially legal liability. In addition, if certain of our IT systems failed, our production line might be affected, which could impact our business and operating results. These events, in addition to impacting our financial results, could result in significant costs or reputational consequences.

Our headquarters and other facilities are located in an active earthquake zone, and an earthquake or other types of natural disasters or resource shortages could disrupt and harm our results of operations .

We conduct a majority of our operations in the San Francisco Bay area in an active earthquake zone, and certain of our facilities are located within known flood plains. The occurrence of a natural disaster such as an earthquake, drought, flood, localized extended outages of critical utilities or transportation systems, or any critical resource shortages could cause a significant interruption in our business, damage or destroy our facilities, our manufacturing equipment, or our inventory, and cause us to incur significant costs, any of which could harm our business, our financial condition, and our results of operations. The insurance we maintain against fires, earthquakes and other natural disasters may not be adequate to cover our losses in any particular case.

Expanding operations internationally could expose us to risks .

Although we currently primarily operate in the United States, we will seek to expand our business internationally. We currently have operations in Japan, China, India, and the Republic of Korea. Managing any international expansion will require additional resources and controls including additional manufacturing and assembly facilities. Any expansion internationally could subject our business to risks associated with international operations, including:

- conformity with applicable business customs, including translation into foreign languages and associated expenses;
- lack of availability of government incentives and subsidies;
- challenges in arranging, and availability of, financing for our customers;
- potential changes to our established business model;
- cost of alternative power sources, which could be meaningfully lower outside the United States;
- availability and cost of natural gas;
- difficulties in staffing and managing foreign operations in an environment of diverse culture, laws, and customers, and the increased travel, infrastructure, and legal and compliance costs associated with international operations;
- installation challenges which we have not encountered before which may require the development of a unique model for each country;
- compliance with multiple, potentially conflicting and changing governmental laws, regulations, and permitting processes including environmental, banking, employment, tax, privacy, and data protection laws and regulations such as the EU Data Privacy Directive;
- compliance with U.S. and foreign anti-bribery laws including the Foreign Corrupt Practices Act and the U.K. Anti-Bribery Act;
- difficulties in collecting payments in foreign currencies and associated foreign currency exposure;
- restrictions on repatriation of earnings;
- compliance with potentially conflicting and changing laws of taxing jurisdictions where we conduct business and compliance with applicable U.S. tax laws as they relate to international operations, the complexity and adverse consequences of such tax laws, and potentially adverse tax consequences due to changes in such tax laws; and
- regional economic and political conditions.

As a result of these risks, any potential future international expansion efforts that we may undertake may not be successful.

We are an “emerging growth company,” and we cannot be certain if the reduced disclosure requirements applicable to emerging growth companies will make our Class A common stock less attractive to investors and may make it more difficult to compare our performance with other public companies.

We are an emerging growth company ("EGC") as defined in the U.S. legislation Jumpstart Our Business Startups Act of 2012 (the "JOBS Act"), and we intend to take advantage of certain exemptions from various reporting requirements that are

applicable to other public companies that are not EGC, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We may take advantage of these exemptions for so long as we are an EGC, which could be until December 31, 2023, the last day of the fiscal year following the fifth anniversary of our IPO. We cannot predict if investors will find our Class A common stock less attractive because we rely on these exemptions. If some investors find our Class A common stock less attractive as a result, there may be a less active trading market for our Class A common stock, and our stock price may be more volatile.

An EGC may elect to provide financial statements in conformance with the U.S. GAAP requirement for transition periods to comply with new or revised accounting standards. With our not making this election, Section 102(b)(2) of the JOBS Act allows us to delay our adoption of new or revised accounting standards until those standards apply to private companies. As a result, our financial statements may not be comparable to companies that comply with public company revised accounting standards effective dates.

Risks Relating to Ownership of Our Common Stock

The stock price of our Class A common stock has been and may continue to be volatile.

The market price of our Class A common stock has been and may continue to be volatile. In addition to factors discussed in this Annual Report on Form 10-K, the market price of our Class A common stock may fluctuate significantly in response to numerous factors, many of which are beyond our control, including:

- overall performance of the equity markets;
- actual or anticipated fluctuations in our revenue and other operating results;
- changes in the financial projections we may provide to the public or our failure to meet these projections;
- failure of securities analysts to initiate or maintain coverage of us, changes in financial estimates by any securities analysts who follow our company or our failure to meet these estimates or the expectations of investors;
- recruitment or departure of key personnel;
- the economy as a whole and market conditions in our industry;
- new laws, regulations, subsidies, or credits or new interpretations of them applicable to our business;
- negative publicity related to problems in our manufacturing or the real or perceived quality of our products;
- rumors and market speculation involving us or other companies in our industry;
- announcements by us or our competitors of significant technical innovations, acquisitions, strategic partnerships, or capital commitments;
- lawsuits threatened or filed against us;
- other events or factors including those resulting from war, incidents of terrorism or responses to these events;
- the expiration of contractual lock-up or market standoff agreements; and
- sales or anticipated sales of shares of our Class A common stock by us or our stockholders.

In addition, the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. Stock prices of many companies have fluctuated in a manner unrelated or disproportionate to the operating performance of those companies. In the past, stockholders have instituted securities class action litigation following periods of market volatility. If we were to become involved in securities litigation, it could subject us to substantial costs, divert resources and the attention of management from our business, and adversely affect our business.

Sales of substantial amounts of our Class A common stock in the public markets, or the perception that they might occur, could cause the market price of our Class A common stock to decline.

The market price of our Class A common stock could decline as a result of sales of a large number of shares of our Class A common stock in the public market as and when our Class B common stock converts to Class A common stock. The perception that these sales might occur may also cause the market price of our common stock to decline. We had a total of

20,868,286 shares of our Class A common stock and 88,552,897 shares of our Class B common stock outstanding as of December 31, 2018 . The lock up for our Class B shares expired on January 21, 2019 and these shares are now freely tradeable once converted into Class A shares, except for any shares purchased by our “affiliates” as defined in Rule 144 under the Securities Act of 1933, as amended ("Securities Act").

Further, as of December 31, 2018, we had an aggregate of $ 296.2 million in convertible debt under which the outstanding principal and interest may be converted, at the option of the holders, into an aggregate of 26.3 million shares of Class B common stock. Upon conversion into Class A common stock, these shares are freely tradable, except to the extent these shares are held by our “affiliates” as defined in Rule 144 under the Securities Act.

In addition, as of December 31, 2018 , we had options and RSUs outstanding that, if fully exercised or settled, would result in the issuance of 26,154,530 shares of Class B common stock. We have filed a registration statement on Form S-8 to register shares reserved for future issuance under our equity compensation plans. Subject to the satisfaction of applicable vesting requirements the shares issued upon exercise of outstanding stock options or settlement of outstanding RSUs will be available for immediate resale in the United States in the open market.

Moreover, certain holders of our common stock have rights, subject to some conditions, to require us to file registration statements for the public resale of such shares or to include such shares in registration statements that we may file for us or other stockholders.

The dual class structure of our common stock and the voting agreements among certain stockholders have the effect of concentrating voting control of our Company with KR Sridhar, our Chairman and Chief Executive Officer, and also with those stockholders who held our capital stock prior to the completion of our IPO including our directors, executive officers and significant stockholders, which limits or precludes your ability to influence corporate matters including the election of directors and the approval of any change of control transaction, and may adversely affect the trading price of our Class A common stock.

Our Class B common stock has ten votes per share, and our Class A common stock has one vote per share. As of December 31, 2018 and after giving effect to the voting agreements between KR Sridhar, our Chairman and Chief Executive Officer, and certain holders of Class B common stock, our directors, executive officers, significant stockholders of our common stock, and their respective affiliates collectively held a substantial majority of the voting power of our capital stock. Because of the ten-to-one voting ratio between our Class B and Class A common stock, the holders of our Class B common stock collectively will continue to control a majority of the combined voting power of our common stock and therefore are able to control all matters submitted to our stockholders for approval until the earliest to occur of (i) immediately prior to the close of business on July 27, 2023, (ii) immediately prior to the close of business on the date on which the outstanding shares of Class B common stock represent less than five percent (5%) of the aggregate number of shares of Class A common stock and Class B common stock then outstanding, (iii) the date and time or the occurrence of an event specified in a written conversion election delivered by KR Sridhar to our Secretary or Chairman of the Board to so convert all shares of Class B common stock, or (iv) immediately following the date of the death of KR Sridhar. This concentrated control limits or precludes Class A stockholders’ ability to influence corporate matters while the dual class structure remains in effect, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval. In addition, this may prevent or discourage unsolicited acquisition proposals or offers for our capital stock that Class A stockholders may feel are in their best interest as one of our stockholders.

Future transfers by holders of Class B common stock will generally result in those shares converting to Class A common stock, subject to limited exceptions such as certain transfers effected for estate planning purposes. The conversion of Class B common stock to Class A common stock will have the effect, over time, of increasing the relative voting power of those remaining holders of Class B common stock who retain their shares in the long-term.

The conversion of the 6% Convertible Promissory Note could result in a significant stockholder with substantial voting control.

The holders of the 6% Convertible Promissory Notes have the options to convert the outstanding principal and interest under the 6% Convertible Promissory Note to Class B common stock at conversion price of $ 11.25 at any time after the IPO and prior to maturity of the 6% Convertible Promissory Note in December 2020. As of December 31, 2018, an aggregate of 21,321,100 shares of Class B common stock is issuable to the Canada Pension Plan Investment Board (“CPPIB”) upon the conversion of the outstanding principal and interest under the 6% Convertible Promissory Note. This, along with 312,575 shares of Class B common stock CPPIB which CPPIB acquired from the exercise of a warrant at IPO, would result in CPPIB having approximately 23.5% of the total voting power with respect to all shares of our Class A and Class B common stock,

voting as a single class and would provide CPPIB significant influence over matters presented to the stockholders for approval and may result in voting decisions by CPPIB which are not in the best interests of our stockholders generally.

The dual class structure of our common stock may adversely affect the trading market for our Class A common stock.

S&P Dow Jones and FTSE Russell have recently announced changes to their eligibility criteria for inclusion of shares of public companies on certain indices, including the S&P 500, namely, to exclude companies with multiple classes of shares of common stock from being added to such indices. In addition, several shareholder advisory firms have announced their opposition to the use of multiple class structures. As a result, the dual class structure of our common stock may prevent the inclusion of our Class A common stock in such indices and may cause shareholder advisory firms to publish negative commentary about our corporate governance practices or otherwise seek to cause us to change our capital structure. Any such exclusion from indices could result in a less active trading market for our Class A common stock. Any actions or publications by shareholder advisory firms critical of our corporate governance practices or capital structure could also adversely affect the value of our Class A common stock.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, the market price of our Class A common stock and trading volume could decline.

The market price for our Class A common stock depends in part on the research and reports that securities or industry analysts publish about us or our business. If industry analysts cease coverage of us, the trading price for our Class A common stock would be negatively affected. In addition, if one or more of the analysts who cover us downgrade our Class A common stock or publish inaccurate or unfavorable research about our business, our Class A common stock price would likely decline. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, demand for our Class A common stock could decrease, which might cause our Class A common stock price and trading volume to decline.

We do not intend to pay dividends for the foreseeable future.

We have never declared or paid any cash dividends on our capital stock and do not intend to pay any cash dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the development of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their Class A common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

Provisions in our charter documents and under Delaware law could make an acquisition of our company more difficult, may limit attempts by our stockholders to replace or remove our current management, may limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees, and may limit the market price of our Class A common stock.

Provisions in our restated certificate of incorporation and amended and restated bylaws may have the effect of delaying or preventing a change of control or changes in our management. Our restated certificate of incorporation and amended and restated bylaws include provisions that:

- our board of directors will be classified into three classes of directors with staggered three year terms;
- permit the board of directors to establish the number of directors and fill any vacancies and newly created directorships;
- require super-majority voting to amend some provisions in our restated certificate of incorporation and amended and restated bylaws;
- authorize the issuance of "blank check" preferred stock that our board of directors could use to implement a stockholder rights plan;
- only the chairman of our board of directors, our chief executive officer, or a majority of our board of directors will be authorized to call a special meeting of stockholders;
- prohibit stockholder action by written consent, which thereby requires all stockholder actions be taken at a meeting of our stockholders;
- a dual class common stock structure in which holders of our Class B common stock may have the ability to control the outcome of matters requiring stockholder approval even if they own significantly less than a majority of the outstanding shares of our common stock, including the election of directors and significant corporate transactions such as a merger or other sale of our company or substantially all of its assets;
- the board of directors is expressly authorized to make, alter, or repeal our bylaws; and
- establish advance notice requirements for nominations for election to our board of directors or for proposing matters that can be acted upon by stockholders at annual stockholder meetings.

In addition, our restated certificate of incorporation and our amended and restated bylaws provide that the Court of Chancery of the State of Delaware will be the exclusive forum for: any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our restated certificate of incorporation or our amended and restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. Our restated certificate of incorporation and our amended and restated bylaws provide that unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. These choice of forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, or other employees, which thereby may discourage lawsuits with respect to such claims. Alternatively, if a court were to find the choice of forum provision contained in our restated certificate of incorporation and our amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business, our operating results, and our financial condition.

On December 19, 2018, the Delaware Chancery Court issued an opinion that invalidated provisions in a Delaware corporation's certificate of incorporation or bylaws that purport to limit to federal court the forum in which a stockholder could bring a claim under the Securities Act. The Chancery Court held that a Delaware corporation can only use its constitutive documents to bind a plaintiff to a particular forum where the claim involves rights or relationships established by or under Delaware's corporate law. This case may be appealed to the Delaware Supreme Court. If a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business and financial condition.

Moreover, Section 203 of the Delaware General Corporation Law may discourage, delay, or prevent a change in control of our company. Section 203 imposes certain restrictions on mergers, business combinations, and other transactions between us and holders of 15% or more of our common stock.

ITEM 1B - UNRESOLVED STAFF COMMENTS

None.

ITEM 2 - PROPERTIES

Our corporate headquarters is located in San Jose, California upon our entering into a new lease for 181,000 square feet of multi-floor office space which began in January 2019 and expires in December 2028. Our headquarters is used for administration, research and development and sales and marketing. Our lease for our former corporate offices in Sunnyvale, California expired in December 2018.

Our primary manufacturing locations for the fuel cells and Energy Servers assembly are in Newark, Delaware and Sunnyvale, California. The 225,700 square foot manufacturing facility that we own in Newark is the first purpose-built Bloom Energy manufacturing center and was designed specifically for copy-exact duplication as we expand, which we believe will help us scale more efficiently. Additionally, we lease various manufacturing facilities in Sunnyvale and Mountain View, California. Our current leases for our Sunnyvale manufacturing facilities, entered into in April 2005, expires in 2020, and for our manufacturing facility in Mountain View, entered into in December 2011, expires in December 2020. Our California facilities comprise approximately 487,228 square feet of manufacturing space.

We lease additional office space as field offices in the United States and around the world including in India, the Republic of Korea, China and Taiwan. We believe our office space and our manufacturing facilities are adequate to support our business for at least the next twelve months.

ITEM 3 - LEGAL PROCEEDINGS

For a discussion of legal proceedings, see "Legal Matters" under Note 13 - *Commitments and Contingencies* , in the notes to our consolidated financial statements.

We are, and from time to time we may become, involved in legal proceedings or be subject to claims arising in the ordinary course of our business. We are not presently a party to any other legal proceedings that in the opinion of our management and if determined adversely to us, would individually or taken together have a material adverse effect on our business, operating results, financial condition or cash flows.

ITEM 4 - MINE SAFETY DISCLOSURES

Not applicable.

Part II

ITEM 5 - MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASE OF EQUITY SECURITIES

As of July 2018 , our Class A common stock was listed on The New York Stock Exchange (NYSE) under the symbol “BE”. There is no public trading market for our Class B common stock. On February 28, 2019 , there were 1,228 registered holders of record of our Class A common stock and 554 registered holders of record of our Class B common stock, and the closing price of our Class A common stock was $14.47 per share as reported on NYSE.

We have not declared or paid any cash dividends on our capital stock and do not intend to pay any cash dividends in the foreseeable future.

For information about our stock-based compensation plans, see Note 11 - *Stock-Based Compensation and Employee Benefit Plans* of the financial statements contained in this Annual Report on Form 10-K .

ITEM 6 - SELECTED CONSOLIDATED FINANCIAL DATA

We derived the selected consolidated statements of operations data for 2018 , 2017 and 2016 and the selected consolidated balance sheet data as of December 31, 2018 and 2017 from our audited consolidated financial statements included in this Annual Report on Form 10-K . The selected consolidated balance sheet data as of December 31, 2016 are derived from audited consolidated financial statements that are not included in this Annual Report on Form 10-K . Our historical results are not necessarily indicative of the results that may be expected in the future. You should read this data together with ITEM 7 - *Management's Discussion and Analysis of Financial Condition and Results of Operations* and ITEM 8 - *Financial Statements* included in this Annual Report on Form 10-K . The selected consolidated financial data in this section are not intended to replace the consolidated financial statements and are qualified in their entirety by the consolidated financial statements and related notes included in this Annual Report on Form 10-K .

Selected Consolidated Financial Statements Data

Selected data from our consolidated statements of operations for the years ended December 31, 2018 , 2017 and 2016 are as follows:

	Years Ended December 31,		
	2018	2017	2016
	(in thousands, except per share amounts)		
Total revenue	$ 742,038	$ 375,996	$ 208,540
Total cost of revenue	624,968	394,040	312,029
Gross profit (loss)	117,070	(18,044)	(103,489)
Operating expenses			
Research and development	89,135	51,146	46,848
Sales and marketing	62,975	32,415	29,101
General and administrative	118,817	55,674	61,545
Total operating expenses	270,927	139,235	137,494
Loss from operations	(153,857)	(157,279)	(240,983)
Net loss attributable to Class A and Class B common stockholders	$ (241,753)	$ (262,599)	$ (279,658)
Net loss per share attributable to Class A and Class B common stockholders, basic and diluted	$ (4.54)	$ (25.62)	$ (27.84)

Selected data from our consolidated balance sheets as of December 31, 2018 , 2017 and 2016 are as follows:

	December 31,		
	2018	2017	2016
	(in thousands)		
Cash and cash equivalents	$ 220,728	$ 103,828	$ 156,577
Working capital	392,915	148,697	130,992
Total assets	1,389,668	1,220,987	1,204,047
Long-term portion of debt	711,433	921,205	773,346
Total liabilities	1,298,958	1,721,624	1,463,159
Convertible redeemable preferred stock [1]	—	1,465,841	1,465,841
Redeemable noncontrolling interest and noncontrolling interest	182,371	213,526	234,988
Stockholders' deficit	(91,661)	(2,180,004)	(1,959,941)

[1] All convertible redeemable preferred stock was converted into Class B common stock at the time of the IPO.

Selected Key Operating Metrics

Please see "Key Operating Metrics" included in ITEM 7 - *Management's Discussion and Analysis of Financial Condition and Results of Operations* for information regarding how we define our product accepted during the period, billings for product accepted in the period, billings for installation on product accepted in the period, billings for annual maintenance services agreements, product costs of product accepted, period costs of manufacturing related expenses not included in product costs and installation costs on product accepted in the period.

	Years Ended December 31,		
	2018	2017	2016
	(in 100 kilowatt systems)		
Product accepted during the period	809	622	687

	Years Ended December 31,		
	2018	2017	2016
	(in thousands)		
Billings for product accepted in the period	$ 458,290	$ 248,102	$ 522,543
Billings for installation on product accepted in the period	78,927	96,452	114,680
Billings for annual maintenance services agreements	82,881	79,881	67,820

	Three Months Ended							
	Dec. 31, 2018	Sept. 30, 2018	Jun. 30, 2018	Mar. 31, 2018	Dec. 31, 2017	Sept. 30, 2017	Jun. 30, 2017	Mar. 31, 2017
	(in thousands)							
Product costs of product accepted in the period (per kilowatt)	$ 2,995	$ 3,351	$ 3,485	$ 3,855	$ 2,944	$ 3,386	$ 3,121	$ 3,999
Period costs of manufacturing related expenses not included in product costs	4,191	6,300	3,018	10,785	9,174	7,152	8,713	7,397
Installation costs on product accepted in the period (per kilowatt)	653	1,713	1,967	526	829	1,263	1,306	1,974

ITEM 7 - MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion of our financial condition and results of operations in conjunction with the consolidated financial statements and the notes thereto included elsewhere in this Annual Report on Form 10-K . Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K , including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties as described under the heading Special Note Regarding Forward-Looking Statements following the Table of Contents of this Annual Report on Form 10-K . You should review the disclosure under ITEM 1A - Risk Factors in this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

Our solution, the Bloom Energy Server, is a stationary power generation platform built for the digital age and capable of delivering highly reliable, uninterrupted, 24x7 constant power that is also clean and sustainable. The Bloom Energy Server converts standard low-pressure natural gas or biogas into electricity through an electrochemical process without combustion, resulting in very high conversion efficiencies and lower harmful emissions than conventional fossil fuel generation. A typical configuration produces 250 kilowatts of power in a footprint roughly equivalent to that of half of a standard thirty-foot shipping container, or approximately 125 times more space-efficient than solar power generation. 250 kilowatts of power is roughly equivalent to the constant power requirement of a typical big box retail store. Any number of these Energy Server systems can be clustered together in various configurations to form solutions from hundreds of kilowatts to many tens of megawatts.

We market and sell our Energy Servers primarily through our direct sales organization in the United States, and also have direct and indirect sales channels internationally. Recognizing that deploying our solutions requires a material financial commitment, we have developed a number of financing options to support sales of Energy Servers to customers that lack the financial capability to purchase our Energy Servers directly, who prefer to finance the acquisition using third party financing or who prefer to contract for our services on a pay-as-you-go model.

Our typical target commercial or industrial customer has historically been either an investment-grade entity or a customer with investment-grade attributes such as size, assets and revenue, liquidity, geographically diverse operations and general financial stability. We have recently expanded our below investment-grade customer base and have also expanded internationally to target customers with deployments on a wholesale grid. Given that our customers are typically large institutions with multi-level decision making processes, we generally experience a lengthy sales process.

Purchase Options

Aside from our direct sales channel targeting those potential customers who prefer to make an outright direct purchase, we have expanded our potential customer base by providing the ability to purchase an Energy Server by other financial vehicles, such as those incorporating third-party capital resources. We have a lease offering through one of our financing partners which we refer to as a Traditional Lease. Similarly, we offer a sale-leaseback sublease arrangement, which we refer to as Managed Services. Additionally, some of our customers have elected to purchase electricity produced by our Energy Servers through a financed offering which we refer to as a Power Purchase Agreement Program, whereby one or more parties are equity investors in financing the entities that purchase the Energy Servers. Our Power Purchase Agreement Programs include both the Bloom Electrons program, which includes an equity investment by us, and our Third-Party PPA programs, where we have no equity investment. For both the Bloom Electrons program and Third-Party PPA programs, we directly manage the end customer (electricity user) relationship from originating the sale to servicing the systems over the course of the deal term.

Depending upon the purchase option chosen by our customer, either the customer or the financing provider may utilize investment tax credits and other government incentives. However, the timing of the product-related cash flows to us is generally consistent across all of the purchase options. We generally receive all product-related payments by the time that the product is accepted by the end customer.

Our capacity to offer our Energy Servers through any of these arrangements depends in large part on the ability of the parties involved in providing payment for the Energy Servers to monetize the related investment tax credits, accelerated tax depreciation and other incentives, and/or the future power purchase obligations of the end customer. Interest rate fluctuations would also impact the attractiveness of any financing offerings for our customers, and currency exchange fluctuations may also impact the attractiveness of international offerings. The Traditional Lease, Managed Services and Power Purchase Agreement Program options are limited by the creditworthiness of the customer. Additionally, the Managed Services and Traditional Lease options, as with all leases, are also limited by the customer's willingness to commit to making fixed payments regardless of the performance of the Energy Servers or our performance of our obligations under the customer agreement.

Under each purchase option, we provide warranties and performance guaranties for the Energy Servers' efficiency and output. Under direct purchase, Traditional Lease, and Power Purchase Agreement program options, the warranty and guaranty is typically included in the price of the Energy Server for the first year. The warranty and guaranty may be renewed annually at the customer's option - as an operations and maintenance services agreement - at predetermined prices for a period of up to 25 years. Historically, our customers have almost always exercised their option to renew under these operations and maintenance services agreements. Under the Managed Services program, the operations and maintenance performance guaranties are priced separately and included for a fixed period specified in the customer agreement. This period is typically either 6 or 10 years, which may be extended at the option of the parties for additional years with all payments made annually. Under the Power Purchase Agreement Programs, we provide warranties and performance guaranties regarding the Energy Servers' efficiency to

the customer (i.e., the end user of the electricity generated by the Energy Servers), and we provide warranties and performance guaranties regarding the Energy Servers' output to the entity that purchases the Energy Servers.

Acceptances

We use "acceptances" as a key operating metric to measure the volume of our operational activity from period to period. We typically define an acceptance as when an Energy Server is installed and running at full power as provided in the customer contract or the financing agreements.

The portion of acceptances in the year ended December 31, 2018 attributable to each purchase option was as follows: direct purchase (including Third Party PPAs) 88% , Traditional Lease 12% , Managed Services 0% and Bloom Electrons 0% . The portion of acceptances in the year ended December 31, 2018 attributable to each payment option was as follows: direct purchase (including Third Party PPAs and the Republic of Korea orders) 68% , Traditional Lease 16% , Managed Services 4% and Bloom Electrons 12% .

The portion of acceptances in the year ended December 31, 2017 attributable to each purchase option was as follows: direct purchase (including Third Party PPAs) 72% , Traditional Lease 7% , Managed Services 21% and Bloom Electrons 0% . The portion of acceptances in the year ended December 31, 2017 attributable to each payment option was as follows: direct purchase (including Third Party PPAs) 61% , Traditional Lease 7% , Managed Services 8% and Bloom Electrons 24% .

The portion of acceptances in the year ended December 31, 2016 attributable to each purchase option was as follows: direct purchase (including Third Party PPAs) 10% , Traditional Lease 6% , Managed Services 31% and Bloom Electrons 53% . The portion of acceptances in the year ended December 31, 2016 attributable to each payment option was as follows: direct purchase (including Third Party PPAs) 40% , Traditional Lease 18% , Managed Services 4% and Bloom Electrons 38% .

Backlog

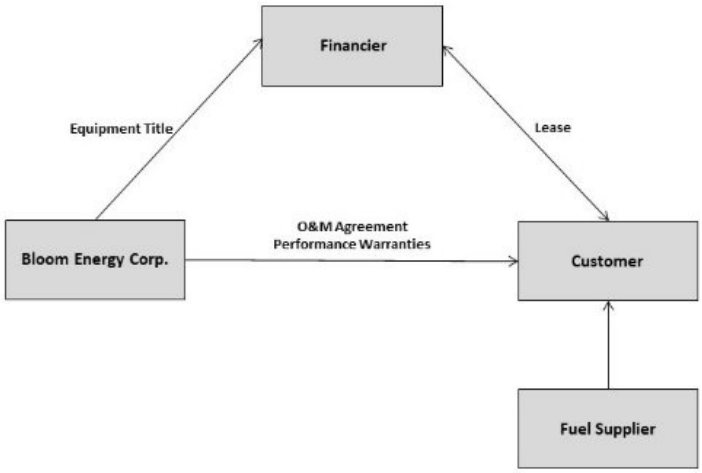
The timing of delivery and installations of our products have a significant impact on the timing of the recognition of product revenue. Many factors can cause a lag between the time that a customer signs a purchase order and our recognition of product revenue. These factors include the number of Energy Servers installed per site, local permitting and utility requirements, environmental, health and safety requirements, weather, and customer facility construction schedules. Many of these factors are unpredictable and their resolution is often outside of our or our customers' control. Customers may also ask us to delay an installation for reasons unrelated to the foregoing, including delays in their obtaining financing. Further, due to unexpected delays, deployments may require unanticipated expenses to expedite delivery of materials or labor to ensure the installation meets the timing objectives. These unexpected delays and expenses can be exacerbated in periods in which we deliver and install a larger number of smaller projects. In addition, if even relatively short delays occur, there may be a significant shortfall between the revenue we expect to generate in a particular period and the revenue that we are able to recognize. For our installations, revenue and cost of revenue can fluctuate significantly on a periodic basis depending on the timing of acceptance and the type of financing used by the customer.

Our product sales backlog was $772.8 million , equivalent to 1,384 systems, or 138.4 megawatts, as of December 31, 2018 . Our product sales backlog was $803.9 million , equivalent to 1,187 systems, or 118.7 megawatts, as of December 31, 2017 . Our product sales backlog was $489.6 million , equivalent to 871 systems, or 87.1 megawatts, as of December 31, 2016. We define product sales backlog as signed customer product sales orders received prior to the period end, but not yet accepted, excluding site cancellations. The timing of the deployment of our backlog depends on the factors described above. However, as a general matter, at any point in time, we expect at least 50% of our backlog to be deployed within the next 12 months. The portion of our backlog in the year ended December 31, 2018 attributable to each payment option was as follows: direct purchase (including Third Party PPAs) 98% , Traditional Lease 2% , Managed Services 0% and Bloom Electrons 0% . The portion of our backlog in the year ended December 31, 2017 attributable to each payment option was as follows: direct purchase (including Third Party PPAs) 61% , Traditional Lease 7% , Managed Services 8% and Bloom Electrons 24% . The portion of our backlog in the year ended December 31, 2016 attributable to each payment option was as follows: direct purchase (including Third Party PPAs) 40% , Traditional Lease 18% , Managed Services 4% and Bloom Electrons 38% .

Purchase and Lease Programs

Initially, we only offered our Energy Servers on a direct purchase basis, in which the customer purchases the product directly from us. In order to expand our offerings to customers who lack the financial capability to purchase our Energy Servers directly and/or who prefer to lease the product or contract for our services on a pay-as-you-go model, we subsequently developed the Traditional Lease, Managed Services, Bloom Electrons program and further, our Third-Party PPA Program. The Third-Party PPA Program carries many of the same obligations as a traditional Bloom Electrons program, except that we do not have any equity interest in the PPA structure. Therefore, the Bloom Electrons programs and the various Third-Party PPA Programs are collectively described here under the Power Purchase Agreement Program(s). The substantial majority of bookings made in recent periods are pursuant to Third-Party PPA Programs.

Traditional Lease



Under the Traditional Lease arrangement, the customer enters into a lease directly with a financier, which pays us for the Energy Servers pursuant to a sales agreement (a Financing Agreement, described below). We recognize product and installation revenue upon acceptance. After the standard one-year warranty period, our customers have almost always exercised the option to enter into operations and maintenance services agreements with us, under which we receive annual service payments from the customer. The price for the annual operations and maintenance services is set at the time we enter into the Financing Agreement. The duration of our Traditional Leases ranges from 6 to 15 years.

Under a Financing Agreement, we are generally paid the full price of the Energy Servers as if sold as a purchase by the customer based on four milestones. The four payment milestones are typically as follows: (i) 15% upon execution of the financier's entry into the lease with a customer, (ii) 25% on the day that is 180 days prior to delivery of the Energy Servers, (iii) 40% upon shipment of the Energy Servers, and (iv) 20% upon acceptance of the Energy Servers. The financier receives title to the Energy Servers upon installation at the customer site and the customer has risk of loss while the Energy Server is in operation on the customer's site.

The Financing Agreement provides for the installation of the Energy Servers and includes a standard one-year warranty, which includes the performance guaranties described below, with the warranty offered on an annually renewing basis at the discretion of the customer. The customer must provide gas for the Energy Servers to operate.

Warranty Commitments

We typically provide (i) an Output Warranty to operate at or above a specified baseload output of the Energy Servers on a site, and (ii) an Efficiency Warranty to operate at or above a specified level of fuel efficiency. Both are measured on a monthly, cumulative, or other basis, as specified in the Financing Agreement. Upon the applicable customer making a warranty claim for a failure of any of our warranty commitments, we are then obligated to repair or replace the Energy Server, or if a repair or replacement is not feasible, to pay the customer an amount approximately equal to the net book value of the Energy Server, after which the Financing Agreement would be terminated. As of December 31, 2018 , we had incurred no obligations to make payments pursuant to these warranty commitments.

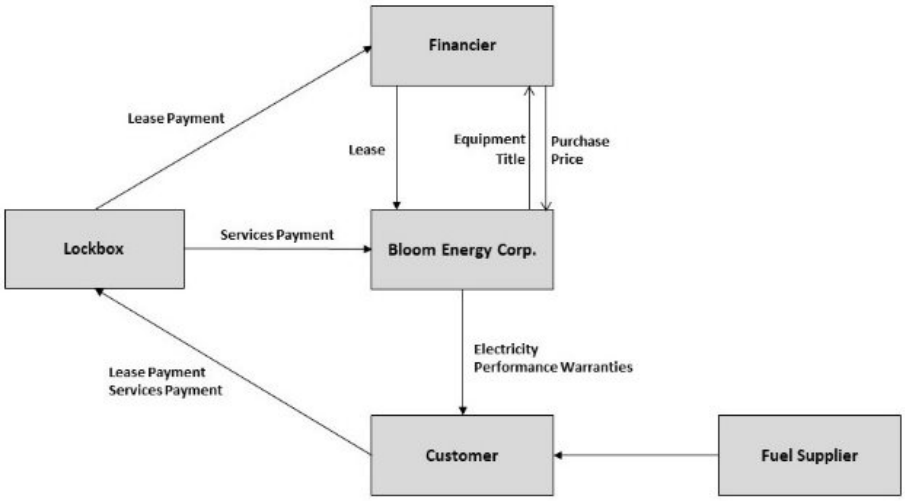
Performance Guaranties

Our performance guaranties are negotiated on a case-by-case basis for projects deployed through the Traditional Lease program, but we typically provide an Output Guaranty of 95% measured cumulatively from the date the applicable Energy Server(s) are commissioned and an Efficiency Guaranty of 52% measured cumulatively from the date the applicable Energy Server(s) are commissioned. In each case, underperformance obligates us to make a payment to the applicable customer. As of December 31, 2018 , the fleet of Energy Servers deployed pursuant to the Traditional Lease programs were performing at a lifetime average output of approximately 86% and a lifetime average efficiency of approximately 54% . As of December 31, 2018 , our obligation to make payments for underperformance against the performance guaranties for Traditional Lease projects was capped at an aggregate total of approximately $5.9 million (including payments both for low output and for low efficiency). As of December 31, 2018 , our aggregate remaining potential liability under this cap was approximately $5.5 million **.**

Remarketing at Termination of Lease

At the end of any customer lease in the event the financier or customer does not renew or purchase the Energy Servers, we may remarket any such Energy Servers to a third party, and any proceeds of such sale would be allocated between us and the applicable financing partner as agreed between them at the time of such sale.

Managed Services



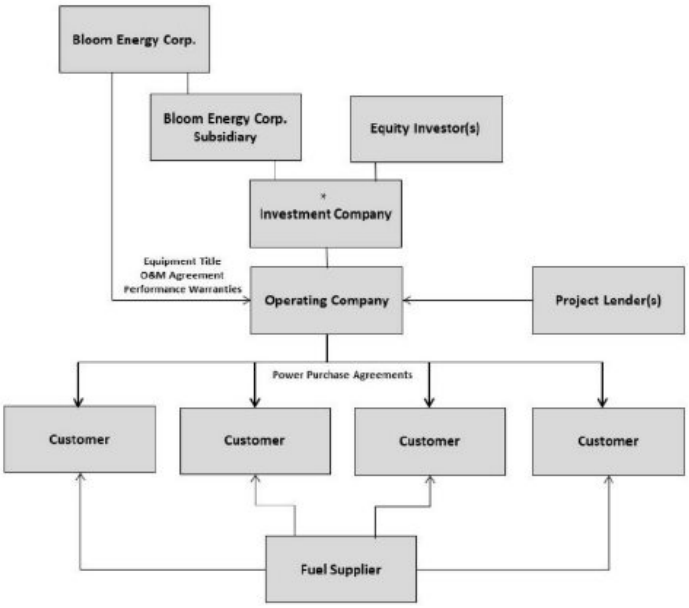
Under our Managed Services program, we initially enter into a master lease agreement with the financing partner which holds title to the Energy Server. Once a customer is identified, we sell the Energy Server to the financing partner and enter into a project-specific operating lease with the financing partner and a service agreement with the customer. The duration of our Managed Services leases is currently either 6 or 10 years. We recognize revenue from the sale of the equipment to the financing partner once the Energy Server has been accepted by the customer. Under the service agreement with the customer, there are two payment components: a monthly equipment fee payable to the financing partner which covers the amount of the lease payment, which is guaranteed by us, and a service payment payable to us for our operation and maintenance of the Energy Server. The service payment may either be fixed or based on the monthly output of electric power produced by the Energy Server. Under the master lease with the financing party, the Company assigns it right to the monthly equipment fee to the financing partner in satisfaction of its rights to make the equipment lease payments.

Our warranty commitments under the Managed Services option are substantially similar to those applicable to the Traditional Lease program described above. Our Managed Services deployments do not typically include any performance guaranties above the warranty commitments, but the customer's payment to us may include a payment that is proportionate to the output generated by the Energy Server(s) and our pricing assumes service revenues at the 95% output level. Since the customer's payment is based on the Energy Server's output, our service revenues are lower if output is less than 95% (and

higher if output exceeds 95%). As of December 31, 2018 , the fleet of Energy Servers deployed pursuant to the Managed Services program were performing at a lifetime average output of approximately 94% .

Power Purchase Agreement Programs

Our customers have the option to purchase electricity produced by our Energy Servers through a financed offering which we refer to as a Power Purchase Agreement Program, whereby one or more parties are equity investors in financing the entities that purchase the Energy Servers. Our Power Purchase Agreement Programs include both the Bloom Electrons program, which includes an equity investment by us and in which we recognize revenue as the electricity is produced, and our Third-Party PPA programs, in which we have no equity investment and we recognize revenue on acceptance.



* Under the Third Party PPA arrangements there is no link with an investment company, as we do not have an equity investment in those arrangements.

In each Power Purchase Agreement Program, we sell our Energy Servers to an entity that owns the Energy Servers (an Operating Company) which sells the electricity generated by the Energy Servers to the ultimate end customers pursuant to a Power Purchase Agreement, energy services agreement, or similar contract. Because the end customer's payment is stated on a dollar-per-kilowatt-hour ("$/kWh") basis, we refer to these agreements as Power Purchase Agreements ("PPAs"). Our Bloom Electrons program involved an equity investment by us (through an Investment Company) in the applicable Operating Company.

Under our Power Purchase Agreement Programs, we perform many of the functions of a typical project developer, including identification of end customers, leading negotiations with such end customer regarding the PPA, and entering into an Energy Server sales, operations and maintenance agreement ("EPC and O&M Agreement") with the Operating Company that will own the Energy Servers for the full term of the PPA. In some cases, the applicable financier(s) assists with the identification of end customers, and the negotiation of the PPAs. The Operating Company then enters into the PPA with the end customer which purchases electricity generated by the Energy Servers at a price that includes the payment for the O&M services. The Operating Company receives all cash flows generated under the PPA(s), in addition to all investment tax credits, all accelerated tax depreciation benefits, and any other cash flows generated by the operation of the Energy Servers not allocated to the end customer under the PPA.

The sales of our Energy Servers to the Operating Company in connection with the various Power Purchase Agreement Programs have many of the same terms and conditions as a direct sale. Payment of the purchase price is generally broken

down into multiple installments, which may include payments prior to shipment, upon shipment or delivery of the Energy Server, and upon acceptance of the Energy Server. Acceptance typically occurs when the Energy Server is installed and running at full power as defined in each contract. A one-year service warranty is provided with the initial sale. After the expiration of the initial standard one-year warranty, the Operating Company has the option to enter into annual operations and maintenance services agreements with us at a price determined at the time of purchase of the Energy Server, which may be renewed annually for each Energy Server for up to 25 years.

Pursuant to the service warranty for Power Purchase Agreement Program projects, we provide efficiency and minimum output warranty commitments (see below) to the Operating Company (collectively, "Performance Warranties") and provide a backstop of the efficiency commitments provided by the Operating Company to the end customer under each PPA. In the event that the Energy Servers fail to satisfy these warranty levels, we may be obligated to repurchase the applicable Energy Servers if we are unable to repair or replace them during the applicable cure period. Across all Power Purchase Agreement Program projects, as of December 31, 2018 , we had incurred no repurchase obligations pursuant to such warranties. In addition, we guarantee minimum output and efficiency levels greater than the warranty levels and pay certain capped performance guaranty amounts if those levels are not achieved. These performance guaranties are negotiated on a case-by-case basis, but we provide an Output Guaranty of 95% measured annually or cumulatively from the date the applicable Energy Server(s) are commissioned and typically an Efficiency Guaranty of 52% measured cumulatively. In each case, underperformance obligates us to make a payment to the Operating Company, either to compensate the Operating Company for lost revenues under the applicable PPA or to reimburse the Operating Company for payments made to the end customer under such PPA. These payments are subject to caps set forth in the applicable PPA.

As of December 31, 2018 , the fleet of Energy Servers deployed pursuant to Power Purchase Agreement Programs performed at an average output of approximately 86% for three months ended December 31, 2018 , and a lifetime average efficiency of approximately 54% through December 31, 2018 . As of December 31, 2018 , our obligation to make payments for underperformance on these projects was capped at an aggregate total of approximately $55.5 million (including payments both for low output and for low efficiency). As of December 31, 2018 , our aggregate remaining potential liability under this cap was approximately $41.8 million .

Obligations to Operating Companies

In each Power Purchase Agreement Program, we and the applicable Operating Company enter into one or more EPC and O&M Agreements pursuant to which we perform certain manufacturing, design, installation, commissioning, operation, and maintenance obligations for the Operating Company for a term of up to 25 years.

Our obligations under the EPC and O&M Agreement(s) for each Power Purchase Agreement Program project include:

i. designing, manufacturing, and installing the Energy Servers, and selling such Energy Servers to the Operating Company,

ii. obtaining all necessary permits and other governmental approvals necessary for the installation and operation of the Energy Servers, and maintaining such permits and approvals throughout the term of the EPC and O&M Agreement(s),

iii. operating and maintaining the Energy Servers in compliance with all applicable laws, permits and regulations,

iv. satisfying the efficiency and output warranties set forth in such EPC and O&M Agreement(s) and the PPA(s) (Performance Warranties), and

v. complying with any specific requirements contained in the PPA(s) with individual end-customer(s).

The EPC and O&M Agreement(s) obligate us to repurchase the Energy Servers in the event the Energy Servers fail to comply with the Performance Warranties or we otherwise breach the terms of the applicable EPC and O&M Agreement(s) and we fail to remedy such failure or breach after a cure period, or in the event that a PPA terminates as a result of any failure by us to comply with the applicable EPC and O&M Agreement(s). In some Power Purchase Agreement Program projects, our obligation to repurchase Energy Servers extends to the entire fleet of Energy Servers sold pursuant to the applicable EPC and O&M Agreement(s) in the event such failure affects more than a specified number of Energy Servers.

In some Power Purchase Agreement Programs, we have also agreed to pay liquidated damages to the applicable Operating Company in the event of delays in the manufacture and installation of Energy Servers, either in the form of a cash payment or a reduction in the purchase price for the applicable Energy Server(s).

Both the upfront purchase price for the Energy Servers and the ongoing fees for our operations and maintenance are paid on a fixed dollar-per-kilowatt ($/kW) basis.

The EPC and O&M Agreement(s) for each Power Purchase Agreement Program project generally provides for the following performance and indemnity obligations:

Efficiency Obligations - We warrant to the applicable Operating Company that each Energy Server and/or the portfolio of Energy Servers sold to such entity will operate at an average efficiency level specified in the O&M Agreement, calculated over a period specified in the O&M Agreement following the commercial operations date of such Energy Server. In some cases, we are obligated to repair or replace Energy Servers that are unable to satisfy the minimum efficiency level, or if a repair or replacement is not feasible, to repurchase such Energy Servers at the original purchase price, subject to adjustment for depreciation (Efficiency Warranty(ies)). In other cases, we are obligated to make a payment to compensate for the increased costs of procuring natural gas for the applicable Energy Server(s) resulting from the underperformance as against the minimum efficiency level, which payments are capped at a level specified in the applicable PPA agreement (the "Efficiency Guaranty").

Output Obligations - In addition, we warrant that the Energy Servers will generate a minimum amount of electricity during specified periods of time. Under O&M Agreements, our output obligations include: (i) the generation of a minimum amount of electricity on a monthly, quarterly, annual, or cumulative basis (as specified in the applicable EPC and O&M Agreement(s)), the failure of which obligates us to repair or replace the Energy Servers that are unable to satisfy such minimum output level, or if such repair or replacement is not feasible, to repurchase such Energy Servers at the original purchase price, subject to adjustment for depreciation ("Output Warranties"), and (ii) the generation of a minimum amount of electricity on either an annual or cumulative basis beginning on the commercial operations date of such Energy Server (as specified in the applicable EPC and O&M Agreement(s), the failure of which obligates us to make a payment to the applicable Operating Company based on the volume of the shortfall below the minimum output level, subject in some cases to a liability cap specified in the applicable EPC and O&M Agreement(s) ("Output Guaranties"). In some Power Purchase Agreement Program projects, these generation obligations are aggregated across the entire fleet of Energy Servers deployed pursuant to such project; in others, each Energy Server must satisfy the minimum generation obligations measured individually.

Indemnification of Performance Warranty Expenses Under PPAs - In addition to the efficiency and output obligations, we also have agreed to indemnify certain Operating Companies for any expenses they incur to any of the end customers resulting from failures of the applicable Energy Servers to satisfy any of the Performance Warranties set forth in the applicable PPA(s). In addition, in the event that a PPA is terminated by an end customer as to any Energy Servers as a result of our failure to perform any of our obligations under the applicable EPC and O&M Agreement(s), we are obligated to repurchase such Energy Server from the applicable Operating Company for a repurchase price equal to the original purchase price, subject to adjustment for depreciation.

Administration of Operating Companies - In each of the Bloom Electrons programs, we perform certain administrative services on behalf of the applicable Operating Company, including invoicing the end customers for amounts owed under the PPAs, administering the cash receipts of the Operating Company in accordance with the requirements of the financing arrangements, interfacing with applicable regulatory agencies, and other similar obligations. We are compensated for these services on a fixed dollar-per-kilowatt ($/kW) basis.

Obligations to End Customers

While the counterparty to the PPAs under each Power Purchase Agreement Program project is the applicable Operating Company, under the applicable EPC and O&M Agreement(s) we are obligated to perform each of the obligations of such Operating Company set forth in each PPA. These obligations include:

i. designing, manufacturing, and installing the Energy Servers,

ii. obtaining (or, where applicable under applicable law, assisting the end customer in obtaining) all necessary permits and other governmental approvals necessary for the installation and operation of the Energy Servers, and maintaining such permits and approvals throughout the term of the PPA,

iii. operating and maintaining the Energy Servers in compliance with all applicable laws, permits and regulations,

iv. satisfying the Performance Warranties set forth in the PPA, and

v. complying with any additional requirements of contained in the PPA.

Each PPA is negotiated on a case-by-case basis, but the PPAs generally adhere to the following terms:

Term; Early Termination - The PPAs typically provide for an initial term of 15 or 20 years, and may be renewed by the mutual agreement of the end customer and the applicable Operating Company for additional periods at the expiration of the initial term. In the event that the end customer desires to terminate the PPA before the end of the contract term, or in the event that the PPA is terminated by the applicable Operating Company due to an end customer default, the end customer is required to pay a “termination value” payment as liquidated damages.

Energy Server Installation and Operation - The applicable Operating Company is responsible for the installation, operation and maintenance of the Energy Servers on a turn-key basis.

Take-Or-Pay Purchase Obligation - The end customer is required to purchase all of the electricity generated by the Energy Servers for the duration of the PPA. In the event that the end customer is unwilling or unable to accept delivery of such electricity or fails to supply the necessary fuel to the Energy Servers, the end customer is required to make a payment to the Operating Company for the amount of electricity that would have been delivered had the Energy Servers continued to operate.

Fuel Supply Obligation - The end customer is required to provide all necessary fuel for the operation of the Energy Servers.

Ownership of Energy Servers - The applicable Operating Company retains title to the Energy Servers at all times unless the PPA provides a purchase option and the end customer elects to purchase the Energy Server(s).

Financial Incentives and Environmental Attributes - As the owner of the Energy Servers, the Operating Company retains ownership of any tax benefits associated with the installation and operation of the Energy Servers. Additional financial incentives available in connection with each installation (such as payments under state incentive programs or renewable portfolio standard programs) and any environmental benefits associated with the Energy Servers (such as carbon emissions reductions credits) are allocated to either the Operating Company or the end customer on a case-by-case basis. In some circumstances, the Operating Company has also agreed to purchase and deliver renewable energy credits to the end customer in connection with the PPA.

Efficiency Commitments - The Operating Company makes certain warranties and guaranties regarding the Energy Servers' efficiency to the end customer. Generally, these consist of (i) an Efficiency Warranty, where the Operating Company is obligated to repair or replace Energy Servers that fail to operate at or above a specified level of efficiency, and/or (ii) an Efficiency Guaranty, where the Operating Company is obligated to make payments to the end customer to cover the cost of procuring excess fuel if the Energy Servers fail to operate at or above a specified level of efficiency on a cumulative basis during the term of the PPA. Where an Efficiency Guaranty is provided, the Operating Company's aggregate liability for payments (and, thereby, our indemnity exposure to the Operating Company) is capped. In certain circumstances, we may negotiate modifications to the efficiency commitments with the end customer, including different efficiency thresholds or providing for monetary payments under the Efficiency Warranty in lieu of or in addition to an obligation to repair or replace underperforming Energy Servers.

Output Commitments - Although our standard PPA offering does not include a minimum output commitment to the end customer, exceptions may be negotiated on a case-by-case basis if we believe the opportunity justifies such exception. These output commitments are at an output level lesser than or equal to the Output Warranty provided by us to the Operating Company under the applicable EPC and O&M Agreement(s), and provide either for a payment to the end customer for the shortfall in electricity produced or for an end customer termination right. In addition, where the end customer (as opposed to the Operating Company) is entitled to the benefits of an incentive program that requires a minimum output level, the Operating Company may agree to reimburse the end customer for any decrease in incentive payments resulting from the Energy Servers' failure to operate at such minimum output level.

Defaults; Remedies - Defaults under the PPAs are typically limited to (i) bankruptcy events, (ii) unexcused failure to perform material obligations (including payment obligations), and (iii) breaches of representations and warranties. Additional defaults may be negotiated on a case-by-case basis. The parties are generally afforded cure periods of at least 30 days to cure any such defaults. In the event of an uncured default by the Operating Company, the end customer may terminate the PPA either in whole or in part as to the Energy Server(s) affected by such default, and may seek other remedies afforded at law or in equity. In the event of an uncured default by the end customer, the Operating Company may terminate the PPA either in whole or in part as to the Energy Server(s) affected by such default, and may seek other remedies afforded at law or in equity; in addition, in the event a PPA is terminated due to an end customer default, the end customer is obligated to make a termination value payment to the Operating Company.

The Operating Company in each of the Power Purchase Agreement Programs (other than PPA I) has incurred debt in order to finance the acquisition of Energy Servers. The lenders for these projects are a combination of banks and/or institutional investors. In each case, the debt is secured by all of the assets of the Operating Company (primarily comprised of the Energy Servers and a collateral assignment of each of the contracts to which the Operating Company is a party, including the O&M Agreement entered into with us and the offtake agreements entered into with the Operating Company's customers), and is senior to all other debt obligations of the Operating Company. As further collateral, the lenders receive a security interest in 100% of the membership interest of the Operating Company. However, as is typical in structured finance transactions of this nature, although the Project Debt is secured by all of the Operating Company's assets, the lenders have no recourse to us or to any of the other tax equity investors in the project. The applicable debt agreements include provisions that implement a customary "payment waterfall" that dictates the priority in which the Operating Company will use its available funds to satisfy its payment obligations to us, the lenders, the tax equity investors and other third parties.

We have determined that we are the primary beneficiary in the PPA Entities. Accordingly, we consolidate 100% of the assets, liabilities and operating results of these entities, including the Energy Servers and lease income, in our consolidated financial statements. We recognize the tax equity investors' share of the net assets of the investment entities as noncontrolling interests in subsidiaries in our consolidated balance sheet. We recognize the amounts that are contractually payable to these investors in each period as distributions to noncontrolling interests in our consolidated statements of convertible redeemable preferred stock and equity. Our consolidated statements of cash flows reflect cash received from these investors as proceeds from investments by noncontrolling interests in subsidiaries. Our consolidated statements of cash flows also reflect cash paid to these investors as distributions paid to noncontrolling interests in subsidiaries. We reflect any unpaid distributions to these investors as distributions payable to noncontrolling interests in subsidiaries on our consolidated balance sheets. However, the PPA Entities are separate and distinct legal entities, and Bloom Energy Corporation may not receive cash or other distributions from the PPA Entities except in certain limited circumstances and upon the satisfaction of certain conditions, such as compliance with applicable debt service coverage ratios and the achievement of a targeted internal rate of return to the tax equity investors, or otherwise.

For further information about our Power Purchase Agreement Programs, see Note 12 - *Power Purchase Agreement Programs* , to our consolidated financial statements included in this Annual Report on Form 10-K .

Third-Party PPA Programs

With our Bloom Electrons program, we endeavored to assist our customers' purchases by directly participating in financing the purchase of their Energy Server. More recently, we have moved to providing the same service to our customers without our direct involvement in the capital financing and therefore, having no equity investment in the resulting PPA. We refer to this purchase option as Third-Party PPA arrangements, structured in a near-identical manner and with the same terms and conditions as our Bloom Electrons program (described above), only without our assuming an equity position in the PPA structure. This way, we retain the benefits for the marketability of our Energy Servers without the capital burden and without the potential financial liability.

International Channel Partners

Prior to 2018, we consummated a small number of sales outside the United States of America, including in India and Japan. In India, sales activities are currently conducted by Bloom Energy (India) Pvt. Ltd., our wholly-owned indirect subsidiary; however, we are currently evaluating the Indian market to determine whether the use of channel partners would be a beneficial go-to-market strategy to grow our India market sales.

In Japan, sales are conducted pursuant to a Japanese joint venture established between us and subsidiaries of SoftBank Corp, called Bloom Energy Japan Limited ("Bloom Energy Japan"). Under this arrangement, we sell Energy Servers to Bloom Energy Japan and we recognize revenue once the Energy Servers leave the port of the U.S. as Bloom Energy Japan enters into the contract with the end customer and performs all installation work as well as some of the operations and maintenance work.

In 2018, Bloom Energy Japan consummated a sale of Energy Servers in the Republic of Korea to Korea South-East Power Company. Following this sale, we entered into a Preferred Distributor Agreement with SK Engineering & Construction Co., Ltd. ("SK E&C") to enable us to sell directly into the Republic of Korea.

SK E&C Agreement

SK E&C has a right of first refusal during the term of the agreement, with certain exceptions, to serve as distributor of Energy Servers for any fuel cell generation project in the Republic of Korea, and we have the right of first refusal to serve as SK E&C's supplier of generation equipment for any Bloom Energy fuel cell project in the Republic of Korea. Under the terms of the Preferred Distributor Agreement, title, risk of loss and acceptance of the Energy Servers pass from us to SK E&C upon delivery at the named port of lading for shipment in the United States for the Energy Servers shipped in 2018 and thereafter upon delivery at the named port of unlading in the Republic of Korea, prior to unloading. The Preferred Distributor Agreement has an initial term expiring on December 31, 2021 (the "Initial Term") and thereafter will automatically be renewed for three year renewal terms unless not so extended by either party (each, a "Renewal Term", and together with the initial term, the "Term"). Either party may terminate the Preferred Distributor Agreement by written notice under certain circumstances.

Under the terms of the Preferred Distributor Agreement, we (or our subsidiary) will contract directly with the customer to provide operations and maintenance services for the Energy Servers. We have established a subsidiary in the Republic of Korea, Bloom Energy Korea, LLC, to which we will subcontract such operations and maintenance services. The terms of the operations and maintenance will be negotiated on a case-by-case basis with each customer, but are generally expected to provide the customer with the option to receive services for at least ten (10) years, and for up to the life of the Energy Servers, with terms specified below.

Output Obligations - We commit that the Energy Servers will generate minimum amount(s) of output during specified periods of time. Our output obligations include the generation of a minimum amount of electricity on a quarterly, annual or

cumulative basis (as specified in the applicable agreement). As of December 31, 2018, the fleet of Energy Servers deployed pursuant to Power Purchase Agreement Programs performed at an average output of approximately 95% for three months ended December 31, 2018, and a lifetime average efficiency of approximately 52% through December 31, 2018. As of December 31, 2018, our obligation to make payments for underperformance on the direct purchase projects was capped at an aggregate total of approximately $2.9 million (including payments both for low output and for low efficiency). As of December 31, 2018, our aggregate remaining potential liability under this cap was approximately $2.9 million. Remedies for underperformance may include (a) the payment of "buy-down" liquidated damages (subject to a cap), for underperformance in connection with the commencement of operations or during an initial performance period following commencement of operations; (b) payment of liquidated damages (subject to a cap) based upon the amount of foregone electricity production; or (c) repair or replacement of the Energy Servers, or, if repair or replacement is not feasible, repurchase of such Energy Servers at a price equal to fair market value or the original purchase price, subject to adjustment for depreciation. As of December 31, 2018 , we have incurred no obligations to make payments pursuant to these warranty commitments.

Efficiency Obligations - We commit that the Energy Servers will operate at minimum efficiency level(s) during specified periods of time. Our efficiency obligations include operating at guaranteed efficiency on a quarterly, annual or cumulative basis (as specified in the applicable agreement). Remedies for underperformance may include (a) the payment of "buy-down" liquidated damages (subject to a cap), for underperformance in connection with the commencement of operations or during an initial performance period following commencement of operations; (b) payment of liquidated damages (subject to a cap) based upon the amount of excess natural gas consumed by the Energy Servers; (c) repair or replacement of the Energy Servers, or, if repair or replacement is not feasible, repurchase of such Energy Servers at a price equal to fair market value or the original purchase price, subject to adjustment for depreciation. As of December 31, 2018 , we have incurred no obligations to make payments pursuant to these warranty commitments.

Key Operating Metrics

In addition to the measures presented in the consolidated financial statements, we use the following key operating metrics to evaluate business activity, to measure performance, to develop financial forecasts and to make strategic decisions:

- **Product accepted** - the number of customer acceptances of our Energy Servers in any period. We recognize revenue when an acceptance is achieved. We use this metric to measure the volume of deployment activity. We measure each Energy Server manufactured, shipped and accepted in terms of 100 kilowatt equivalents.
- **Billings for product accepted in the period** - the total contracted dollar amount of the product component of all Energy Servers that are accepted in a period. We use this metric to gauge the dollar value of the product acceptances and to evaluate the change in dollar amount of acceptances between periods.
- **Billings for installation on product accepted in the period** - the total contracted dollar amount billable with respect to the installation component of all Energy Servers that are accepted. We use this metric to gauge the dollar value of the installations of our product acceptances and to evaluate the change in dollar value associated with the installation of our product acceptances between periods.
- **Billings for annual maintenance service agreements** - the dollar amount billable for one-year service contracts that have been initiated or renewed. We use this metric to measure the cumulative billings for all service contracts in any given period. As our installation base grows, we expect our billings for annual maintenance service agreements to grow, as well.
- **Product costs of product accepted in the period (per kilowatt)** - the average unit product cost for the Energy Servers that are accepted in a period. We use this metric to provide insight into the trajectory of product costs and, in particular, the effectiveness of cost reduction activities.
- **Period costs of manufacturing expenses not included in product costs** - the manufacturing and related operating costs that are incurred to procure parts and manufacture Energy Servers that are not included as part of product costs. We use this metric to measure any costs incurred to run our manufacturing operations that are not capitalized (i.e., absorbed) into inventory and therefore, expensed to our consolidated statement of operations in the period that they are incurred.
- I **nstallation costs on product accepted (per kilowatt)** - the average unit installation cost for Energy Servers that are accepted in a given period. This metric is used to provide insight into the trajectory of install costs and, in particular, to evaluate whether our installation costs are in line with our installation billings.

Comparison of the Years Ended December 31, 2018 and 2017

	Years Ended December 31,		Change	
	2018	2017	Amount	%
Product accepted during the period (in 100 kilowatt systems)	809	622	187	30.1%

Product accepted increase d by approximately 187 systems, or 30.1% , for 2018 compared to 2017 . Acceptance volume increase d as we installed more systems from backlog as demand increased for our Bloom Energy servers, in addition to enhancing our ability and capacity to install more energy servers with our installation team.

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Billings for product accepted in the period	$ 458,290	$ 248,102	210,188	84.7 %
Billings for installation on product accepted in the period	78,927	96,452	(17,525)	(18.2)%
Billings for annual maintenance services agreements	82,881	79,881	3,000	3.8 %

Billings for product accepted increase d by approximately $210 million , or 84.7% , for 2018 compared to 2017 . The increase was primarily due to three factors.

First, product accepted increase d by approximately 187 systems, or 30.1% , for 2018 compared to 2017 .

Second, ITC was reinstated on February 9, 2018. ITC was not available to the fuel cell industry in 2017, so our billings for product accepted for 2017 only included $1.3 million in benefit from ITC. Due to the reinstatement of ITC in 2018, billings for product accepted now includes the benefit of ITC. For 2018 , billings for product accepted included $132.9 million in benefits from ITC, of which $45.1 million was retroactive ITC for 2017 acceptances.

Third, the adoption of customer personalized applications, such as batteries and grid-independent solutions, increased in 2018 compared to 2017 . Products that incorporate these personalized applications have, on average, a higher billings rate than our standard platform products that do not incorporate these personalized applications.

Billings for installation on product accepted decrease d $17.5 million for 2018 , as compared to 2017 . Although product acceptances in the period increased 30.1% , billings for installation on product accepted decrease d due to the mix in installation billings driven by site complexity, size, customer purchase option and one large customer in particular in 2018 where the installation was performed by the customer and therefore, we did not have any installation billing for that customer. In general, when we do not perform the installation function for a customer, such as SK E&C in the Republic of Korea, we will not have any installation billings for those orders.

When we analyze changes between the years ended 2018 and 2017 , we take into account the impact of ITC that was available in 2018 as a result of the reinstatement of the ITC through December 2021. The effect of the reinstatement of ITC was higher billings in the periods eligible for ITC. For 2018 , the combined total for billings for product and installation accepted was $537.2 million , an increase of 55.9% from the billings for product and installation accepted combined of $344.6 million for 2017 . The increase was significantly greater than the 30.1% increase in associated acceptances during the same periods due to the reinstatement of the ITC benefit, including the one-time FY17 retroactive ITC benefit recognized in 2018 that is included in the 2018 billings numbers.

Billings for annual maintenance service agreements increase d $3.0 million for 2018 compared to 2017 . This increase was driven by the incremental billings for new annual maintenance service agreement renewals as a result of our growing fleet of installed Energy Servers.

	Years Ended December 31,		Change	
	2018	2017	Amount	%
Product costs of product accepted in the period	$3,372/kW	$3,292/kW	$80/kW	2.4 %
Period costs of manufacturing related expenses not included in product costs (in thousands)	$ 24,294	$ 32,437	$ (8,143)	(25.1)%
Installation costs on product accepted in the period	$1,189/kW	$1,271/kW	$(82)/kW	(6.5)%

Product costs of product accepted increase d by approximately $80 per kilowatt , or 2.4% , for 2018 compared to 2017 . This increase in cost is primarily related to the reinstatement of the ITC program in February 2018 , in which we were required to repay certain suppliers for previously negotiated contractual discounts. This resulted in a one-time payment of $116 per kilowatt or $9.4 million, which was recorded to cost of product revenue.

Period costs of manufacturing related expenses decrease d by approximately $8.1 million , or 25.1% , for 2018 compared to 2017 . Our period costs of manufacturing related expenses decrease d primarily as a result of higher absorption of fixed manufacturing costs into product costs due to a larger volume of builds through our factory tied to our acceptance growth, which resulted in higher factory utilization.

Installation costs on product accepted decrease d by approximately $82 per kilowatt , or 6.5% , for 2018 compared to 2017 . Each customer site is different and installation costs can vary due to a number of factors, including site complexity, size, location of gas, etc. As such, installation on a per kW basis can vary significantly from period-to-period. In addition, some customers do their own installation, or, as is the case for SK E&C in the Republic of Korea orders, we have a partner who performs the installation. In those instances, we have little to no installation cost.

Comparison of the Years Ended December 31, 2017 and 2016

	Years Ended December 31,		Change	
	2017	2016	Amount	%
Product accepted during the period (in 100 kilowatt systems)	622	687	(65)	(9.5)%

Product accepted decrease d by approximately 65 systems, or 9.5% , for 2017 compared to 2016 . The decline was driven by extreme weather-related seasonality on both the U.S. East Coast and West Coast, which impacted our ability to install Energy Servers at our customer sites.

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Billings for product accepted in the period	$ 248,102	$ 522,543	$ (274,441)	(52.5)%
Billings for installation on product accepted in the period	96,452	114,680	(18,228)	(15.9)%
Billings for annual maintenance services agreements	79,881	67,820	12,061	17.8 %

Billings for product accepted decrease d by approximately $274.4 million , or 52.5% , for 2017 compared to 2016 . The decrease was primarily due to two factors.

First, product accepted decrease d approximately 65 systems, or 9.5% , for 2017 compared to 2016 .

Second, the Federal Investment Tax Credit ("ITC") was not available to the fuel cell industry in 2017. Given that, our billings for product accepted did not include the benefit of the ITC in 2017. Our 2016 billings for product accepted included $159.8 million of ITC, whereas our 2017 billings from product accepted had $1.3 million associated with ITC. The ITC was subsequently reinstated on February 9, 2018.

Billings for installation on product accepted decrease d $18.2 million , or 15.9% for 2017 , compared to 2016 . Although product acceptances in the period decrease d 9.5% , billings for installation on product accepted decrease d due to the mix in installation billings driven by site complexity, size, customer purchase option and one large customer in particular in 2017 where the installation was performed by the customer and therefore, we did not have any installation billing for that customer. In general, when we do not perform the installation function for a customer, such as in SK E&C in the Republic of Korea, we do not have any installation billings for those orders.

When we analyze changes between the years ended 2017 and 2016 , we take into account the impact of ITC that was available in 2016. The effect of the loss of ITC in 2017 was lower billings in the period. For 2017 , the combined total for billings for product and installation accepted was $344.6 million , a decrease of 45.9% from the billings for product and installation accepted combined of $637.2 million for 2016 . The decrease was significantly greater than the 9.5% decrease in associated acceptances during the same periods due to the loss of ITC in 2017, which lowered billings for installations.

Billings for annual maintenance service agreements increase d $12.1 million for 2017 compared to 2016 . This increase was driven by the billings for new annual maintenance service agreement renewals as a result of a growing fleet of installed Energy Servers.

	Years Ended December 31,		Change	
	2017	2016	Amount	%
Product costs of product accepted in the period	$3,292/kW	$4,457/kW	$(1,165)/kW	(26.1)%
Period costs of manufacturing related expenses not included in product costs (in thousands)	$32,437	$21,900	$10,537	48.1 %
Installation costs on product accepted in the period	$1,271/kW	$1,234/kW	$37/kW	3.0 %

Product costs of product accepted decrease d by approximately $1,165 per kilowatt , or 26.1% , for 2017 compared to 2016 . The cost reduction was driven generally by our ongoing cost reduction efforts to reduce material costs, labor and overhead through improved automation of our manufacturing facilities, better facility utilization and ongoing material cost reduction programs with our vendors.

Period costs of manufacturing related expenses increase d by approximately $10.5 million , or 48.1% , for 2017 compared to 2016 . Our period costs of manufacturing related expenses increase d primarily as a result of lower absorption of fixed manufacturing costs into product costs due to a lower volume of builds through our factory.

Installation costs on product accepted increase d by approximately $37 per kilowatt , or 3.0% , for 2017 compared to 2016 . Each customer site is different and installation costs can vary due to a number of factors, including site complexity, size, location of gas, etc. As such, installation on a per kW basis can vary significantly from period-to-period. In addition, some customers do their own installation, or, as is the case for Republic of Korea orders, we have a partner who performs the installation. In those instances, we have little to no installation cost.

Results of Operations

Revenue

We primarily recognize revenue from the sale and installation of Energy Servers, by providing services under maintenance contracts, and from electricity sales by our PPA Entities.

Product Revenue

All of our product revenue is generated from the sale of our Energy Servers to direct purchase, Third-Party PPAs, traditional lease and managed services customers. We generally recognize product revenue from contracts with customers for the sales of our Energy Servers once we achieve acceptance; that is, generally when the system has been installed and is running at full power as defined in each contract.

The amount of product revenue we recognize in a given period is materially dependent on the volume and size of installations of our Energy Servers and on the type of financing used by the customer.

Installation Revenue

All of our installation revenue is generated from the installation of our Energy Servers to direct purchase, traditional lease and managed services customers. The amount of installation revenue we recognize in a given period is materially dependent on the volume and size of installations of our Energy Servers in a given period, whether the customer chooses to do the installation themselves, and on the type of financing used by the customer.

Service Revenue

Service revenue is generated from operations and maintenance services agreements that extend the standard one-year warranty service coverage beyond the initial one-year coverage for Energy Servers sold under direct purchase, traditional lease and managed services sales. Customers of our purchase and lease programs can renew their operating and maintenance services agreements on an annual basis for the life of the contract at prices predetermined at the time of purchase of the Energy Server. We anticipate that almost all of our customers will continue to renew their operations and maintenance services agreements each year.

Electricity Revenue

Our PPA Entities purchase Energy Servers from us and sell the electricity produced by these systems to customers through long-term PPAs. Customers are required to purchase all of the electricity produced by the Energy Servers at agreed-upon rates over the course of the PPA's term. We generally recognize revenue from such PPA Entities as the electricity is provided over the term of the agreement.

Cost of Revenue

Our total cost of revenue consists of cost of product revenue, cost of installation revenue, cost of service revenue and cost of electricity revenue. It includes personnel costs associated with our operations and global customer support organizations consisting of salaries, benefits, bonuses, stock-based compensation and allocated facilities costs.

Cost of Product Revenue

Cost of product revenue consists of costs of Energy Servers that we sell to direct, traditional lease and managed services customers, including costs of materials, personnel costs, allocated costs, shipping costs, provisions for excess and obsolete inventory and the depreciation costs of our equipment. Because the sale of our Energy Servers includes a standard one-year warranty, cost of product revenue also includes estimated first-year warranty costs. Warranty costs for customers that purchase under contracts where the revenue is recognized ratably are recognized as a cost of product revenue as they are incurred. We expect our cost of product revenue to increase in absolute dollars as we deliver and install more Energy Servers and our product revenue increases.

Cost of Installation Revenue

Cost of installation revenue consists of the costs to install the Energy Servers that we sell to direct, traditional lease and managed services customers, including costs of materials and service providers, personnel costs, and allocated costs. In both Japan and the Republic of Korea, the cost of the installations and resulting revenue is attributable to our channel partners. Notwithstanding the use of channel partners, for the next twelve months, we expect our cost of installation revenue to increase in absolute dollars as we deliver and install more Energy Servers, though it will be subject to variability as a result of the timing of installation and other factors.

Cost of Service Revenue

Cost of service revenue consists of costs incurred under maintenance service contracts for all customers including direct sales, traditional lease, managed services and PPA customers. Such costs include personnel costs for our customer support organization, allocated costs and extended maintenance-related product repair and replacement costs. We expect our cost of service revenue to increase in absolute dollars as our base of megawatts deployed grows, and we expect our cost of service revenue to fluctuate period by period depending on the timing of maintenance of Energy Servers.

Cost of Electricity Revenue

Cost of electricity revenue primarily consists of the depreciation of the cost of the Energy Servers owned by our PPA Entities and the cost of gas purchased in connection with PPAs entered into by our first PPA Entity. The cost of depreciation of the Energy Servers is reduced by the amortization of any U.S. Treasury grant payment in lieu of the energy investment tax credit associated with these systems. We expect our cost of electricity revenue to increase in absolute dollars as our base of megawatts deployed grows.

Gross Profit (Loss)

Gross profit (loss) has been and will continue to be affected by a variety of factors, including the sales price of our products, manufacturing costs, the costs to install the products, the costs to maintain the systems in the field, the mix of financing options used and the mix of revenue between product, service and electricity. We expect our gross profit to fluctuate over time depending on the factors described above.

Operating Expenses

Research and Development

Research and development costs are expensed as incurred and consist primarily of personnel costs. Research and development expense also includes prototype related expenses and allocated facilities costs. We expect research and development expense to increase in absolute dollars as we continue to invest in our future products and services, and we expect our research and development expense to fluctuate as a percentage of total revenue.

Sales and Marketing

Sales and marketing expense consists primarily of personnel costs, including commissions. We expense commission costs as earned. Sales and marketing expense also includes costs for market development programs, promotional and other marketing costs, travel costs, office equipment and software, depreciation, professional services and allocated facilities costs. We expect sales and marketing expense to continue to increase in absolute dollars as we increase the size of our sales and marketing organizations and as we expand our international presence, and we expect our sales and marketing expense to fluctuate as a percentage of total revenue.

General and Administrative

General and administrative expense consists of personnel costs, fees for professional services and allocated facilities costs. General and administrative personnel include our executive, finance, human resources, information technology, facilities, business development and legal organizations. We expect general and administrative expense to increase in absolute dollars due to additional legal fees and costs associated with accounting, insurance, investor relations, SEC and stock exchange compliance and other costs associated with being a public company, and we expect our general and administrative expense to fluctuate as a percentage of total revenue.

Stock-Based Compensation

We measure and recognize compensation expense for all stock-based awards, including stock options and purchase rights issued to employees based on the estimated fair value of the awards on the grant date. We use the Black-Scholes-Merton ("Black-Scholes") option pricing model to estimate the fair value of stock options and 2018 ESPP purchase rights. The fair value of restricted stock units ("RSUs"), is measured using the fair value of our common stock on the date of the grant. The fair value of stock options is recognized as expense on a straight-line basis over the requisite service period, which is generally two years. The fair value of RSUs is recognized as expense on a straight-line basis over the requisite service period, which generally ranges from two to four years. For stock-based awards granted to employees with a performance condition, we recognize stock-based compensation expense using the accelerated attribution method over the requisite service period when management determines it is probable that the performance condition will be satisfied. The fair value of the 2018 ESPP purchase rights is recognized as expense on the vesting period of each offering period. Stock-based compensation expense is recorded net of estimated forfeitures such that expense is recorded only for those stock-based awards that are expected to vest. Stock-based compensation expense is recorded in the consolidated statements of operations based on the employees' respective function.

Interest Expense

Interest expense primarily consists of interest charges associated with our secured line of credit, long-term debt facilities, financing obligations and capital lease obligations.

Other Income (Expense), Net

Other income (expense), net primarily consists of gains or losses associated with foreign currency fluctuations, net and of income earned on our cash and cash equivalents holdings in interest-bearing accounts. We have historically invested our cash in money-market funds.

Gain (Loss) on Revaluation of Warrant Liabilities

Warrants issued to investors and lenders that allow them to acquire our convertible preferred stock have been classified as liability instruments on our balance sheet. We record any changes in the fair value of these instruments between reporting dates as a separate line item in our statement of operations. Since the warrants issued were mandatorily convertible into common stock at the completion of our IPO, the liability related to these mandatorily converted warrants was reclassified to additional paid-in capital on the IPO date and total gains and losses for revaluation of warrant liabilities was recorded in the consolidated statement of operations.

Provision for Income Taxes

Provision for income taxes consists primarily of federal and state income taxes in the United States and income taxes in foreign jurisdictions in which we conduct business. We have provided a full valuation allowance on our U.S. deferred tax assets because we believe it is more likely than not that the deferred tax assets will not be realized. At December 31, 2018 , we had federal and state net operating loss carryforwards of $1.7 billion and $1.5 billion , respectively, which will expire, if unused, beginning in 2022 and 2028 , respectively.

Net Income (Loss) Attributable to Noncontrolling Interests

We allocate profits and losses to the noncontrolling interests under the hypothetical liquidation at book value ("HLBV") method. HLBV is a balance sheet-oriented approach for applying the equity method of accounting when there is a complex structure, such as our PPA entities. Net income (loss) attributable to noncontrolling interests is deducted from our net income (loss) in determining our net income (loss) attributable to common stockholders.

Comparison of the Years Ended December 31, 2018 and 2017

Revenue

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Product	$ 512,322	$ 179,768	$ 332,554	185.0 %
Installation	91,416	63,226	28,190	44.6 %
Service	82,385	76,904	5,481	7.1 %
Electricity	55,915	56,098	(183)	(0.3)%
Total revenue	$ 742,038	$ 375,996	$ 366,042	97.4 %

Total Revenue

Total revenue increase d by approximately $366.0 million , or 97.4% , for 2018 compared to 2017 . There were four principal drivers of this revenue increase .

First, product acceptances increase d by approximately 187 systems, or 30.1% , for 2018 compared to 2017 .

Second, we achieved a significantly higher mix of orders from customers where revenue is recognized on acceptance compared to orders where revenue is recognized over the term of the agreement. In 2018 , we recognized 100.0% of our orders at acceptance whereas only 79.0% of total acceptances in 2017 were recognized at acceptance.

Third, the Federal Investment Tax Credit (ITC) was reinstated on February 9, 2018. ITC was not available to the fuel cell industry in 2017, however, our revenue in 2018 includes the benefit of the reinstatement. The total revenue for 2018 included $171.1 million of benefit from ITC whereas the total revenue for 2017 included $9.6 million of benefit, thus an increase in benefit to revenue from ITC of $161.5 million compared to the same period in 2017 . The $171.1 million benefit of ITC in 2018 included $45.5 million benefit of the retroactive ITC for 2017 acceptances and in that sense was benefited by a one-time “catch-up” (including the 2017 benefit).

Lastly, the adoption of customer personalized applications, such as batteries and grid-independent solutions, increased in 2018 compared to 2017 . Customer orders that include these personalized applications generated, on average, higher revenue than our standard orders that do not include these personalized applications.

Product and installation revenue combined increased by approximately $360.7 million , or 148.5% , to $603.7 million for 2018 from $243.0 million for 2017 . Depending on the customer purchase option elected by our customers, the product, installation and electricity revenue for that contract will either be recognized up front at acceptance or ratably over the life of the contract. The ratable portion of the product and installation revenue increased approximately $0.2 million to $25.2 million for 2018 from $25.0 million for 2017. This immaterial increase was due to acceptances on orders during 2017 where revenue is recognized over the term of the agreement. The upfront portion of the product and install revenue increased approximately $360.5 million to $578.5 million for 2018 from $218.0 million for 2017. This increase in upfront product and install revenue was primarily due to the increase in upfront acceptances to 809 in 2018 from 489 in 2017. The upfront product and install average selling price increased to $7,155 per kilowatt for 2018, from $4,460 per kilowatt for 2017, primarily driven by the reinstatement of the ITC benefit, including the one-time FY17 retroactive ITC benefit recognized in 2018, and the increased sales of customer personalized applications.

Product Revenue

Product revenue increase d by approximately $332.6 million , or 185.0% , for 2018 compared to 2017 . This increase was driven by the increase in acceptances, higher mix of orders where revenue is recognized on acceptance, the ITC reinstatement, and an increase in the sales of customer personalized applications.

Installation Revenue

Installation revenue increase d by approximately $28.2 million , or 44.6% , from $63.2 million for 2017 to $91.4 million for 2018 . This increase was driven by the increase in acceptances, higher mix of orders where revenue is recognized on acceptance, and increase in the sales of customer personalized applications, partially offset by the lower installation revenue associated with one large customer in 2018 where the installation was performed by the customer and as a result, we did not have any installation revenue for that customer. In general, when a customer or, in the case of SK E&C in the Republic of Korea, a partner performs the installation service, we do not generate revenue for the installation.

Service Revenue

Service revenue increase d by approximately $5.5 million , or 7.1% for 2018 compared to 2017 . This was primarily due to the increase in the number of annual maintenance contract renewals driven by our growing fleet of installed Energy Servers.

Electricity Revenue

Electricity revenue decrease d by approximately $0.2 million , or 0.3% , for 2018 compared to 2017 , due to a normal fluctuation in energy produced by the PPA entities' Energy Servers.

Cost of Revenue

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Cost of revenue:				
Product	$ 374,590	$ 210,773	$ 163,817	77.7 %
Installation	119,474	59,929	59,545	99.4 %
Service	94,639	83,597	11,042	13.2 %
Electricity	36,265	39,741	(3,476)	(8.7)%
Total cost of revenue	$ 624,968	$ 394,040	$ 230,928	58.6 %
Gross profit (loss)	$ 117,070	$ (18,044)	$ 135,114	748.8 %

Total Cost of Revenue

Total cost of revenue increase d by approximately $230.9 million , or 58.6% , for 2018 compared to 2017 . Included as a component of total cost of revenue, stock-based compensation increased approximately $33.7 million for 2018 compared to 2017 . Total cost of revenue, excluding stock-based compensation, increased approximately $197.2 million , or 51.0% , to $583.5 million for 2018 compared to $386.3 million for 2017 . This increase in total cost of revenue was primarily attributable to higher product and install cost of revenue which was driven by an increase in the volume of product acceptances and a higher mix of orders with customers in which cost of revenue is recognized on acceptance, instead of ratably over the life of the agreement. Additionally there was an increase in the sales of customer personalized applications for 2018 . These applications generally have a cost associated with them and therefore cause an increase in the cost of revenue.

Combined product and installation cost of revenue increased approximately $223.4 million, or 82.5%, to $494.1 million for 2018, from $270.7 million for 2017. The ratable portion of the product and installation cost of revenue increased by approximately $1.6 million to $18.2 million for 2018 from $16.6 million in 2017. This increase was due to the increase in ratable acceptances through 2017 whose contract was started at various times throughout the year and therefore only recognized for a portion of the year, which would now have a full year of product and installation costs recognized in 2018. Product and installation stock-based expense increased approximately $30.2 million to $31.4 million for 2018 from $6.2 million for 2017. The remaining upfront portion of the product and installation cost of revenue, excluding stock based compensation, increased approximately $191.5 million to $438.6 million for 2018 from $247.1 million for 2017. This increase in upfront product and installation cost of revenue was primarily due to the increase in upfront acceptances to 809 in 2018 from 489 in 2017. The upfront product and installation average cost of revenue on a per kilowatt basis, also described as total install system cost ("TISC") increased to $5,425 per kilowatt for 2018 from $5,056 per kilowatt for 2017. The increase was primarily driven by the increase in the sales of customer personalized applications which have a higher per unit cost and the one-time cost associated with the reinstatement of ITC in 2018.

Cost of Product Revenue

Cost of product revenue increase d by approximately $163.8 million , or 77.7% , for 2018 compared to 2017 . This increase was driven by the increase in acceptances, higher mix of orders where cost of revenue is recognized on acceptance, increased costs from the sales of customer personalized applications, and an increase in stock-based compensation. Additionally, as a result of the reinstatement of the ITC program in February 2018, we were required to repay certain suppliers for previously negotiated contractual discounts. This one-time payment of $9.4 million was recorded to cost of product revenue.

Cost of Installation Revenue

Cost of installation revenue increase d by approximately $59.5 million , or 99.4% , for 2018 compared to 2017 . This increase was driven by the increase in acceptances, higher mix of orders where cost of revenue is recognized on acceptance, and increased costs from the sales of customer personalized applications where the installation is more complex, partially offset by the lower cost of installation associated with one large customer in 2018 where the installation was performed by the customer and as a result, we did not have any installation cost for that customer. In general, when we do not perform the installation function for a customer, such as in SK E&C in the Republic of Korea, we do not incur any installation costs on those orders.

Cost of Service Revenue

Cost of service revenue increase d by approximately $11.0 million , or 13.2% , for 2018 compared to 2017 . This increase in service cost was primarily due to more power module replacements required in the fleet as a result of a larger fleet of installed Energy Servers, as well as replacing older generation power modules during the normal service process.

Cost of Electricity Revenue

Cost of electricity revenue decrease d by approximately $3.5 million , or 8.7% , for 2018 compared to 2017 , mainly due to a gain recorded as a result of the fair value adjustment on our natural gas fixed price forward contract.

Gross Profit (Loss)

	Years Ended December 31,		Change
	2018	2017	
	(dollars in thousands)		
Gross Profit (Loss):			
Product	$ 137,732	$ (31,005)	$ 168,737
Installation	(28,058)	3,297	(31,355)
Service	(12,254)	(6,693)	(5,561)
Electricity	19,650	16,357	3,293
Total Gross Profit (Loss)	$ 117,070	$ (18,044)	$ 135,114
Gross Margin			
Product	27 %	(17)%	
Installation	(31)%	5 %	
Service	(15)%	(9)%	
Electricity	35 %	29 %	
Total Gross Margin	16 %	(5)%	

Total Gross Profit

Gross profit improve d $135.1 million , in 2018 compared to 2017 . This improvement was generally as a result of higher product margins due to the increase in product acceptances which drove higher volume, a higher mix of orders recognized at acceptance versus ratably over the life of the agreement, and the reinstatement of the ITC.

Product Gross Profit

Product gross profit increase d $168.7 million in 2018 compared to 2017 . This increase was due to the increase in product acceptances which drove higher volume, a higher mix of orders recognized at acceptance versus ratably over the life of the Bloom Electrons' or managed service contracts and the reinstatement of the ITC.

Installation Gross Loss

Installation gross loss increase d $31.4 million in 2018 compared to 2017 . This increase in loss was due to higher installation costs associated with the initial installations for the new customer personalized applications. Our installation costs are driven by the complexity of each site at which we are installing an Energy Server, including personalized applications, as well as the size of each installation, which can cause variability in installation costs from year-to-year.

Service Gross Loss

Service gross loss increased $5.6 million in 2018 compared to 2017 . This decrease was primarily due to more power module replacements required in the fleet as a result of a larger fleet of installed Energy Servers, as well as replacing older power modules during the normal service process.

Electricity Gross Profit

Electricity gross profit increase d $3.3 million , or 20.1% in 2018 compared to 2017 mainly due to a gain recorded as a result of the fair value adjustment on a natural gas fixed price forward contract.

Operating Expenses

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Research and development	$ 89,135	$ 51,146	$ 37,989	74.3%
Sales and marketing	62,975	32,415	30,560	94.3%
General and administrative	118,817	55,674	63,143	113.4%
Total operating expenses	$ 270,927	$ 139,235	$ 131,692	94.6%

Total Operating Expenses

Total operating expenses increase d $131.7 million , or 94.6% , in 2018 compared to 2017 . Included as a component of total operating expenses, stock-based compensation expenses increase d approximately $116.1 million for 2018 compared to 2017 , accounting for much of the year-over-year increase. The increase in stock-based compensation is primarily attributable to a one-time employee grant of restricted stock units (RSUs) at the time of our IPO, and that have a 2-year vesting period. These RSUs provided us with a market equity employee retention vehicle to help us compete for talent across our peer group. Additionally, the stock-based compensation included some previously granted RSUs that vested upon the completion of our IPO. Total operating expenses, excluding stock-based compensation, increase d approximately $15.6 million , or 13.4% , in 2018 compared to 2017 . This increase was primarily due to compensation related expenses associated with hiring new employees, investments for next generation servers and customer personalized application technology development, and expenses related to our efforts to increase demand and raise market awareness of our Energy Server solutions, as well as to drive new customer financing partners.

Research and Development

Research and development expenses increase d by approximately $38.0 million , or 74.3% , in 2018 compared to 2017 . Included as a component of research and development expenses, stock-based compensation expenses increase d by approximately $33.5 million for 2018 compared to 2017 . The majority of this increase was due to stock-based compensation expenses related to the RSU grants made at the time of our IPO. Total research and development expenses, excluding stock-based compensation, increase d by approximately $4.5 million , or 9.9% , for 2018 compared to 2017 . This increase was primarily due to compensation-related expenses related to hiring new employees and investments made for customer personalized applications, such as a battery solution, sustaining engineering projects for the current Energy Server platform and investments made for our next generation technology development.

Sales and Marketing

Sales and marketing expenses increase d by approximately $30.6 million , or 94.3% , in 2018 compared to 2017 . Included as a component of sales and marketing expenses, stock-based compensation expenses increase d by approximately $27.6 million for 2018 compared to 2017 . The majority of this increase was due to stock-based compensation expenses related to the RSU grants made at the time of our IPO. Total sales and marketing expenses, excluding stock-based compensation, increase d by approximately $3.0 million , or 10.7% , for 2018 compared to 2017 . This increase was primarily due to compensation expenses related to hiring new employees and expenses related to efforts to increase demand and raise market awareness of our Energy Server solutions, expanding outbound communications, as well as efforts to attract new customer financing partners.

General and Administrative

General and administrative expenses increase d by approximately $63.1 million , or 113.4% , in 2018 compared to 2017 . Included as a component of general and administrative expenses, stock-based compensation expenses increase d by approximately $55.0 million for 2018 compared to 2017 . The majority of this increase was due to stock-based compensation expenses related to the RSU grants made at the time of our IPO. Total general and administrative expenses, excluding stock-based compensation, increase d by approximately $8.2 million , or 18.9% , for 2018 compared to 2017 . The increase in general and administrative expenses was due to an increase in compensation related expenses associated with hiring new employees to support public company readiness across accounting and legal functions, expenses related to becoming a public company and information technology related expenses for infrastructure and security support.

Stock-Based Compensation

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Cost of revenue	$ 41,481	$ 7,734	$ 33,747	436.3%
Research and development	39,030	5,560	33,470	602.0%
Sales and marketing	32,284	4,684	27,600	589.2%
General and administrative	67,489	12,501	54,988	439.9%
Total stock-based compensation	$ 180,284	$ 30,479	$ 149,805	491.5%

Total stock-based compensation increase d $149.8 million , or 491.5% , in 2018 compared to 2017 . Of the $180.3 million in stock based compensation for 2018 , approximately $139.1 million was related to one-time employee grant of RSUs that were issued at the time of our IPO and that have a 2-year vesting period. These RSUs provided us with a market equity employee retention vehicle necessary to compete for talent across our peer group. In addition, the stock-based compensation included some previously granted RSUs that vested upon completion of our IPO.

Other Income and Expense

	Years Ended December 31,		Change
	2018	2017	
	(in thousands)		
Interest income	$ 4,322	$ 759	$ 3,563
Interest expense	(76,936)	(96,358)	19,422
Interest expense, related parties	(8,893)	(12,265)	3,372
Other expense, net	(999)	(491)	(508)
Loss on revaluation of warrant liabilities and embedded derivatives	(21,590)	(14,995)	(6,595)
Total	$ (104,096)	$ (123,350)	$ 19,254

Total Other Expense

Total other expense decrease d $19.3 million in 2018 compared to 2017 . This decrease was primarily due to the decrease in interest expense following the conversion of a portion of our debt into equity at the time of the IPO.

Interest Income

Interest income increased $3.6 million in 2018 compared to 2017 . This increase was primarily due to the increase in interest on the short term investment balances which increased from proceeds from the IPO.

Interest Expense

Interest expense decrease d $19.4 million in 2018 compared to 2017 . This decrease was primarily due to lower amortization expense of our debt derivatives and due to the conversion of a portion of our debt into equity at the time of the IPO.

Interest Expense, Related Parties

Interest expense, related parties decreased $3.4 million due to the conversion of $40.1 million of our 8% Notes from related parties into equity at the time of the IPO.

Other Income (Expense), net

Other expense increase d $27.4 million in 2018 compared to 2017 . This change was primarily due to an increase in interest income, partially offset by foreign currency translation.

Revaluation of Warrant Liabilities and Embedded Derivatives

For 2018 , the loss on revaluation of warrant liabilities and embedded derivatives increase d $6.6 million when compared to 2017 . This was due to an increase in our derivative valuation adjustment of $13.7 million and offset by the gain recognized from the revaluation of the preferred warrant liability of $6.6 million, which was driven by our valuation at the date of the IPO. Our convertible preferred stock warrants were converted into common stock warrants upon the completion of the IPO. At that time, the convertible preferred stock warrant liability was reclassified to additional paid-in capital. Upon the IPO, the final valuation of the embedded derivatives related to the 6% Notes was reclassified from a derivative liability to additional paid-in capital.

Provision for Income Taxes

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Income tax provision	$ 1,537	$ 636	$ 901	141.7%

Income tax provision increase d in 2018 compared to 2017 and was primarily due to fluctuations in the effective tax rates on income earned by international entities.

Net Loss Attributable to Noncontrolling Interests and Redeemable Noncontrolling Interests

	Years Ended December 31,		Change	
	2018	2017	Amount	%
	(dollars in thousands)			
Net loss attributable to noncontrolling interests and redeemable noncontrolling interests	$ (17,736)	$ (18,666)	$ 930	5.0%

Total loss attributable to noncontrolling interests decrease d $0.9 million , or 5.0% , in 2018 compared to 2017 . The net loss decrease d due to the allocation of the Company's lower net loss using HLBV allocation methodology.

Comparison of the Years Ended December 31, 2017 and 2016

Revenue

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Product	$ 179,768	$ 76,478	$ 103,290	135.1%
Installation	63,226	16,584	46,642	281.2%
Service	76,904	67,622	9,282	13.7%
Electricity	56,098	47,856	8,242	17.2%
Total revenue	$ 375,996	$ 208,540	$ 167,456	80.3%

Total Revenue

Total revenue increase d by approximately $167.5 million , or 80.3% , for 2017 compared to 2016 . Revenue across all product lines increased year-over-year, driving the increase in total revenue despite the loss of the Federal Investment Tax Credit ("ITC") benefit, which was not available to the fuel cell industry in 2017. The total revenue for the year ended December 31, 2016 included $35.9 million of benefit from ITC, while the total revenue for the year ended December 31, 2017 included $9.6 million of benefit from ITC, driven by the loss of the ITC in 2017.

Product and install revenue combined increased by approximately $149.9 million, or 161.1% from $93.1 million for the year ended December 31, 2016, to $243.0 million for the year ended December 31, 2017. The ratable portion of the product and

install revenue increased approximately $15.9 million from $9.1 million in 2016 to $25.0 million in 2017. This increase was due to the increase in ratable acceptances through 2017. The upfront portion of the product and install revenue increased by approximately $134.0 million from $84.0 million in 2016 to $218.0 million in 2017. This increase in upfront product and install revenue was primarily due to the increase in upfront acceptances from 109 in 2016 to 489 in 2017. The upfront product and install average selling price decreased from $7,705 per kilowatt in 2016 to $4,460 per kilowatt in 2017 due to the loss of ITC in 2017.

Product Revenue

Product revenue increase d by approximately $103.3 million , or 135.1% , for 2017 compared to 2016 . Despite a decrease in acceptances from 687 systems in 2016 to 622 systems in 2017 , revenue increased due to a significantly higher mix of orders through direct sales to customers, where revenue is recognized upfront at the time of acceptance, compared to orders where revenue is recognized over the term of the agreement (generally 10 to 21 years). In 2016, 109 acceptances or 16% of total acceptances of 687 was recognized upfront at the time of the acceptance, while in 2017, 489 acceptances, or 79% of total acceptances of 622 was recognized upfront at the time of acceptance. A higher mix of upfront revenue recognition drove the increase in revenue.

Installation Revenue

Installation revenue increase d by approximately $46.6 million , or 281.2% , from $16.6 million for 2016 to $63.2 million for 2017 . Similar to product revenue, despite a decrease in acceptances from 687 systems in 2016 to 622 systems in 2017 and the loss of ITC, this increase was driven by the higher mix of orders through our direct purchase programs, where revenue is recognized upfront at acceptance instead of ratably over the life of the contract.

Service Revenue

Service revenue increase d by approximately $9.3 million , or 13.7% for 2017 compared to 2016 . This was primarily due to the increase in the number of annual maintenance contract renewals driven by our expanding customer base and growing fleet of installed Energy Servers.

Electricity Revenue

Electricity revenue increase d by approximately $8.2 million , or 17.2% , for 2017 compared to 2016 , due to an increase in energy produced by the PPA entities' Energy Servers.

Cost of Revenue

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Cost of revenue:				
Product	$ 210,773	$ 103,283	$ 107,490	104.1 %
Installation	59,929	17,725	42,204	238.1 %
Service	83,597	155,034	(71,437)	(46.1)%
Electricity	39,741	35,987	3,754	10.4 %
Total cost of revenue	$ 394,040	$ 312,029	$ 82,011	26.3 %
Gross profit (loss)	$ (18,044)	$ (103,489)	$ 85,445	748.8 %

Total Cost of Revenue

Total cost of revenue increase d by approximately $82.0 million , or 26.3% , for 2017 compared to 2016 . Included as a component of total cost of revenue, stock-based compensation increase d approximately $1.7 million for 2017 compared to 2016 . Total cost of revenue, excluding stock-based compensation, increase d approximately $80.3 million , or 26.2% , to $386.3 million for 2017 compared to $306.0 million for 2016 . This increase in total cost of revenue was primarily attributable to higher product and install cost of revenue which was driven by a higher mix of orders with customers in which cost of revenue is recognized on acceptance. The product and install cost of revenue increased by approximately $149.7 million, or 123.7% from $121.0 million for the year ended December 31, 2016, to $270.7 million for the year ended December 31, 2017. The ratable portion of the product and install cost of revenue increased approximately $11.4 million from $5.2 million in 2016 to $16.6 million in 2017. This increase was due to the increase in ratable acceptances through 2017. The product and install cost of revenue includes stock based compensation which also increased by $1.6 million from $5.4 million for the year ended December 31, 2016, to $7.0 million for the year ended December 31, 2017. The remaining upfront portion of the product and install cost of revenue excluding stock based compensation increased approximately $136.7 million from $110.4 million in 2016 to $247.1 million in 2017. This increase in upfront product and install cost of revenue was due to the increase in upfront acceptances from 109 in 2016 to 489 in 2017. The upfront product and install average cost of revenue on a per kilowatt basis, also described as total install system cost ("TISC") decreased from $10,127 per kilowatt in 2016 to $5,056 per kilowatt in 2017 due to the increase in upfront acceptances.

Cost of Product Revenue

Cost of product revenue increase d by approximately $107.5 million , or 104.1% , for 2017 compared to 2016 . This increase was driven by a higher mix of orders where cost of revenue is recognized on acceptance, partially offset by our ongoing cost reduction efforts.

Cost of Installation Revenue

Cost of installation revenue increase d by approximately $42.2 million , or 238.1% , for 2017 compared to 2016 . This increase was driven by the higher mix of orders where cost of revenue is recognized on acceptance.

Cost of Service Revenue

Cost of service revenue decrease d by approximately $71.4 million , or 46.1% , for 2017 compared to 2016 . This improvement was associated with ongoing operations and maintenance of deployed Energy Servers in the ordinary course of
business due to a lower number of power module replacements as the life of our product continues to lengthen.

Cost of Electricity Revenue

Cost of electricity revenue increase d by approximately $3.8 million , or 10.4% , for 2017 compared to 2016 , mainly due to a gain recorded as a result of the fair value adjustment on our natural gas fixed price forward contract.

Gross Profit (Loss)

	Years Ended December 31,		Change
	2017	2016	
		(dollars in thousands)	
Gross Profit (Loss):			
Product	$ (31,005)	$ (26,805)	$ (4,200)
Installation	3,297	(1,141)	4,438
Service	(6,693)	(87,412)	80,719
Electricity	16,357	11,869	4,488
Total Gross Profit (Loss)	$ (18,044)	$ (103,489)	$ 85,445
Gross Margin			
Product	(17)%	(35)%	
Installation	5 %	(7)%	
Service	(9)%	(129)%	
Electricity	29 %	25 %	
Total Gross Margin	(5)%	(50)%	

Total Gross Profit (Loss)

Gross loss improve d $135.1 million , in 2017 compared to 2016 . This improvement was generally driven by improvement in the service loss.

Product Gross Loss

Product gross loss increase d $4.2 million in 2017 compared to 2016 . This increase was due to the loss of ITC in 2017, partially offset by higher profit from a higher mix of orders recognized at acceptance.

Installation Gross Profit

Installation gross profit increase d $4.4 million in 2017 compared to 2016 . Our installation costs are driven by the complexity of each site at which we are installing an Energy Server, including personalized applications, as well as the size of each installation, which can cause variability in installation profit from year-to-year.

Service Gross Loss

Service gross loss decrease d $80.7 million in 2017 compared to 2016 . This decrease was primarily due to a lower number of required power module replacements as a result of the longer lives of our Energy Servers.

Electricity Gross Profit

Electricity gross profit increase d $4.5 million , or 37.8% , in 2017 compared to 2016 due to normal fluctuations in system performance offset by a gain recorded as a result of the fair value adjustment on our natural gas fixed price forward contract.

Operating Expenses

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Research and development	$ 51,146	$ 46,848	$ 4,298	9.2 %
Sales and marketing	32,415	29,101	3,314	11.4 %
General and administrative	55,674	61,545	(5,871)	(9.5)%
Total operating expenses	$ 139,235	$ 137,494	$ 131,692	94.6 %

Total Operating Expenses

Total operating expenses increased $1.7 million , or 1.3% , in 2017 compared to 2016 . Included as a component of total operating expenses, stock-based compensation expenses increased approximately $0.6 million for 2017 compared to 2016 . Total operating expenses, excluding stock-based compensation, increased approximately $1.1 million, or 1.0%, for 2017 compared to 2016 . This increase was primarily due to compensation related expenses related to hiring new employees, investments for next generation technology development, and expenses related to expanding the market and driving new customer financing partners.

Research and Development

Research and development expenses increased by approximately $4.3 million , or 9.2% , in 2017 compared to 2016 . Included as a component of research and development expenses, stock-based compensation expenses increased approximately $0.9 million for 2017 compared to 2016 . Total research and development expenses, excluding stock-based compensation, increased approximately $3.4 million, or 8.1%, for 2017 compared to 2016 . This increase was primarily due to compensation-related expenses related to hiring new employees and investments in next generation technology development.

Sales and Marketing

Sales and marketing expenses increased by approximately $3.3 million , or 11.4% , in 2017 compared to 2016 . Included as a component of sales and marketing expenses, stock-based compensation expenses decreased approximately $0.9 million for 2017 compared to 2016 . Total sales and marketing expenses, excluding stock-based compensation, increased approximately $4.2 million, or 18.0%, for 2017 compared to 2016 . This increase was primarily due to compensation expenses related to hiring new employees and expenses related to expanding the market and driving new customer financing partners.

General and Administrative

General and administrative expenses decreased by approximately $5.9 million , or 9.5% , in 2017 compared to 2016 . Included as a component of general and administrative expenses, stock-based compensation expenses increased by approximately $0.6 million for 2017 compared to 2016 . Total general and administrative expenses, excluding stock-based compensation, decreased approximately $6.5 million, or 13.1%, for 2017 compared to 2016 . The decrease in general and administrative expenses was primarily due to a decrease in professional service expenses of $5.8 million as a result of decreased legal expenses associated with closing costs incurred related to our traditional PPAs in the prior year, as compared to no closing costs in 2017.

Stock-Based Compensation

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Cost of revenue	$ 7,734	$ 6,005	$ 1,729	28.8 %
Research and development	5,560	4,686	874	18.7 %
Sales and marketing	4,684	5,600	(916)	(16.4)%
General and administrative	12,501	11,866	635	5.4 %
Total stock-based compensation	$ 30,479	$ 28,157	$ 2,322	8.2 %

Total stock-based compensation increase d $2.3 million , or 8.2% , in 2017 compared to 2016 .

Other Income and Expense

	Years Ended December 31,		Change
	2017	2016	
	(in thousands)		
Interest income	$ 759	$ 394	$ 365
Interest expense	(96,358)	(73,559)	(22,799)
Interest expense to related parties	(12,265)	(7,631)	(4,634)
Other expense, net	(491)	(773)	282
Loss on revaluation of warrant liabilities and embedded derivatives	(14,995)	(13,035)	(1,960)
Total	$ (123,350)	$ (94,604)	$ (28,746)

Total Other Expense

Total other expense increase d $28.7 million in 2017 compared to 2016 . This increase was primarily due to the increase in interest expense.

Interest Income

Interest income increase d $0.4 million in 2017 compared to 2016 . This increase was primarily due to higher cash balances in 2017.

Interest Expense and Interest Expense to Related Parties

Interest expense and interest expense to related parties increase d $ 27.4 million in 2017 compared to 2016 . This increase was primarily due to higher balances of financing obligations and outstanding debt in 2017, compared to the prior year.

Other Income (Expense)

Other expense decreased $ 0.3 in 2017 compared to 2016 . This change was primarily due to a decrease in the impact of foreign currency translation.

Revaluation of Warrant Liabilities and Embedded Derivatives

For 2017 , the loss on revaluation of warrant liabilities and embedded derivatives increase d $2.0 million when compared to 2016 . This was primarily due to an increase in our derivative valuation adjustment of $13.4 million, offset by a decrease in our warrant valuation of $11.4 million.

Provision for Income Taxes

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Income tax provision	$ 636	$ 729	$ (93)	(12.8)%

Income tax provision decrease d in 2017 compared to 2016 and was primarily due to fluctuations in the effective tax rates on income earned by international entities.

Net Loss Attributable to Noncontrolling Interests and Redeemable Noncontrolling Interests

	Years Ended December 31,		Change	
	2017	2016	Amount	%
	(dollars in thousands)			
Net loss attributable to noncontrolling interests and redeemable noncontrolling interests	$ (18,666)	$ (56,658)	$ 37,992	67.1%

Total loss attributable to noncontrolling interests decreased $38.0 million , or 67.1% , in 2017 compared to 2016 . The net loss decreased due to the allocation of the Company's lower net loss using HLBV allocation methodology.

Liquidity and Capital Resources

As of December 31, 2018 , we had an accumulated deficit of approximately $2.6 billion . We have financed our operations, including the costs of acquisition and installation of Energy Servers, mainly through a variety of financing arrangements and PPA Entities, credit facilities from banks, sales of our preferred and common stock, debt financings and cash generated from our operations. As of December 31, 2018 , we had $400.5 million of total outstanding debt and other long term liabilities. See Note 6 - *Outstanding Loans and Security Agreements* for a complete description of our outstanding debt. As of December 31, 2018 and December 31, 2017 , we had cash and cash equivalents and short-term investments of $325.1 million and $130.6 million , respectively.

We believe that our existing cash and cash equivalents and short-term investments will be sufficient to meet our operating cash flow, capital requirements and other cash flow needs for at least the next 12 months. Our future capital requirements may vary materially from those currently planned and will depend on many factors, including our rate of revenue growth, the timing and extent of spending on research and development efforts and other business initiatives, the rate of growth in the volume of system builds, the expansion of sales and marketing activities, market acceptance of our products, the timing of receipt by us of distributions from our PPA Entities and overall economic conditions. We do not expect to receive significant cash distributions from our PPA Entities. To the extent that current and anticipated future sources of liquidity are insufficient to fund our future business activities and requirements, we may be required to seek additional debt or equity financing.

In July 2018 , we successfully completed an IPO with the sale of 20,700,000 shares of our Class A common stock at a price of $15.00 per share, resulting in cash proceeds of $282.3 million , net of underwriting discounts, commissions and estimated offering costs. We intend to use the net proceeds from this offering for general corporate purposes including research and development and sales and marketing activities, general and administrative matters and capital expenditures.

Cash Flows - Years Ended December 31, 2018 and 2017

Overview

A summary of our sources and uses of cash, cash equivalents and restricted cash for the Company for December 31, 2018 and 2017 is as follows (in thousands):

	Years Ended December 31,		Change
	2018	2017	
Net cash provided by (used in):			
Operating activities	$ (58,417)	$ (67,176)	$ 8,759
Investing activities	(94,829)	(31,933)	(62,896)
Financing activities	253,119	61,806	191,313
Net cash provided by (used in)	$ 99,873	$ (37,303)	$ 137,176

In 2018 , we generated cash of $99.9 million and in 2017 , we used cash of $37.3 million . In 2018 , cash used in operating activities decreased by $8.8 million to cash used in operating activities of $58.4 million in 2018 from cash used in operating activities of $67.2 million in 2017 . The improvement in cash used in operating activities for 2018 was due to an increase of 187 acceptances over the period relative to the same period in 2017 , as well as the reinstatement of the ITC.

In 2018 , cash used in investing activities increased by $62.9 million to cash used of $94.8 million in 2018 from cash used in operating activities of $31.9 million in 2017 . In 2018 , cash provided by financing activities increased by $191.3 million to cash provided of $253.1 million in 2018 from cash provided of $61.8 million in 2017 .

Net cash provided by our variable interest entities (the PPA Entities) which are incorporated into the consolidated statement of cash flows for December 31, 2018 and 2017 , is as follows (in thousands):

	Years Ended December 31,		Change
	2018	2017	
PPA Entities [1]			
Net cash provided by PPA operating activities	$ 30,613	$ 24,797	$ 5,816

[1] The PPA Entities' operating cash flows, which is a subset of our consolidated cash flows and represents the stand-alone cash flows prepared in accordance with U.S. GAAP, consists principally of cash used to run the operations of the PPA Entities, the purchase of Energy Servers from us and principal reductions in loan balances. We believe this presentation of net cash provided by (used in) PPA activities is useful to provide the reader with the impact to consolidated cash flows of the PPA Entities in which we have only a minority interest.

Operating Activities

In 2018 , we used approximately $58.4 million of cash in operating activities. This use of cash resulted primarily from a net operating loss of $259.5 million , which included net non-cash charges of $269.7 million . Non-cash items include depreciation of approximately $43.5 million , a revaluation of derivative contracts of $28.5 million , stock-based compensation of $180.3 million and amortization of debt discount of $20.5 million , partially offset by a revaluation of preferred stock warrants of $9.1 million .

Cash used in operating activities consisted primarily of an increase in inventory of $42.2 million , an increase in accounts receivable of $54.6 million , a decrease in deferred revenue and customer deposits of approximately $92.0 million relating to upfront milestone payments received from customers and an increase in prepaid expenses and other current assets of $7.1 million , partially offset by a decrease in deferred cost of revenue of $88.3 million , an increase in accounts payable of $18.3 million , a decrease in other current liabilities of $6.8 million and an increase in other long-term liabilities of $18.2 million .

In 2017 , we used approximately $67.2 million in operating activities. This use of cash resulted primarily from a net operating loss of $281.3 million , which included net non-cash charges of $135.7 million . Non-cash items include depreciation of approximately $46.1 million , a revaluation of derivative contracts of $14.8 million , stock-based compensation of $30.5 million and amortization of debt discount of $43.0 million . Cash used in operating activities consisted primarily of an increase in deferred cost of revenue of $71.0 million , an increase in inventory of $7.1 million , and an increase in prepaid expenses and other current assets of $2.2 million , partially offset by an increase in accounts payable of $7.1 million , a decrease in accounts receivable of $4.8 million , an increase in other long term liabilities of $43.2 million , an increase of accrued and other current liabilities of $8.6 million and an increase in deferred revenue and customer deposits of $91.9 million relating to upfront milestone payments received from customers.

Net cash used in operating activities decrease d $8.8 million for 2018 when compared to 2017 . This decrease was primarily the result of a decrease in our net loss of $21.8 million . Other activities providing cash flow improvements were a decrease in deferred cost of revenue of $88.3 million compared to the prior year's increase of $71.0 million and an increase in accounts payable of $18.3 million compared to an increase of $7.1 million in the prior year. Activities which partially offset the decrease of cash used in operating activities were an increase in inventory for 2018 of $42.2 million compared to the prior year's minimal increase, an increase in accounts receivable of $54.6 million compared to the prior year's decrease of $4.8 million and also from a decrease in deferred revenue and customer deposits of $92.0 million in the current year compared to an increase of $91.9 million of those accounts in the prior year.

Investing Activities

Our investing activities consist primarily of capital expenditures, which include our expenditures to maintain or increase the scope of our manufacturing operations. These capital expenditures also include leasehold improvements to our office space, purchases of office equipment, IT infrastructure equipment and furniture and fixtures.

In 2018 , we used approximately $94.8 million in cash from investing activities. This is primarily the result of cash used in investment account activities of $76.9 million (net) and $14.7 million used for the purchase of fixed assets.

In 2017 , we used approximately $31.9 million in cash from investing activities. This is primarily the result of cash used for the acquisition of investments of $26.8 million (net) and $5.1 million used for the purchase of fixed assets.

Net cash used in investing activities increase d (worsened) by $59.6 million for 2018 when compared to 2017 . The change is primarily due to the investment of cash proceeds received from our IPO in 2018 in marketable securities. Our use of cash in 2018 for the purchase of property, plant and equipment increased when compared to the same period in 2017 as we scaled investment in our next generation technology and infrastructure.

Financing Activities

In 2018 , we had $253.1 million of net cash provided by financing activities. This cash resulted primarily from the completion of our IPO in July 2018 , which resulted in net proceeds of $287.0 million , partially offset by distributions paid to our PPA Equity Investors of $15.3 million and repayments of $20.2 million of long-term debt.

In 2017 , we had $61.8 million provided by financing activities. We had net proceeds of $93.9 million from the issuance of debt and proceeds from noncontrolling interests of $13.7 million , offset by distributions paid to our PPA Equity Investors of $23.7 million and repayments of $21.4 million of long-term debt.

Net cash provided by financing activities increase d $191.3 million for 2018 when compared to 2017 , primarily as a result of our IPO in July 2018 .

Comparison of the Years Ended December 31, 2017 and 2016

Overview

A summary of the sources and uses of our cash, cash equivalents and restricted cash for the years ended December 31, 2017 and 2016 is as follows (in thousands):

	Years Ended December 31,		Change
	2017	2016	
Net cash used in:			
Operating activities	$ (67,176)	$ (282,826)	$ 215,650
Investing activities	(31,933)	(8,979)	(22,954)
Financing activities	61,806	283,383	(221,577)
Net cash used	$ (37,303)	$ (8,422)	$ (28,881)

In 2017 , we used cash of $37.3 million . In 2016 , we used cash of $8.4 million . In 2017 , cash used in operating activities decrease d (improved) $215.7 million to cash used of $67.2 million from cash used of $282.8 million in 2016 . The improvement in cash used by operating activities for 2017 was due to a decrease in cash used for customer financing receivable.

In 2017 , cash used in investing activities increase d (worsened) $23.0 million to cash used of $31.9 million from cash used of $9.0 million in 2016 . In 2017 , cash provided by financing activities decrease d $221.6 million to cash provided of $61.8 million from cash provided of $283.4 million in 2016 .

Net cash provided by our variable interest entities (the PPA Entities) which are incorporated into the consolidated statement of cash flows for December 31, 2018 and 2016 is as follows (in thousands):

	Years Ended December 31,		Change
	2017	2016	
PPA Entities [1]			
Net cash provided by PPA operating activities	$ 24,797	$ (272,933)	$ 297,730

[1] The PPA Entities' operating cash flows, which is a subset of our consolidated cash flows and represents the stand-alone cash flows prepared in accordance with U.S. GAAP, consists principally of cash used to run the operations of the PPA Entities, the purchase of Energy Servers from us and principal reductions in loan balances. We believe this presentation of net cash provided by (used in) PPA activities is useful to provide the reader with the impact to consolidated cash flows of the PPA Entities in which we have only a minority interest.

Operating Activities

In 2017 , we used approximately $67.2 million of cash in operating activities. This use of cash resulted primarily from a net operating loss of $281.3 million , which included net non-cash charges of $135.7 million . Non-cash items include depreciation of approximately $46.1 million , a revaluation of derivative contracts of $14.8 million , stock-based compensation of $30.5 million and amortization of debt discount of $43.0 million .

Cash used in operating activities consisted primarily of an increase in deferred cost of revenue of $71.0 million , an increase in inventory of $7.1 million , and an increase in prepaid expenses and other current assets of $2.2 million , partially offset by an increase in accounts payable of $7.1 million , a decrease in accounts receivable of $4.8 million , an increase in other long term liabilities of $43.2 million , an increase of accrued and other current liabilities of $8.6 million and an increase in deferred revenue and customer deposits of approximately $91.9 million relating to upfront milestone payments received from customers.

In 2016 , we used approximately $282.8 million of cash in operating activities. This use of cash resulted primarily from a net operating loss of $336.3 million , which included net non-cash charges of $116.8 million . Non-cash items include depreciation of approximately $43.1 million , a revaluation of derivative contracts of $1.3 million , stock-based compensation of $28.2 million and amortization of debt discount of $28.9 million .

Cash used in operating activities consisted primarily of an increase in customer financing receivable of $211.7 million , an increase in deferred cost of revenue of $84.7 million , an increase in accounts receivable of $0.7 million , and an increase in prepaid expenses and other current assets of $8.4 million , partially offset by an increase in deferred revenue and customer deposits of approximately $183.6 million relating to upfront milestone payments received from customers, an increase in accounts payable of $4.8 million , an increase in other current liabilities of $11.3 million and an increase in other long-term liabilities of $46.8 million .

Net cash used in operating activities decrease d (improved) $215.7 million for 2017 when compared to 2016 . This was primarily the result of an improvement in our net loss of $281.3 million .

Investing Activities

In 2017 , we used approximately $31.9 million in cash from investing activities. This is primarily the result of cash used for the acquisition of investments of $26.8 million (net) and $5.1 million used for the purchase of fixed assets.

In 2016 , we used approximately $9.0 million in cash from investing activities attributable to $9.0 million used for the purchase of fixed assets.

Net cash used in investing activities increase d (worsened) $23.0 million for 2017 when compared to 2016 . The change is primarily due to investment account activity in 2017 . Our use of cash in 2017 for the purchase of property, plant and equipment did not change significantly when compared to the same period in 2016 .

Financing Activities

In 2017 , we had $61.8 million provided by financing activities. We had net proceeds of $93.9 million from the issuance of debt and proceeds from noncontrolling interests of $13.7 million , offset by distributions paid to our PPA Equity Investors of approximately $23.7 million and repayments of $21.4 million of long-term debt.

In 2016 , we had $283.4 million provided by financing activities. We had net proceeds of approximately $148.3 million from the issuance of debt and proceeds from noncontrolling interests of $209.9 million , offset by distributions paid to our PPA Equity Investors of approximately $45.8 million , repayments of $33.2 million of long-term debt.

Net cash provided by financing activities decrease d $221.6 million for 2017 when compared to 2016 , primarily as a result of the decrease in amounts received from noncontrolling and redeemable noncontrolling interests in the same twelve month period in 2016 .

Outstanding Loans and Security Agreements

The following is a summary of our debt as of December 31, 2018 (in thousands):

	Unpaid Principal Balance	Net Carrying Value			Unused Borrowing Capacity
		Current	Long-Term	Total	
LIBOR + 4% term loan due November 2020	$ 3,286	$ 1,686	$ 1,528	$ 3,214	$ —
5% convertible promissory note due December 2020	33,104	—	34,706	34,706	—
6% convertible promissory notes due December 2020	296,233	—	263,284	263,284	—
10% notes due July 2024	100,000	7,000	88,555	95,555	—
Total recourse debt	432,623	8,686	388,073	396,759	—
5.22% senior secured term notes due March 2025	79,698	11,994	66,572	78,566	—
7.5% term loan due September 2028	40,538	2,200	34,119	36,319	—
LIBOR + 5.25% term loan due October 2020	24,723	827	23,089	23,916	—
6.07% senior secured notes due March 2030	83,457	2,469	79,868	82,337	—
LIBOR + 2.5% term loan due December 2021	125,456	3,672	119,712	123,384	—
Letters of Credit due December 2021	—	—	—	—	1,220
Total non-recourse debt	353,872	21,162	323,360	344,522	1,220
Total debt	$ 786,495	$ 29,848	$ 711,433	$ 741,281	$ 1,220

Recourse debt refers to debt that Bloom Energy Corporation has an obligation to pay. Non-recourse debt refers to debt that is recourse to only specified assets or subsidiaries of the Company. The differences between the unpaid principal balances and the net carrying values are due to debt discounts and deferred financing costs. We were in compliance with all of our financial covenants as of December 31, 2018 and 2017 .

Recourse Debt Facilities

LIBOR + 4% Term Loan due November 2020 - In May 2013, we entered into a $5.0 million credit agreement and a $12.0 million financing agreement to help fund the building of a new facility in Newark, Delaware. The $5.0 million credit agreement expired in December 2016. The $12.0 million financing agreement has a term of 90 months, payable monthly at a variable rate equal to one-month LIBOR plus the applicable margin. The weighted average interest rate as of December 31, 2018 and 2017 was 5.9% and 5.1% , respectively. The loan requires monthly payments and is secured by the manufacturing facility. In addition, the credit agreements also include a cross-default provision which provides that the remaining balance of borrowings under the agreements will be due and payable immediately if a lien is placed on the Newark facility in the event we default on any indebtedness in excess of $100,000 individually or $300,000 in the aggregate. Under the terms of these credit agreements, we are required to comply with various restrictive covenants. As of December 31, 2018 and 2017 , the debt outstanding was $3.3 million and $4.9 million , respectively.

5% Convertible Promissory Notes due 2020 (Originally 8% Convertible Promissory Notes due December 2018) - Between December 2014 and June 2016, we issued $193.2 million of three-year convertible promissory notes ("8% Notes") to certain investors. The 8% Notes had a fixed interest rate of 8% compounded monthly, due at maturity or at the election of the investor with accrued interest due in December of each year.

On January 18, 2018, amendments were finalized to extend the maturity dates for all the 8% Notes to December 2019. At the same time, the portion of the notes that was held by Constellation NewEnergy, Inc. ("Constellation") was extended to December 2020 and the interest rate decreased from 8% to 5% ("5% Notes").

Investors held the right to convert the unpaid principal and accrued interest of both the 8% and 5% notes to Series G convertible preferred stock at any time at the price of $38.64 . In July 2018, upon our IPO, the $221.6 million

of principal and accrued interest of outstanding 8% Notes automatically converted into additional paid-in capital, the conversion of which included all the related-party noteholders. The 8% Notes converted to shares of Series G convertible preferred stock and, concurrently, each such share of Series G convertible preferred stock converted automatically into one share of Class B common stock. Upon the Company's IPO, 5,734,440 shares of Class B common stock were issued from conversions and the 8% Notes were retired. Constellation, the holders of the 5% convertible promissory notes, have not elected to convert as of December 31, 2018 . The outstanding unpaid principal and accrued interest debt balance of the 5% Note of $34.7 million was classified as non-current as of December 31, 2018 , and the outstanding unpaid principal and accrued interest debt balance of the 8% Notes of $244.7 million was classified as non-current as of December 31, 2017 .

6% Convertible Promissory Notes due December 2020 - Between December 2015 and September 2016, we issued $260.0 million convertible promissory notes due December 2020, ("6% Notes") to certain investors. The 6% Notes bore a 5% fixed interest rate, payable monthly either in cash or in kind, at our election. We amended the terms of the 6% Notes in June 2017 to increase the interest rate from 5% to 6% and to reduce the collateral securing the notes.

As of December 31, 2018 and 2017 , the amount outstanding on the 6% Notes, which includes interest paid in kind through the IPO date, was $296.2 million and $286.1 million , respectively. Upon the IPO, the debt is convertible at the option of the holders at the conversion price of $11.25 per share into common stock at any time through the maturity date. In January 2018, we amended the terms of the 6% Notes to extend the convertible put option, which investors could elect only if the IPO did not occur prior to December 2019. After the IPO, we paid the interest in cash when due and no additional interest accrued on the consolidated balance sheet on the 6% Notes.

On or after July 27, 2020, we may redeem, at our option, all or part of the 6% Notes if the last reported sale price of our common stock has been at least $22.50 for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending within the three trading days immediately preceding the date on which we provide written notice of redemption In certain circumstances, the 6% Notes are also redeemable at our option in connection with a change of control.

Under the terms of the indenture governing the 6% Notes, we are required to comply with various restrictive covenants, including meeting reporting requirements, such as the preparation and delivery of audited consolidated financial statements, and restrictions on investments. In addition, we are required to maintain collateral which secures the 6% Notes in an amount equal to 200% of the principal amount of and accrued and unpaid interest on the outstanding notes. This minimum collateral test is not a negative covenant and does not result in a default if not met. However, the minimum collateral test does restrict us with respect to investing in non-PPA subsidiaries. If we do not meet the minimum collateral test, we cannot invest cash into any non-PPA subsidiary that is not a guarantor of the notes. The 6% Notes also include a cross-acceleration provision which provides that the holders of at least 25% of the outstanding principal amount of the 6% Notes may cause such notes to become immediately due and payable if we or any of our subsidiaries default on any indebtedness in excess of $15.0 million such that the repayment of such indebtedness is accelerated.

In connection with the issuance of the 6% Notes, we agreed to issue to J.P. Morgan and CPPIB, upon the occurrence of certain conditions, warrants to purchase we common stock up to a maximum of 146,666 shares and 166,222 shares, respectively. On August 31, 2017, J.P. Morgan transferred its rights to CPPIB. Upon completion of the IPO, the 312,888 warrants were net exercised for 312,575 shares of Class B Common stock.

10% Notes due July 2024 - In June 2017, we issued $100.0 million of senior secured notes ("10% Notes"). The 10% Notes mature between 2019 and 2024 and bear a 10.0% fixed rate of interest, payable semi-annually. The 10% Notes have a continuing security interest in the cash flows payable to us as servicing, operations and maintenance fees and administrative fees from the five active power purchase agreements in our Bloom Electrons program. Under the terms of the indenture governing the notes, we are required to comply with various restrictive covenants including, among other things, to maintain certain financial ratios such as debt service coverage ratios, to incur additional debt, issue guarantees, incur liens, make loans or investments, make asset dispositions, issue or sell share capital of our subsidiaries and pay dividends, meet reporting requirements, including the preparation and delivery of audited consolidated financial statements, or maintain certain restrictions on investments and requirements in incurring new debt. As of December 31, 2018, we were in compliance with all of such covenants. In addition, we are required to maintain collateral which secures the 10% Notes based on debt ratio analyses. This minimum collateral test is not a negative covenant and does not result in a default if not met. However, the minimum collateral test does restrict us with respect to investing in non-PPA subsidiaries. If we do not meet the minimum collateral test, we cannot invest cash into any non-PPA subsidiary that is not a guarantor of the notes.

Non-recourse Debt Facilities

5.22% Senior Secured Term Notes - In March 2013, PPA Company II refinanced its existing debt by issuing 5.22% Senior Secured Notes due March 30, 2025. The total amount of the loan proceeds was $144.8 million , including $28.8 million to repay outstanding principal of existing debt, $21.7 million for debt service reserves and transaction costs and $94.3 million to fund the remaining system purchases. The loan is a fixed rate term loan that bears an annual interest rate of 5.22% payable quarterly. The loan has a fixed amortization schedule of the principal, payable quarterly, which began March 30, 2014 that requires repayment in full by March 30, 2025. The Note Purchase Agreement requires us to maintain a debt service reserve, the balance of which was $11.2 million and $11.3 million as of December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. The notes are secured by all the assets of PPA II.

7.5% Term Loan due September 2028 - In December 2012 and later amended in August 2013, PPA IIIa entered into a $46.8 million credit agreement to help fund the purchase and installation of Energy Servers. The loan bears a fixed interest rate of 7.5% payable quarterly. The loan requires quarterly principal payments which began in March 2014. The credit agreement requires us to maintain a debt service reserve for all funded systems, the balance of which was $3.7 million and $3.7 million as of December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. The loan is secured by all assets of PPA IIIa.

LIBOR + 5.25% Term Loan due October 2020 - In September 2013, PPA IIIb entered into a credit agreement to help fund the purchase and installation of Energy Servers. In accordance with that agreement, PPA IIIb issued floating rate debt based on LIBOR plus a margin of 5.2% , paid quarterly. The aggregate amount of the debt facility is $32.5 million . The loan is secured by all assets of PPA IIIb and requires quarterly principal payments which began in July 2014. The credit agreement requires us to maintain a debt service reserve for all funded systems, the balance of which was $1.7 million and $1.7 million December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. In September 2013, PPA IIIb entered into pay-fixed, receive-float interest rate swap agreement to convert the floating-rate loan into a fixed-rate loan.

6.07% Senior Secured Notes - In July 2014, PPA IV issued senior secured notes amounting to $99.0 million to third parties to help fund the purchase and installation of Energy Servers. The notes bear a fixed interest rate of 6.07% payable quarterly which began in December 2015 and ends in March 2030. The notes are secured by all the assets of the PPA IV. The Note Purchase Agreement requires us to maintain a debt service reserve, the balance of which was $7.5 million as of December 31, 2018 and $7.0 million as of December 31, 2017 , and which was included as part of long-term restricted cash in the consolidated balance sheets.

LIBOR + 2.5% Term Loan due December 2021 - In June 2015, PPA V entered into a $131.2 million credit agreement to fund the purchase and installation of Energy Servers. The lenders are a group of five financial institutions and the terms included commitments to a letter of credit (LC) facility (see below). The loan was initially advanced as a construction loan during the development of the PPA V Project and converted into a term loan on February 28, 2017 (the “Term Conversion Date”). As part of the term loan’s conversion, the LC facility commitments were adjusted.

In accordance with the credit agreement, PPA V was issued a floating rate debt based on LIBOR plus a margin, paid quarterly. The applicable margins used for calculating interest expense are 2.25% for years 1-3 following the Term Conversion Date and 2.5% thereafter. The loan is secured by all the assets of the PPA V and requires quarterly principal payments which began in March 2017. In connection with the floating-rate credit agreement, in July 2015 the PPA V entered into pay-fixed, receive-float interest rate swap agreements to convert its floating-rate loan into a fixed-rate loan.

Letters of credit due December 2021 - In June 2015, PPA V entered into a $131.2 million term loan due December 2021. The agreement also included commitments to a letter of credit ("LC") facility, with the characteristics of a line of credit, with the aggregate principal amount of $6.4 million , later adjusted down to $6.2 million . The amount reserved under the letter of credit as of December 31, 2018 and 2017 was $5 million and $4.4 million , respectively. The unused capacity as of December 31, 2018 and 2017 was $1.2 million and $1.8 million , respectively.

Contractual Obligations and Other Commitments

The following table summarizes our contractual obligations and the debt of our consolidated PPA entities that is non-recourse to Bloom as of December 31, 2018:

	Payments Due By Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
	(in thousands)				
Contractual Obligations and Other Commitments:					
Recourse debt [1]	$ 432,623	$ 8,715	$ 360,908	$ 38,000	$ 25,000
Non-recourse debt [2]	353,872	21,163	183,791	46,268	102,650
Operating leases	49,467	6,813	13,023	8,267	21,364
Sale-leaseback leases from managed services	137,694	16,677	34,386	35,750	50,881
Other sale-leaseback related transactions	30,362	—	7,966	7,975	14,421
Natural gas fixed price forward contracts	9,729	3,228	6,237	264	—
Grant for Delaware facility	10,469	—	10,469	—	—
Interest rate swap	3,630	4	199	1,487	1,940
Supplier purchase commitments	3,018	1,035	1,983	—	—
Renewable energy credit obligations	1,892	774	1,118	—	—
Accrued other current liabilities [3]	1,331	1,331	—	—	—
Asset retirement obligations	500	—	500	—	—
Total	$ 1,034,587	$ 59,740	$ 620,580	$ 138,011	$ 216,256

[1] Our 6% Notes and our credit agreements related to the building of our facility in Newark, Delaware each contain cross-default or cross-acceleration provisions. See "-Credit Facilities-Bloom Energy Indebtedness" above for more details.

[2] Each of the debt facilities entered into by PPA Company II, PPA Company IIIa, PPA Company IIIb, PPA Company IV and PPA Company V contain cross-default provisions. See "-Credit Facilities-PPA Entities' Indebtedness" above for more details.

[3] Accrued other current liabilities includes a liability payable in common stock in connection with a dispute settlement with the principals of a securities placement agent.

Off-Balance Sheet Arrangements

We include in our consolidated financial statements all assets and liabilities and results of operations of our PPA Entities that we have entered into and over which we have substantial control. For additional information, see Note 12 - *Power Purchase Agreement Programs.*

We have not entered into any other transactions that have generated relationships with unconsolidated entities or financial partnerships or special purpose entities. Accordingly, as of December 31, 2018 and 2017 , we had no off-balance sheet arrangements.

ITEM 7A - QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risks as part of our ongoing business operations, primarily by exposure to changes in interest rates, in commodity fuel prices and in foreign currency.

Interest Rate Risk

Our cash is maintained in interest-bearing accounts, our cash equivalents are invested in money market funds and our short-term investments are invested in U.S. Treasury Bills . Lower interest rates would have an adverse impact on our interest income. Due to the short-term investment nature of our cash, cash equivalents and short-term investments, we believe that we do not have material financial statement exposure to changes in fair value as a result of changes in interest rates. Since we believe we have the ability to liquidate substantially all of this portfolio, we do not expect our operating results or cash flows to be materially affected to any significant degree by a sudden change in market interest rates on our investment portfolio.

To provide a meaningful assessment of the interest rate risk associated with our cash, cash equivalents and short-term investments, we performed a sensitivity analysis to determine the impact a change in interest rates would have on income statement and in investment fair values assuming a 1% decline in yield. Based on investment positions as of December 31, 2018 and 2017 , a hypothetical 1% decrease in interest rates across all maturities would result in a $3.8 million and $2.0 million decline in interest income on an annualized basis, respectively. As these investments have maturities of less than twelve months, changes with respect to the portfolio fair value would be limited to these amounts and only be realized if we were to terminate the investments prior to maturity.

We are exposed to interest rate risk related to our indebtedness that bears interest based on a floating LIBOR rate. We generally hedge such interest rate risks with the use of hedging instruments, and for these loans, changes in interest rates are generally offset by interest rate derivative swap contracts. For our fixed-rate debt, interest rate changes do not affect our earnings or cash flows.

To provide a meaningful assessment of the interest rate risk for that portion of our outstanding loans associated with floating LIBOR and not covered by interest rate derivative swaps, the Company performed a sensitivity analysis to determine the impact a change in interest rates would have on our consolidated statements of operations assuming a 1% interest rate increase. Based on monthly floating-rate loan positions for the years ended December 31, 2018 and 2017 , a hypothetical 1% increase in LIBOR would have resulted in a $0.2 million and a $0.3 million increase to our interest expense, respectively. These losses would be directly attributable to our PPA Entities.

Commodity Price Risk

We are subject to commodity price risk arising from price movements for natural gas that we supply to customers to operate our Energy Servers under certain power purchase agreements. While the Company entered into a fixed price fixed quantity fuel forward contract with its gas supplier in 2011, the fuel forward contract meets the definition of a derivative under U.S. GAAP and accordingly, any changes in its fair value is recorded within cost of revenue in the statements of operations. The fair value of the contract is determined using a combination of factors including the Company's credit rating and future natural gas prices.

To provide a meaningful assessment of the commodity price risk arising from price movements in the commodity futures contracts for natural gas, the Company performed a sensitivity analysis to determine the impact a change in natural gas commodity pricing would have on our consolidated statements of operations assuming a 10% change in the commodity contracts held. Based on monthly commodity positions for the years ended December 31, 2018 and 2017 , a hypothetical 10% increase in the price of natural gas futures would have resulted in a $1.0 million and a $1.1 million adjustment to their balance sheet fair values, respectively.

Foreign Currency Risk

Our sales contracts are primarily denominated in U.S. dollars and, therefore, substantially all of our revenue is not subject to foreign currency market risk. Our supply contracts are primarily denominated in U.S. dollars and our corporate operations are domiciled in the U.S. However, we conduct some internationally domiciled field operations and therefore, find it necessary to transact in foreign currencies for limited operational purposes, necessitating that we hold foreign currency bank accounts.

To provide a meaningful assessment of the risk associated with our foreign currency holdings, we performed a sensitivity analysis to determine the impact a currency devaluation would have on our balance sheet assuming a 20% decline in the value of the U.S. dollar. Based on our foreign currency holdings as of December 31, 2018 and 2017 , a hypothetical 20% devaluation of the U.S. dollar against foreign currencies would not be material to our reported cash position.

However, an increasing portion of our operating expenses are incurred outside the United States, are denominated in foreign currencies and are subject to such risk. Although not yet material, if we are not able to successfully hedge against the risks associated with currency fluctuations in our future activities, our financial condition and operating results could be adversely affected.

Actual future gains and losses associated with our investment portfolio, debt and derivative positions and foreign currency may differ materially from the sensitivity analyses performed as of December 31, 2018 and 2017 due to the inherent limitations associated with predicting the timing and amount of changes in interest rates, foreign currency exchange rates and our actual commodity derivative exposures and positions.

ITEM 8 - FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Index to Consolidated Financial Statements and Supplementary Data

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Bloom Energy Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Bloom Energy Corporation and its subsidiaries (the "Company") as of December 31, 2018 and December 31, 2017 , and the related consolidated statements of operations, of comprehensive loss, of convertible redeemable preferred stock, redeemable noncontrolling interest, stockholders' deficit and noncontrolling interest and of cash flows for each of the three years in the period ended December 31, 2018 , including the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and December 31, 2017 , and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits of these consolidated financial statements in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

San Jose, California
March 21, 2019

We have served as the Company's auditor since 2009.

Bloom Energy Corporation
Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31, 2018	December 31, 2017
Assets [1]		
Current assets:		
Cash and cash equivalents ($5,295 and $9,549)	$ 220,728	$ 103,828
Restricted cash ($2,917 and $7,969)	28,657	44,387
Short-term investments	104,350	26,816
Accounts receivable ($7,516 and $7,680)	84,887	30,317
Inventories	132,476	90,260
Deferred cost of revenue	62,147	92,488
Customer financing receivable ($5,594 and $5,209)	5,594	5,209
Prepaid expense and other current assets ($4,909 and $6,365)	33,742	26,676
Total current assets	672,581	419,981
Property, plant and equipment, net ($399,060 and $430,464)	481,414	497,789
Customer financing receivable, non-current ($67,082 and $72,677)	67,082	72,677
Restricted cash ($27,854 and $26,748)	31,100	32,397
Deferred cost of revenue, non-current	102,699	160,683
Other long-term assets ($2,692 and $3,767)	34,792	37,460
Total assets	$ 1,389,668	$ 1,220,987
Liabilities [1], Redeemable Noncontrolling Interest, Convertible Redeemable Preferred Stock, Stockholders' Deficit and Noncontrolling Interests		
Current liabilities:		
Accounts payable ($724 and $520)	$ 66,889	$ 48,582
Accrued warranty	19,236	16,811
Accrued other current liabilities ($1,442 and $2,378)	69,535	67,649
Deferred revenue and customer deposits ($786 and $786)	94,158	118,106
Current portion of recourse debt	8,686	1,691
Current portion of non-recourse debt ($18,962 and $17,057)	18,962	17,056
Current portion of recourse debt from related parties	—	—
Current portion of non-recourse debt from related parties ($2,200 and $1,389)	2,200	1,389
Total current liabilities	279,666	271,284
Preferred stock warrant liabilities	—	9,825
Derivative liabilities ($3,626 and $5,060)	10,128	156,552
Deferred revenue and customer deposits ($8,696 and $9,482)	241,794	309,843
Long-term portion of recourse debt	360,339	509,056
Long-term portion of non-recourse debt ($289,241 and $306,499)	289,241	306,499
Long-term portion of recourse debt from related parties	27,734	70,099
Long-term portion of non-recourse debt from related parties ($34,119 and $35,551)	34,119	35,551
Other long-term liabilities ($1,798 and $1,226)	55,937	52,915
Total liabilities	1,298,958	1,721,624
Commitments and contingencies (Note 13)		
Redeemable noncontrolling interest	57,261	58,154
Convertible redeemable preferred stock: 80,461,552 shares authorized at December 31, 2018 and December 31, 2017; no shares and 71,740,162 shares issued and outstanding at December 31, 2018 and December 31, 2017, respectively. Aggregate liquidation preference of $1,441,757 at December 31, 2017.	—	1,465,841
Stockholders' deficit:		
Common stock: $0.0001 par value; Common shares, no shares and 113,333,333 shares authorized at December 31, 2018 and December 31, 2017, respectively, and no shares and 10,353,269 shares issued and outstanding at December 31, 2018 and December 31, 2017, respectively.	—	1
Common stock: $0.0001 par value; Class A shares, 400,000,000 shares and no shares authorized at December 31, 2018 and December 31, 2017, respectively, and 20,868,286 shares and no shares issued and outstanding at December 31, 2018 and December 31, 2017, respectively; Class B shares, 400,000,000 shares and no shares authorized at December 31, 2018 and December 31, 2017, respectively, and 88,552,897 shares and no shares issued and outstanding at December 31, 2018 and December 31, 2017, respectively.	11	—
Additional paid-in capital	2,480,597	150,804
Accumulated other comprehensive gain (loss)	131	(162)
Accumulated deficit	(2,572,400)	(2,330,647)
Total stockholders' deficit	(91,661)	(2,180,004)
Noncontrolling interest	125,110	155,372
Total liabilities, redeemable noncontrolling interest, convertible redeemable preferred stock, stockholders' deficit and noncontrolling interest	$ 1,389,668	$ 1,220,987

[1] Asset and liability amounts in parentheses represent the portion of the consolidated balance at December 31, 2018 and 2017, respectively, attributable to the variable interest entities.

The accompanying notes are an integral part of these consolidated financial statements.

Bloom Energy Corporation
Consolidated Statements of Operations
(in thousands, except per share data)

	Years Ended December 31,		
	2018	**2017**	**2016**
Revenue:			
Product	$ 512,322	$ 179,768	$ 76,478
Installation	91,416	63,226	16,584
Service	82,385	76,904	67,622
Electricity	55,915	56,098	47,856
Total revenue	742,038	375,996	208,540
Cost of revenue:			
Product	374,590	210,773	103,283
Installation	119,474	59,929	17,725
Service	94,639	83,597	155,034
Electricity	36,265	39,741	35,987
Total cost of revenue	624,968	394,040	312,029
Gross profit (loss)	117,070	(18,044)	(103,489)
Operating expenses:			
Research and development	89,135	51,146	46,848
Sales and marketing	62,975	32,415	29,101
General and administrative	118,817	55,674	61,545
Total operating expenses	270,927	139,235	137,494
Loss from operations	(153,857)	(157,279)	(240,983)
Interest income	4,322	759	394
Interest expense	(76,935)	(96,358)	(73,559)
Interest expense to related parties	(8,893)	(12,265)	(7,631)
Other expense, net	(999)	(491)	(773)
Loss on revaluation of warrant liabilities and embedded derivatives	(21,590)	(14,995)	(13,035)
Net loss before income taxes	(257,952)	(280,629)	(335,587)
Income tax provision	1,537	636	729
Net loss	(259,489)	(281,265)	(336,316)
Net loss attributable to noncontrolling interests and redeemable noncontrolling interests	(17,736)	(18,666)	(56,658)
Net loss attributable to Class A and Class B common stockholders	$ (241,753)	$ (262,599)	$ (279,658)
Net loss per share attributable to Class A and Class B common stockholders, basic and diluted	$ (4.54)	$ (25.62)	$ (27.84)
Weighted average shares used to compute net loss per share attributable to Class A and Class B common stockholders, basic and diluted	53,268	10,248	10,046

The accompanying notes are an integral part of these consolidated financial statements.

Bloom Energy Corporation
Consolidated Statements of Comprehensive Loss
(in thousands)

	Years Ended December 31,		
	2018	**2017**	**2016**
Net loss attributable to Class A and Class B stockholders	$ (241,753)	$ (262,599)	$ (279,658)
Other comprehensive income (loss), net of taxes:			
Unrealized gain (loss) on available-for-sale securities	26	(13)	—
Change in effective portion of interest rate swap	2,098	894	(418)
Other comprehensive income (loss)	2,124	881	(418)
Comprehensive loss	(239,629)	(261,718)	(280,076)
Comprehensive (income) loss attributable to noncontrolling interests and redeemable noncontrolling interests	(1,831)	(501)	720
Comprehensive loss attributable to Class A and Class B stockholders	$ (241,460)	$ (262,219)	$ (279,356)

The accompanying notes are an integral part of these consolidated financial statements.

Bloom Energy Corporation
Consolidated Statements of Convertible Redeemable Preferred Stock, Redeemable Noncontrolling Interest, Stockholders' Deficit and Noncontrolling Interest
(in thousands, except share amounts)

	Convertible Redeemable Preferred Stock		Redeemable Noncontrolling Interest	Class A and Class B Common Stock [1]						
	Shares	Amount	Amount	Shares	Amount	Additional Paid-In Capital	Accumulated Other Comprehensive Gain (Loss)	Accumulated Deficit	Total Stockholders' Deficit	Noncontrolling Interest
Balances at December 31, 2015	71,617,187	$ 1,459,506	$ 62,419	9,938,603	$ 1	$ 102,449	$ (844)	$ (1,788,390)	$ (1,686,784)	$ 70,708
Contributions from noncontrolling interests	—	—	—	—	—	—	—	—	—	209,860
Exercise of Series F preferred warrants for preferred stock	45,336	3,335	—	—	—	—	—	—	—	—
Issuance of shares of Series G convertible preferred stock	77,639	3,000	—	—	—	—	—	—	—	—
Issuance of Common Stock	—	—	—	58,667	— [2]	1,816	—	—	1,816	—
Exercise of stock options	—	—	—	125,394	— [2]	1,237	—	—	1,237	—
Issuance of restricted stock awards	—	—	—	9,556	— [2]	280	—	—	280	—
Stock-based compensation expense	—	—	—	—	—	27,865	—	—	27,865	—
Excess fair value of consideration paid over the noncontrolling interest reduction	—	—	—	—	—	(25,000)	—	—	(25,000)	—
Change in effective portion of interest rate swap agreement	—	—	4	—	—	—	302	—	302	(724)
Distributions to noncontrolling interests	—	—	(4,614)	—	—	—	—	—	—	(46,007)
Net income (loss)	—	—	1,511	—	—	—	—	(279,658)	(279,658)	(58,169)
Balances at December 31, 2016	71,740,162	1,465,841	59,320	10,132,220	1	108,647	(542)	(2,068,048)	(1,959,942)	175,668
Contributions from noncontrolling interests	—	—	—	—	—	—	—	—	—	13,652
Issuance of common stock warrant	—	—	—	—	—	9,410	—	—	9,410	—
Issuance of common stock	—	—	—	64,000	— [2]	1,981	—	—	1,981	—
Exercise of stock options	—	—	—	123,153	— [2]	432	—	—	432	—
Issuance of restricted stock awards	—	—	—	33,896	— [2]	1,254	—	—	1,254	—
Stock-based compensation expense	—	—	—	—	—	29,080	—	—	29,080	—
Unrealized gain on available-for-sale securities	—	—	—	—	—	—	(13)	—	(13)	—
Change in effective portion of interest rate swap agreement	—	—	1	—	—	—	393	—	393	500
Distributions to noncontrolling interests	—	—	(5,104)	—	—	—	—	—	—	(11,845)
Net income (loss)	—	—	3,937	—	—	—	—	(262,599)	(262,599)	(22,603)
Balances at December 31, 2017	71,740,162	1,465,841	58,154	10,353,269	1	150,804	(162)	(2,330,647)	(2,180,004)	155,372

	Convertible Redeemable Preferred Stock		Redeemable Noncontrolling Interest	Class A and Class B Common Stock [1]		Additional Paid-In Capital	Accumulated Other Comprehensive Gain (Loss)	Accumulated Deficit	Total Stockholders' Deficit	Noncontrolling Interest
	Shares	Amount	Amount	Shares	Amount					
Balances at December 31, 2017	71,740,162	1,465,841	58,154	10,353,269	1	150,804	(162)	(2,330,647)	(2,180,004)	155,372
Issuance of Class A common stock upon public offering, net	—	—	—	20,700,000	2	[1] 282,274	—	—	282,276	—
Issuance of Class B common stock on convertible notes	—	—	—	5,734,440	1	[1] 221,579	—	—	221,580	—
Issuance of Class A and B common stock upon exercise of warrants	—	—	—	312,575	—	[2] —	—	—	—	—
Conversion of redeemable convertible preferred stock Series A-G	(71,740,162)	(1,465,841)	—	71,740,162	7	[1] 1,465,834	—	—	1,465,841	—
Reclassification of redeemable convertible preferred stock warrant liability to additional paid-in capital	—	—	—	—	—	882	—	—	882	—
Reclassification of derivative liability into additional paid-in capital	—	—	—	—	—	177,208	—	—	177,208	—
Issuance of common stock	—	—	—	166,667	—	[2] 2,500	—	—	2,500	—
Issuance of restricted stock awards	—	—	—	17,793	—	[2] 349	—	—	349	—
Exercise of stock options	—	—	—	396,277	—	[2] 1,521	—	—	1,521	—
Stock-based compensation	—	—	—	—	—	177,646	—	—	177,646	—
Unrealized loss on available-for-sale securities	—	—	—	—	—	—	26	—	26	—
Change in effective portion of interest rate swap agreement	—	—	2	—	—	—	267	—	267	1,829
Distributions to noncontrolling interests	—	—	(6,788)	—	—	—	—	—	—	(8,462)
Net loss	—	—	5,893	—	—	—	—	(241,753)	(241,753)	(23,629)
Balances at December 31, 2018	—	$ —	$ 57,261	109,421,183	$ 11	$ 2,480,597	$ 131	$ (2,572,400)	$ (91,661)	$ 125,110

[1] Common Stock issued and converted to Class A Common and Class B Common effective July 2018.

[2] Amounts are less than $0.5 thousand and round down to zero

The accompanying notes are an integral part of these consolidated financial statements.

Bloom Energy Corporation
Consolidated Statements of Cash Flows
(in thousands)

	Years Ended December 31,		
	2018	**2017**	**2016**
Cash flows from operating activities:			
Net loss	$ (259,489)	$ (281,265)	$ (336,316)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and Amortization	43,459	46,105	43,100
Write-off of property, plant and equipment, net	939	48	140
Impairment of assets, net	—	—	2,092
PPA I decommissioning, net	—	—	617
Revaluation of derivative contracts	28,471	14,754	1,343
Stock-based compensation	180,284	30,479	28,157
Loss (gain) on long-term REC purchase contract	200	(70)	124
Revaluation of stock warrants	(9,108)	(2,975)	8,373
Amortization of interest expense from preferred stock warrants	1,066	1,060	1,083
Amortization of debt issuance cost	3,868	3,263	2,802
Amortization of debt discount from embedded derivatives	20,503	42,989	28,925
Changes in operating assets and liabilities:			
Accounts receivable	(54,570)	4,849	(701)
Inventories	(42,216)	(7,105)	(209)
Deferred cost of revenue	88,324	(70,979)	(84,660)
Customer financing receivable and other	4,878	5,459	(211,659)
Prepaid expenses and other current assets	(7,064)	(2,175)	(8,433)
Other long-term assets	1,897	4,625	(1,020)
Accounts payable	18,307	7,076	4,807
Accrued warranty	2,426	(7,045)	(2,986)
Accrued other current liabilities	(6,800)	8,599	11,258
Deferred revenue and customer deposits	(91,996)	91,893	183,564
Other long-term liabilities	18,204	43,239	46,773
Net cash used in operating activities	(58,417)	(67,176)	(282,826)
Cash flows from investing activities:			
Purchase of property, plant and equipment	(14,659)	(5,140)	(8,979)
Payments for acquisition of intangible assets	(3,256)	—	—
Purchase of marketable securities	(103,914)	(29,043)	—
Proceeds from maturity of marketable securities	27,000	2,250	—
Net cash used in investing activities	(94,829)	(31,933)	(8,979)
Cash flows from financing activities:			
Borrowings from issuance of debt	—	100,000	123,489
Borrowings from issuance of debt to related parties	—	—	25,000
Repayment of debt	(18,770)	(20,507)	(32,192)
Repayment of debt to related parties	(1,390)	(912)	(966)
Debt issuance costs	—	(6,108)	(218)
Proceeds from noncontrolling and redeemable noncontrolling interests	—	13,652	209,860
Distributions to noncontrolling and redeemable noncontrolling interests	(15,250)	(23,659)	(45,828)
Proceeds from issuance of common stock	1,521	432	1,238
Proceeds from issuance of convertible preferred stock	—	—	3,000
Proceeds from public offerings, net of underwriting discounts and commissions	292,529	—	—
Payments of initial public offering issuance costs	(5,521)	(1,092)	—
Net cash provided by financing activities	253,119	61,806	283,383
Net increase (decrease) in cash, cash equivalents, and restricted cash	99,873	(37,303)	(8,422)
Cash, cash equivalents, and restricted cash:			
Beginning of period	180,612	217,915	226,337
End of period	$ 280,485	$ 180,612	$ 217,915
Supplemental disclosure of cash flow information:			
Cash paid during the period for interest	$ 39,465	$ 21,948	$ 20,549
Cash paid during the period for taxes	1,748	616	635
Non-cash investing and financing activities:			
Transfer of inventory to Energy Servers	—	—	217,205
Liabilities recorded for property, plant and equipment	12,236	975	992
Liabilities recorded for intangible assets	3,180	2,138	—
Exercise of warrants	—	—	3,336

Issuance of common stock warrant	—	9,410	—
Reclassification of redeemable convertible preferred stock warrant liability to additional paid-in capital	882	—	—
Conversion of redeemable convertible preferred stock into additional paid-in capital	1,465,841	—	—
Conversion of 8% convertible promissory notes into additional paid-in capital	221,579	—	—
Reclassification of derivative liability into additional paid-in capital	177,208	—	—
Reclassification of prior year prepaid initial public offering costs to additional paid-in capital	4,732	—	—
Issuance of common stock	—	1,981	1,816
Issuance of restricted stock	—	1,254	—
Accrued distributions to Equity Investors	576	576	7,287
Accrued interest and issuance for notes	19,041	29,705	23,987
Accrued interest and issuance for notes to related parties	2,733	4,368	3,856
Issuance of 6% convertible promissory notes	—	—	25,000

The accompanying notes are an integral part of these consolidated financial statements.

1. Nature of Business and Liquidity

Nature of Business

Bloom Energy Corporation (together with its subsidiaries, the Company or Bloom Energy) designs, manufactures and sells solid-oxide fuel cell systems, or Energy Servers, for on-site power generation. The Company's Energy Servers utilize an innovative fuel cell technology. The Energy Servers provide efficient energy generation with reduced operating costs and lower greenhouse gas emissions. By generating power where it is consumed, the systems offer increased electrical reliability and improved energy security while providing a path to energy independence. The Company was originally incorporated in Delaware under the name of Ion America Corporation on January 18, 2001 and was renamed on September 16, 2006 to Bloom Energy Corporation.

Liquidity

The Company incurred operating losses and negative cash flows from operations since its inception. The Company's ability to achieve its long-term business objectives is dependent upon, among other things, raising additional capital, acceptance of its products and attaining future profitability. Management believes the Company will be successful in raising additional financing from its stockholders or from other sources, in expanding operations and in gaining market share. In July 2018, the Company successfully completed an initial public stock offering ("IPO") with the sale of 20,700,000 shares of Class A common stock at a price of $15.00 per share, resulting in net cash proceeds of $282.3 million net of underwriting discounts, commissions and offering costs. The Company believes that its existing cash and cash equivalents and short-term investments will be sufficient to meet our operating and capital cash flow requirements and other cash flow needs for at least the next 12 months from the date of this annual report on Form 10-K. However, there can be no assurance that in the event the Company requires additional financing, such financing will be available on terms which are favorable or at all.

Common Stock

In July 2018 and just prior to the closing of the Company's IPO, the Board of Directors (the "Board") and stockholders approved the Twelfth Amended and Restated Certificate of Incorporation which authorized two new classes of common stock, Class A common stock and Class B common stock. As of July 18, 2018, just prior to the IPO, the Company had 400,000,000 shares of Class A common stock authorized with a par value of $0.0001 per share and 400,000,000 shares of Class B common stock authorized with a par value of $0.0001 per share. All shares of common stock outstanding immediately prior to the IPO were converted into an equivalent number of shares of Class B common stock. Shares of Class B common stock were voluntarily convertible into shares of Class A common stock at the option of the holder upon expiration of the lock-up period that expired on January 21, 2019. The Company's board of directors and stockholders approved an amended and restated certificate of incorporation to effect a 2-for-3 reverse stock split of the Company's Class B common stock on July 5, 2018 and July 18, 2018, respectively. The Company filed the amended and restated certificate of incorporation on July 19, 2018 that effected the 2-for-3 reverse stock split. The financial statements have been retrospectively adjusted to give effect to the reverse stock split, including reclassifying an amount equal to the reduction in par value of Class B common stock to accumulated deficit. Class B common stock will automatically convert into Class A common stock without further action by the Company or the holder thereof on the first to occur: (i) the fifth anniversary of the IPO, (ii) when the outstanding shares of Class B Common Stock represent less than five percent (5%) of the aggregate number of shares of Class A and Class B Common Stock then outstanding, (iii) a date and time, or upon an event specified in writing and delivered by KR Sridhar to the Board to convert all shares of Class B Common Stock, or (iv) immediately following the date of the death of KR Sridhar, whichever comes first.

Holders of Class A common stock are entitled to one vote for each share of Class A common stock held on all matters submitted to a vote of stockholders. Holders of Class B common stock are entitled to ten votes for each share of Class B common stock held on all matters submitted to a vote of stockholders. Except with respect to voting, the rights, preferences, powers and restrictions of the holders of Class A and Class B common stock are identical. Added to existing shares of Class B common stock were shares mandatorily converted from various financial instruments as a result of the IPO. See Note 8 - *Convertible Notes, Convertible Preferred Stock and Common and Preferred Stock Warrants* .

Still authorized are 80,461,552 shares of Convertible Redeemable Preferred Stock having rights and preferences, including voting rights, designated from time to time by the Board. All shares of Convertible Redeemable Preferred Stock outstanding immediately prior to the IPO were automatically converted into an equivalent number of shares of Class B common stock.

2. Basis of Presentation and Summary of Significant Accounting Policies

The consolidated balance sheets as of December 31, 2018 and 2017, the consolidated statements of operations, the consolidated statements of comprehensive loss, the consolidated statements of convertible redeemable preferred stock, redeemable noncontrolling interest, stockholders' deficit and noncontrolling interest, and the consolidated statements of cash flows for the years ended December 31, 2018 , 2017 and 2016 , as well as other information disclosed in the accompanying notes have been prepared in accordance with generally accepted accounting principles as applied in the United States ("U.S. GAAP").

Principles of Consolidation

These consolidated financial statements reflect the accounts and operations of the Company and those of its subsidiaries in which the Company has a controlling financial interest. The Company uses a qualitative approach in assessing the consolidation requirement for each of its variable interest entities, which the Company refers to as its power purchase agreement entities ("PPA Entities"). This approach focuses on determining whether the Company has the power to direct those activities of the PPA Entities that most significantly affect their economic performance and whether the Company has the obligation to absorb losses, or the right to receive benefits, that could potentially be significant to the PPA Entities. For all periods presented, the Company has determined that it is the primary beneficiary in all of its operational PPA Entities. The Company evaluates its relationships with the PPA Entities on an ongoing basis to ensure that it continues to be the primary beneficiary. All intercompany transactions and balances have been eliminated in consolidation. For additional information, see Note 12 - *Power Purchase Agreement Programs* .

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and the accompanying notes. Significant estimates include assumptions used to compute the best estimate of selling-prices ("BESP"), the fair value of lease and non-lease components such as estimated output, efficiency and residual value of the Energy Servers, estimates for inventory write-downs, estimates for future cash flows and the economic useful lives of property, plant and equipment, the valuation of other long-term assets, the valuation of certain accrued liabilities such as derivative valuations, estimates for accrued warranty and extended maintenance, estimates for recapture of U.S. Treasury grants and similar grants, estimates for income taxes and deferred tax asset valuation allowances, warrant liabilities, stock-based compensation costs and estimates for the allocation of profit and losses to the noncontrolling interests. Actual results could differ materially from these estimates under different assumptions and conditions.

Revenue Recognition

The Company primarily earns revenue from the sale and installation of its Energy Servers both to direct and to lease customers, by providing services under its operations and maintenance services contracts and by selling electricity to customers under power purchase agreements. The Company offers its customers several ways to finance their purchase of a Bloom Energy Server. Customers may choose to purchase the Company’s Energy Servers outright. Customers may also lease the Company’s Energy Servers through one of the Company’s financing partners via the Company’s managed services program or as a traditional lease. Finally, customers may purchase electricity through the Company’s Power Purchase Agreement Programs.

Direct Sales - Customers may choose to purchase the Company's Energy Servers outright and purchase directly from the Company or from a financing party, which would then purchase the Energy Servers from the Company through a lease, PPA or Third-Party PPA agreement. To date, the Company has never sold an Energy Server without a maintenance service agreement, or vice-versa, nor does it have plans to do so in the near future. As a result, the Company recognizes revenue from contracts with customers for the sales of products and services included within these contracts in accordance with ASC 605-25, *Revenue Recognition for Multiple-Element Arrangements* .

Revenue from the sale and installation of Energy Servers to direct customers is recognized when all of the following criteria are met:

- ***Persuasive evidence of an arrangement exists.*** The Company relies upon non-cancelable sales agreements and purchase orders to determine the existence of an arrangement.
- ***Delivery and acceptance has occurred.*** The Company uses shipping documents and confirmation from the Company's installations team that the deployed systems are running at full power as defined in each contract to verify delivery and acceptance.
- ***The fee is fixed or determinable.*** The Company assesses whether the fee is fixed or determinable based on the payment terms associated with the transaction.
- ***Collectability is reasonably assured.*** The Company assesses collectability based on the customer's credit analysis and payment history.

Most of the Company's arrangements are multiple-element arrangements with a combination of Energy Servers, installation and maintenance services. Products and services, including installation, generally qualify as separate units of accounting. For multiple-element arrangements, the Company allocates revenue to each unit of accounting based on an estimated selling price at the arrangement inception. The estimated selling price for each element is based upon the following hierarchy: vendor-specific objective evidence ("VSOE") of selling price, if available; third-party evidence ("TPE") of selling price, if VSOE of selling price is not available; or best estimate of selling price ("BESP") if neither VSOE of selling price nor TPE of selling price are available. The total arrangement consideration is allocated to each separate unit of accounting using the relative estimated selling prices of each unit based on the aforementioned selling price hierarchy. The Company limits the amount of revenue recognized for delivered elements to an amount that is not contingent upon future delivery of additional products or services or upon meeting any specified performance conditions.

The Company has not been able to obtain reliable evidence of the selling price of the standalone Energy Server. Given that the Company has never sold an Energy Server without a maintenance service agreement, and vice-versa, the Company has no evidence of selling prices for either and virtually no customers have elected to cancel their maintenance service agreements while continuing to operate the Energy Servers. The Company's objective is to determine the price at which it would transact business if the items were being sold separately. As a result, the Company's estimate of its selling price is driven primarily by its expected margin on both the Energy Server and the maintenance service agreement based on their respective costs or, in the case of maintenance service agreements, the estimated costs to be incurred during the expected service period.

Costs for Energy Servers include all direct and indirect manufacturing costs, applicable overhead costs and costs for normal production inefficiencies (i.e., variances). The Company then applies a margin to the Energy Servers to determine the selling price to be used in its BESP model. Costs for maintenance service arrangements are estimated over the life of the maintenance contracts and include estimated future service costs and future product costs. Product costs over the period of the service arrangement are impacted significantly by the longevity of the fuel cells themselves. After considering the total service costs, the Company applies a slightly lower margin to its service costs than to its Energy Servers as it best reflects the Company's long-term service margin expectations.

As the Company's business offerings and eligibility for the Investment Tax Credit ("ITC") evolve over time, the Company may be required to modify its estimated selling prices in subsequent periods and the Company's revenue could be adversely affected.

The Company does not offer extended payment terms or rights of return for its products. Upon shipment of the product, the Company defers the product's revenue until the acceptance criteria have been met. Such amounts are recorded within deferred revenue in the consolidated balance sheets. The related cost of such product is also deferred as a component of deferred cost of goods sold in the consolidated balance sheets until customer acceptance. Prior to shipment of the product, any prepayment made by the customer is recorded as customer deposits. Customer deposits were $13.5 million and $10.2 million as of December 31, 2018 and 2017 , respectively, and were included in deferred revenue and customer deposits in the consolidated balance sheets.

Traditional Leases - Under this financing option, the Company sells its Energy Servers through a direct sale to a financing partner who, in turn, leases the Energy Servers to the customer under a lease agreement between the customer and the financing partner. In addition, the Company contracts with the customer to provide extended maintenance services from the end of the standard one -year warranty period extending for the remaining duration of the lease term.

Payments received are recorded within deferred revenue in the consolidated balance sheets until the acceptance criteria as defined within the customer contract are met. The related cost of such product is also deferred as a component of deferred cost in the consolidated balance sheets until acceptance.

The Company also sells extended maintenance services to its customers that effectively extend the standard warranty coverage. Payments from customers for the extended maintenance contracts are received at the beginning of each service year. Accordingly, the customer payment received is recorded as deferred revenue and revenue is recognized ratably over the extended maintenance contract.

As discussed within the *Direct Sales* section above, the Company's arrangements with its traditional lease customers are also multiple-element arrangements as they include a combination of Energy Servers, installation and extended maintenance services. Accordingly, the Company recognizes revenue from contracts with customers for the sales of products and services included within these contracts in accordance with ASC 605-25, *Revenue Recognition - Multiple-Element Arrangements* .

Extended Maintenance Services - The Company typically provides to its customers a standard one -year warranty against manufacturing or performance defects. The Company also sells to these customers extended maintenance services that effectively extend the standard one -year warranty coverage at the customer's option. These customers generally have an option to renew or cancel the extended maintenance services on an annual basis. Revenue is recognized from extended maintenance services ratably over the term of the service (or annual renewal period) using the estimates of value, as discussed above.

Sale-Leaseback (Managed Services) - The Company is a party to master lease agreements that provide for the sale of Energy Servers to third-parties and the simultaneous leaseback of the systems, which the Company then subleases to its customers. In sale-leaseback sublease arrangements (also referred to as managed services), the Company first determines whether the Energy Servers under the sale-leaseback arrangement are "integral equipment". An Energy Server is determined to be integral equipment when the cost to remove the system from its existing location, including the shipping costs of the Energy Server at the new site including any diminution in fair value, exceeds 10% of the fair value of the Energy Server at the time of its original installation. As the Energy Servers are determined not to be integral equipment, the Company determines if the leaseback is classified as a capital lease or an operating lease.

The Company's managed services arrangements are classified as operating leases. As operating leases, the Company recognizes a portion of the net revenue, net of any commitments made to the customer to cover liabilities associated with insurance, property taxes and/or incentives recorded, as managed service liabilities and the associated cost of sale, and then defers the portion of net revenue and cost of sale that represents the gross profit that is equal to the present value of the future minimum lease payments over the master leaseback term. For both capital and operating leasebacks, the Company records the net deferred gross profit in its consolidated balance sheet as deferred income, and then amortizes the deferred income over the leaseback term as a reduction to the leaseback rental expense included in operating leases.

In connection with the Company's common stock award agreement with a managed services customer, the share issuances are recorded as a reduction of product revenue when the installation milestones are achieved and are recorded as additional paid-in capital when the shares are issued.

Revenue Recognized from Power Purchase Agreement Programs *(See Note 12 - Power Purchase Agreement Programs)*

In 2010, the Company began offering its Energy Servers through its Bloom Electrons financing program. This program is financed via a special purpose Investment Company and Operating Company, collectively referred to as a PPA Entity, and are owned partly by the Company and partly by third-party investors. The investors contribute cash to the PPA Entity in exchange for an equity interest, which then allows the PPA Entity to purchase the Energy Server from the Company. The cash contributions held are classified as short-term or long-term restricted cash according to the terms of each power purchase agreement (PPA). As the Company identifies end customers, the PPA Entity enters into a PPA with the end customer pursuant to which the customer agrees to purchase the power generated by the Energy Server at a specified rate per kilowatt hour (kWh) for a specified term, which can range from 10 to 21 years. The PPA Entity typically enters into a maintenance services agreement with the Company following the first year of service to extend the standard one-year warranty service and performance guaranties. This intercompany arrangement is eliminated in consolidation. Those power purchase agreements that qualify as leases are classified as either sales-type leases or operating leases and those that do not qualify as leases are classified as tariff agreements. For both operating leases and tariff agreements, income is recognized as contractual amounts are due when the electricity is generated and presented within electricity revenue on the consolidated statements of operations.

Sales-Type Leases - Certain arrangements entered into by certain PPA entities, including Bloom Energy 2009 PPA Project Company, LLC (PPA I), 2012 ESA Project Company, LLC (PPA Company IIIa) and 2013B ESA Project Company, LLC (PPA Company IIIb), qualify as sales-type leases in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 840, *Leases* (ASC 840). The Company is responsible for the installation, operation and maintenance of the Energy Servers at the customers' sites, including running the Energy Servers during the term of the PPA which ranges from 10 to 15 years. Based on the terms of the customer contracts, the Company may also be obligated to supply

fuel for the Energy Servers. The amount billed for the delivery of the electricity to PPA I's customers primarily consists of returns on the amounts financed including interest revenue, service revenue and fuel revenue for certain arrangements.

The Company is obligated to supply fuel to the Energy Servers that deliver electricity under the PPA I agreements. Based on the customer offtake agreements, the customers pay an all-inclusive rate per kWh of electricity produced by the Energy Servers. The consideration received under the PPA I agreements primarily consists of returns on the amounts financed including interest revenue, service revenue and fuel revenue on the consolidated statements of operations.

As the Power Purchase Agreement Programs contain a lease, the consideration received is allocated between the lease elements (lease of property and related executory costs) and non-lease elements (other products and services, excluding any derivatives) based on relative fair value in accordance with ASC 605-25-13A (b). Lease elements include the leased system and the related executory costs (i.e. installation of the system, electricity generated by the system, maintenance costs). Non-lease elements include service, fuel and interest related to the leased systems.

Service revenue and fuel revenue are recognized over the term of the PPA as electricity is generated. The interest component related to the leased system is recognized as interest revenue over the life of the lease term. The customer has the option to purchase the Energy Servers at the then fair market value at the end of the PPA contract term.

Service revenue related to sales-type leases of $3.4 million , $4.0 million and $6.7 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, is included in electricity revenue in the consolidated statements of operations. Fuel revenue of $0.5 million , $1.0 million and $1.9 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, is included in electricity revenue in the consolidated statements of operations. Interest revenue of $1.4 million , $1.9 million and $1.8 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, is included in electricity revenue in the consolidated statements of operations.

Product revenue associated with the sale of the Energy Servers under the PPAs that qualify as sales-type leases is recognized at the present value of the minimum lease payments, which approximates fair value, assuming all other conditions for revenue recognition noted above have also been met. A sale is typically recognized as revenue when an Energy Server begins generating electricity and has been accepted, which is consistent across all purchase options in that acceptance generally occurs after the Energy Server has been installed and is running at full power as defined in each contract. There was no product revenue recognized under sales-type leases for the years ended December 31, 2018 , 2017 and 2016 .

Operating Leases - Certain Power Purchase Agreement Program leases entered into by PPA Company IIIa, PPA Company IIIb, 2014 ESA Holdco, LLC (PPA Company IV) and 2015 ESA Holdco, LLC (PPA Company V) that are leases in substance, but do not meet the criteria of sales-type leases or direct financing leases in accordance with ASC 840, are accounted for as operating leases. Revenue under these arrangements is recognized as electricity sales and service revenue and is provided to the customer at rates specified under the contracts. During the years ended December 31, 2018 , 2017 and 2016 , revenue from electricity sales amounted to $30.9 million , $29.9 million and $21.2 million , respectively. During the years ended December 31, 2018 , 2017 and 2016 , service revenue amounted to $15.2 million , $15.6 million and $10.8 million , respectively.

Tariff Agreement - PPA Company II entered into an agreement with Delmarva, PJM Interconnection (PJM), a regional transmission organization, and the State of Delaware under which PPA Company II provides the energy generated from its Energy Servers to PJM and receives a tariff as collected by Delmarva.

Revenue at the tariff rate is recognized as electricity sales and service revenue as it is generated over the term of the arrangement. Revenue relating to power generation at the Delmarva sites of $23.0 million , $23.3 million and $23.0 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, is included in electricity sales in the consolidated statements of operations. Revenue relating to power generation at the Delmarva sites of $13.7 million , $13.9 million and $13.7 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, is included in service revenue in the consolidated statements of operations.

Incentives and Grants

Self-Generation Incentive Program ("SGIP") - The Company's PPA Entities' customers receive payments under the SGIP, which is a program specific to the State of California that provides financial incentives for the installation of new and qualifying self-generation equipment that the Company owns. The SGIP funds are assigned to the PPA Entities by the customers and are recorded as other current assets and other long-term assets until received. For sales-type leases, the benefit of the SGIP funds are recorded as deferred revenue which is recognized as revenue when the Energy Server is accepted. For operating leases, the benefit of the SGIP funds are recorded as deferred revenue which is amortized on a straight-line basis over the PPA contract period. The SGIP program issues 50% of the fully anticipated amount in the first year the equipment is placed into service. The remaining incentive is then paid based on the size of the equipment (i.e., nameplate kilowatt capacity) over the subsequent five years . The SGIP program has operational criteria primarily related to fuel mixture and minimum output for the

first five years after the qualified equipment is placed in service. If the operational criteria are not fulfilled, it could result in a partial refund of funds received. The SGIP program will expire on January 1, 2021.

The Company received $1.9 million , $2.7 million and $3.3 million of SGIP funds for the years ended December 31, 2018 , 2017 and 2016 , respectively. There were no reductions or refunds of SGIP funds during the years ended December 31, 2018 , 2017 and 2016 , and no accrual has been made for a refund of any incentives.

The Company makes SGIP reservations on behalf of certain of the PPA Entities. However, the PPA Entity receives the SGIP funds directly from the program and, therefore, bears the risk of loss if these funds are not paid.

U.S. Treasury Grants - The Company is eligible for U.S. Treasury grants on eligible property as defined under Section 1603 of the American Recovery and Reinvestment Act of 2009. However, to be eligible for the U.S. Treasury grants, a fuel cell system must have commenced construction in 2011 either physically or through the commitment of sufficient project costs. For fuel cell systems under Power Purchase Agreement Programs, U.S. Treasury grants are considered a component of minimum lease payments. For fuel cell systems deployed under tariff legislation, the Company recorded the fuel cell systems net of the U.S. Treasury grants. U.S. Treasury grant receivables are classified as other current assets in the Company's consolidated balance sheets. For operating leases, the benefit of the U.S. Treasury grant is recorded as deferred revenue and is amortized on a straight-line basis over the PPA contract period. No such grant funds have been accrued or received in the years ended December 31, 2018 and 2017 .

Investment Tax Credits ("ITCs") - Through December 31, 2016, the Company's Energy Servers were eligible for federal ITCs that accrued to eligible property under Internal Revenue Code Section 48. Under the Company's Power Purchase Agreement Programs, ITCs are primarily passed through to Equity Investors with approximately 1% to 10% of incentives received by the Company. These incentives are accounted for by using the flow-through method. On February 9, 2018, the U.S. Congress passed legislation to extend the federal investment tax credits for fuel cell systems applicable retroactively to January 1, 2017. Due to this reinstatement of ITC in 2018, the benefit of ITC to total revenue was $45.5 million of revenue benefit related to the retroactive ITC for 2017 acceptances.

The ITC program has operational criteria for the first five years after the qualified equipment is placed in service. If the qualified energy property is disposed or otherwise ceases to be investment credit property before the close of the five -year recapture period is fulfilled, it could result in a partial reduction of the incentives. No ITC recapture has occurred during the years ended December 31, 2018 and 2017 , while $8.3 million in ITC recapture occurred during the year ended December 31, 2016.

Renewable Energy Credits (RECs) - RECs are tradeable energy credits that represent one megawatt hour of electricity generated from an eligible renewable energy resource generated in the U.S. RECs are primarily "held for use" and are presented as part of other current assets and other long-term assets in the consolidated balance sheets until the RECs are sold and accounted for as revenue. The Company accounts for such RECs as output from the facility where they originate. The Company values these RECs at the lower of cost or market at the end of each reporting period.

To the extent the PPA Entities do not produce enough RECs to satisfy the requirements under certain PPAs, the Company may also acquire RECs under stand-alone purchase agreements with third parties to satisfy these REC obligations. Under PPAs with certain customers, the PPA Entities are required to deliver a specified quantity of biogas RECs or Western Electricity Coordinating Council (WECC) RECs. In order to meet these obligations, the PPA Entities may enter into REC purchase agreements with third parties to purchase a fixed quantity of the relevant RECs at a fixed price and on a fixed schedule. The PPA Entities utilize the Western Renewable Energy Information System (WREGIS), an independent tracking system for the region covered by the WECC, which allows the PPA Entities to manage RECs purchased and deliver the RECs to satisfy the customer obligation. Purchased RECs used to satisfy customer obligations are recorded at cost and are presented as part of other current assets and other long-term assets in the consolidated balance sheets. Costs of RECs purchased are expensed as the obligation to provide such RECs to customers occurs.

The Company estimates the number of excess RECs it will ultimately acquire under the non-cancelable purchase contracts over the number required to satisfy its obligations to its customers. The Company records a purchase commitment loss if the fair value of RECs is less than the fixed purchase price amount. The purchase commitment loss is recorded on the consolidated balance sheets as a component of other current liabilities and other long-term liabilities.

Components of Revenue and Cost of Revenue

Revenue - The Company primarily recognizes revenue from the sale and installation of Energy Servers, from the sale of electricity and by providing services under extended operations and under maintenance services contracts (together, service agreements).

Product Revenue - All of the Company's product revenue is generated from the sale of the Company's Energy Servers to direct purchase, including financing partners on Third-Party PPAs, managed services and traditional lease customers. The Company generally begins to recognize product revenue from contracts with customers once the Company achieves acceptance; that is, generally when the system has been installed and is running at full power as defined in each contract.

All of the Company's product arrangements contain multiple elements representing a combination of revenue from Energy Servers, from installation and from maintenance services. Upon acceptance, the Company allocates fair value to each of these elements and the Company limits the amount of revenue recognized for delivered elements up to an amount that is not contingent upon future delivery of additional products or services or upon meeting any specified performance conditions. The sale of the Company's Energy Servers also includes a standard one -year warranty, the estimated cost of which is recorded as a component of cost of product revenue.

Installation Revenue - All of the Company's installation revenue is generated from the sale and installation of the Company's Energy Servers to direct purchase, including financing partners on Third-Party PPAs, managed services and traditional lease customers. The Company generally begins to recognize installation revenue from contracts with customers for the sales of its Energy Servers once the Company achieves acceptance; that is, generally when the system has been installed and running at full power.

Service Revenue - Service revenue is generated from operations and maintenance services agreements that extend the standard one -year warranty coverage beyond the initial first year for Energy Servers sold under direct purchase, including Third-Party PPAs, traditional lease and managed services sales. Customers can renew these agreements on an annual basis. Revenue is recognized ratably over the term of the renewed one -year service period. The Company anticipates that almost all of its customers will continue to renew their maintenance services agreements each year.

Electricity Revenue - The Company's PPA Entities purchase Energy Servers from the Company and sell electricity produced by these systems to customers through long-term power purchase agreements (PPAs). Customers are required to purchase all of the electricity produced by the Energy Servers at agreed-upon rates over the course of the PPA's contractual term. The Company recognizes revenue from the PPAs as the electricity is provided over the term of the agreement.

Cost of Product Revenue - Cost of product revenue consists of costs of Energy Servers that the Company sells to direct, including financing partners on Third-Party PPAs, managed services and traditional lease customers. It includes costs paid to the Company's materials suppliers, personnel costs, certain allocated costs, shipping costs, provisions for excess and obsolete inventory and the depreciation costs of the Company's equipment. Estimated standard one-year warranty costs are also included in cost of product revenue, see *Warranty Costs* below.

Cost of Installation Revenue - Cost of installation revenue consists of the costs to install the Energy Servers that the Company sells to direct and lease customers. It includes costs paid to the Company's materials and service providers, personnel costs and allocated costs.

Cost of Service Revenue - Cost of service revenue consists of costs incurred under maintenance service contracts for all customers. It includes personnel costs for the Company's customer support organization, certain allocated costs and extended maintenance-related product repair and replacement costs.

Cost of Electricity Revenue - Cost of electricity revenue primarily consists of the depreciation of the cost of the Energy Servers owned by the PPA Entities and the cost of gas purchased in connection with the Company's first PPA Entity. The cost of electricity revenue is generally recognized over the term of the customer's PPA contract. The cost of depreciation of the Energy Servers is reduced by the amortization of any U.S. Treasury Department grant payment in lieu of the energy investment tax credit associated with these systems.

Warranty Costs - The Company generally warrants its products sold to its direct customers for one year following the date of acceptance of the products (the "standard one -year warranty"). Additionally as part of its master service agreements (MSAs), the Company provides output and efficiency guaranties (collectively "performance guaranties") to its customers which contractually guarantee specified levels of efficiency and output. Expenditures related to these obligations have not been material to date.

As part of both its standard one -year warranty and MSA obligations, the Company monitors the operations of the underlying systems including efficiency and output levels. Performance guaranty payments represent maintenance decisions made by the Company and are accounted for as costs of goods sold. To estimate the warranty costs, the Company continuously monitors product returns for warranty failures and maintains the reserve for the related warranty expense based on various factors including historical warranty claims, field monitoring and results of lab testing. The Company's obligations under its standard product warranty and MSAs are generally in the form of product replacement, repair or reimbursement for higher customer electricity costs. Further, if the Energy Servers run at a lower efficiency or power output than the Company committed

under its performance guaranty, the Company will reimburse the customer for this underperformance. The Company's obligation includes ensuring the customer's equipment operates at least at the efficiency and power output levels set forth in the customer agreement. The Company's aggregate reimbursement obligation for this performance guaranty for each order is capped at a portion of the purchase price.

The standard one -year warranty covers defects in materials and workmanship under normal use and service conditions and against manufacturing or performance defects. The Company's warranty accrual represents its best estimate of the amount necessary to settle future and existing claims during the warranty period as of the balance sheet date. The Company accrues for warranty costs based on estimated costs that may be incurred including material costs, labor costs and higher customer electricity costs should the units not work for extended periods. Estimated costs associated with standard one -year warranty, including the performance guaranty payments, are recorded at the time of sale as a component of costs of goods sold. Prior to fiscal year 2014, certain MSAs with direct customers were accounted for as separately-priced warranty contracts under ASC 605-20-25 Separately Priced Extended Warranty and Product Maintenance Contracts (formerly FTB 90-1), in which the Company recorded an accrual for any expected costs that exceed the contracted revenues for that one-year service renewal arrangement, and is included as a component of the accrued warranty liability. Customers may renew the MSAs leading to future expense that is not recognized under GAAP until the renewal occurs. Over time, as the Company's service offering evolved and the Company began managing the Energy Servers taking into consideration individual customer arrangements as well as the Company's Energy Server fleet management objectives, the Company's service offering evolved to the point that our services changed, becoming a more strategic offering for both the Company and its customers. Additionally, virtually all of the Company's sales arrangements included bundled sales of maintenance service agreements along with the Energy Servers. The result is that the Company allocates a certain portion of the contractual revenue related to the Energy Servers to the MSAs based on the Company's BESP compared to the stated amount in the service contracts.

Shipping and Handling Costs - The Company records costs related to shipping and handling in cost of revenue.

Sales and Utility Taxes - The Company recognizes revenue on a net basis for taxes charged to its customers and collected on behalf of the taxing authorities.

Components of Operating Expenses

Advertising and Promotion Costs - Expenses related to advertising and promotion of products are charged to sales and marketing expense as incurred. The Company did not incur any material advertising or promotion expenses during the years ended December 31, 2018 , 2017 and 2016 .

Research and Development - The Company conducts internally funded research and development activities to improve anticipated product performance and reduce product life-cycle costs. Research and development costs are expensed as incurred and include salaries and expenses related to employees conducting research and development.

Stock-Based Compensation - The Company accounts for stock options and restricted stock units (RSUs) awarded to employees and non-employee directors under the provisions of Financial Accounting Standards Board Accounting Standards Codification Topic 718 - *Compensation-Stock Compensation* (ASC 718) using the Black-Scholes valuation model to estimate fair value. The Black-Scholes valuation model requires the Company to make estimates and assumptions regarding the underlying stock's fair value, the expected life of the option and RSU, the risk-free rate of return interest rate, the expected volatility of the Company's common stock price and the expected dividend yield. In developing estimates used to calculate assumptions, the Company establishes the expected term for employee options and RSUs, as well as expected forfeiture rates, based on the historical settlement experience and after giving consideration to vesting schedules. Forfeitures are estimated at the time of grant and revised in subsequent periods, if necessary, if actual forfeitures differ from initial estimates. Stock-based compensation expense is recorded net of estimated forfeitures such that expense is recorded only for those stock-based awards that are expected to vest. Previously recognized expense is reversed for the portion of awards forfeited prior to vesting as and when the forfeitures occurred. The Company typically records stock-based compensation expense under the straight-line attribution method over the vesting term, which is generally four years for options, and records stock-based compensation expense for performance based awards using the graded-vesting method. Stock issued to grantees in the Company's stock-based compensation is from authorized and previously unissued shares. Stock-based compensation expense is recorded in the consolidated statements of operations based on the employees' respective function.

Stock-based compensation cost for RSUs is measured based on the fair value of the underlying shares on the date of grant. Up to the date of the Company's IPO, RSUs were subject to a time-based vesting condition and a performance-based vesting condition, both of which require satisfaction before the RSUs vest and settle for shares of common stock. The performance-based condition was tied to a liquidity event such as a sale event of the Company or the completion of the Company's IPO. The time-based conditions range between six months and four years from the end of the lock-up period after IPO. Upon completion of the Company's IPO in July 2018, the performance-based condition of our RSUs was satisfied and the

Company began recognizing stock based compensation over the remaining time-based vesting condition, which ranges from six-months and up to four years from IPO.

The Company uses the Black-Scholes valuation model to estimate the fair value of stock purchase rights under our 2018 ESPP plan. The fair value of the 2018 ESPP purchase rights is recognized as expense under the multiple options approach. Stock-based compensation expense is recorded in the consolidated statements of operations based on the employees' respective function.

Compensation expense for equity instruments granted to non-employees is measured on the date of performance at the fair value of the consideration received or the fair value of the equity instruments issued, whichever is more reliably measured. Compensation expense for equity awards granted to non-employees is periodically remeasured until the performance condition is achieved and the shares vest. The fair value of the equity instruments is expensed over the term of the non-employee's service period.

The Company records deferred tax assets for awards that result in deductions on the Company's income tax returns, unless the Company cannot realize the deduction (i.e., the Company is in a net operating loss, or NOL, position), based on the amount of compensation cost recognized and the Company's statutory tax rate. With the Company's adoption of ASU 2016-09 in the first quarter of 2017 on a prospective basis, stock-based compensation excess tax benefits or deficiencies are reflected in the consolidated statements of operations as a component of the provision for income taxes. No tax benefit or expense for stock-based compensation has been recorded for the years ended December 31, 2018 , 2017 and 2016 since the Company remains in an NOL position.

Determining the amount of stock-based compensation to be recorded requires the Company to develop estimates for the inputs used in the Black-Scholes valuation model to calculate the grant-date fair value of stock options. The Company uses weighted-average assumptions in applying the Black-Scholes valuation model.

The risk free interest rate for periods within the contractual life of the option is based on the U.S. Treasury zero-coupon issues in effect at the grant date for periods corresponding with the expected term of option. The Company's estimate of an expected term is calculated based on the Company's historical share option exercise data. The Company has not and does not expect to pay dividends in the foreseeable future. The estimated stock price volatility is derived based on historical volatility of the Company's peer group, which represents the Company's best estimate of expected volatility.

The amount of stock-based compensation recognized during a period is based on the value of that portion of the awards that are ultimately expected to vest. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from estimates. The term "forfeitures" is distinct from "cancellations" or "expirations" and represents only the unvested portion of the surrendered option. The Company reviews historical forfeiture data and determines the appropriate forfeiture rate based on that data. The Company reevaluates this analysis periodically and adjusts the forfeiture rate as necessary and ultimately recognizes the actual expense over the vesting period only for the shares that vest.

Refer to Note 11 - *Stock-Based Compensation and Employee Benefits* for further discussion of the Company's stock-based compensation arrangements.

Income Taxes

The Company accounts for income taxes using the liability method under Financial Accounting Standards Board Accounting Standards Codification Topic 740 - *Income Taxes* (ASC 740). Under this method, deferred tax assets and liabilities are determined based on net operating loss carryforwards, research and development credit carryforwards and temporary differences resulting from the different treatment of items for tax and financial reporting purposes. Deferred items are measured using the enacted tax rates and laws that are expected to be in effect when the differences reverse. Additionally, the Company must assess the likelihood that deferred tax assets will be recovered as deductions from future taxable income. The Company has provided a full valuation allowance on its deferred tax assets because it believes it is more likely than not that its deferred tax assets will not be realized.

The Company follows the accounting guidance in ASC 740-10, which requires a more-likely-than-not threshold for financial statement recognition and measurement of tax positions taken or expected to be taken in a tax return. The Company records a liability for the difference between the benefit recognized and measured pursuant to ASC 740-10 and the tax position taken or expected to be taken on the Company's tax return. To the extent that the assessment of such tax positions change, the change in estimate is recorded in the period in which the determination is made. The Company establishes reserves for tax-related uncertainties based on estimates of whether, and the extent to which, additional taxes will be due. These reserves are established when the Company believes that certain positions might be challenged despite the Company's belief that the tax return positions are fully supportable. The reserves are adjusted in light of changing facts and circumstances such as the outcome of a tax audit. The provision for income taxes includes the impact of reserve provisions and changes to reserves that

are considered appropriate. The Company recognizes interest and penalties related to unrecognized tax benefits in income tax expense.

Refer to Note 9 - *Income Taxes* for further discussion of the Company's income tax expense.

Comprehensive Loss

The Company's comprehensive loss is comprised of net loss attributable to Class A and Class B shareholders, unrealized gain (loss) on available-for-sale securities, change in the effective portion of the Company's interest rate swap agreements and comprehensive (income) loss attributable to noncontrolling interest and redeemable noncontrolling interest.

Fair Value Measurement

Financial Accounting Standards Board Accounting Standards Codification Topic 820 - *Fair Value Measurements and Disclosures* (ASC 820), defines fair value, establishes a framework for measuring fair value under U.S. GAAP and enhances disclosures about fair value measurements. Fair value is defined under ASC 820 as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value under ASC 820 must maximize the use of observable inputs and minimize the use of unobservable inputs. The guidance describes a fair value hierarchy based on three levels of inputs, of which the first two are considered observable and the last unobservable, that may be used to measure fair value:

Level 1 Quoted prices in active markets for identical assets or liabilities. Financial assets utilizing Level 1 inputs typically include money market securities and U.S. Treasury securities.

Level 2 Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Financial instruments utilizing Level 2 inputs include interest rate swaps.

Level 3 Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. Financial liabilities utilizing Level 3 inputs include natural gas fixed price forward contract derivatives and warrants issued to purchase the Company's preferred stock and embedded derivatives bifurcated from convertible notes. Derivative liability valuations are performed based on a binomial lattice model and adjusted for illiquidity and/or nontransferability and such adjustments are generally based on available market evidence.

Cash, Cash Equivalents, Short-Term Investments and Restricted Cash - Cash equivalents consist of highly liquid short-term investments with maturities of 90 days or less at the date of purchase.

Short-term investments consist of highly liquid investments with maturities of greater than 90 days at the reporting period end date. Short-term investments are reported at fair value with unrealized gains or losses, net of tax, recorded in accumulated other comprehensive income (loss). Short-term investments are anticipated to be used for current operations and are, therefore, classified as available-for-sale in current assets even though their maturities may extend beyond one year. The Company periodically reviews short-term investments for impairment. In the event a decline in value is determined to be other-than-temporary, an impairment loss is recognized. When determining if a decline in value is other-than-temporary, the Company takes into consideration the current market conditions and the duration and severity of and the reason for the decline as well as considering the likelihood that it would need to sell the security prior to a recovery of par value.

The specific identification method is used to determine the cost of any securities disposed with any realized gains or losses recognized as income or expense in the consolidated statements of operations.

As of December 31, 2018 , short-term investments consisted of $104.4 million of U.S. Treasury Bills . As of December 31, 2017 , short-term investments consisted of $26.8 million of U.S. Treasury Bills . The cost of these securities approximated fair value and there were no material gross realized or unrealized gains or losses for the years ended December 31, 2018 , 2017 and 2016 . There were no impairments to value for the periods ended December 31, 2018 and 2017 . As of December 31, 2018 , all investments were scheduled to mature within the next twelve months.

Restricted cash is held as collateral to provide financial assurance that the Company will fulfill obligations and commitments primarily related to its power purchase agreement financings, its debt service reserves, its maintenance service reserves and its facility lease agreements. Restricted cash that is expected to be used within one year of the balance sheet date is classified as a current asset, whereas restricted cash expected to be used more than one year from the balance sheet date is classified as a non-current asset.

Derivative Financial Instruments - The Company enters into derivative forward contracts to manage its exposure to the fluctuating price of natural gas under certain of its power purchase agreements entered in connection with the Bloom Electrons program (refer to Note 12 - *Power Purchase Agreement Programs*). In addition, the Company enters into fixed forward interest rate swap arrangements to convert variable interest rates on debt to a fixed rate. The Company also issued derivative financial instruments embedded in its 6% Notes as a means by which to provide additional incentive to investors and to obtain a lower cost cash-source of funds.

Derivative transactions are governed by procedures covering areas such as authorization, counterparty exposure and hedging practices. Positions are monitored based on changes in the spot price in the commodity market and their impact on the market value of derivatives. Credit risk on derivatives arises from the potential for counterparties to default on their contractual obligations to the Company. The Company limits its credit risk by dealing with counterparties that are considered to be of high credit quality. The Company does not enter into derivative transactions for trading or speculative purposes.

The Company accounts for its derivative instruments as either an asset or a liability which are carried at fair value on the consolidated balance sheets. Changes in the fair value of the derivatives that are designated and qualify as cash flow hedges are recorded in accumulated other comprehensive income (loss) on the consolidated balance sheets and for those that do not qualify for hedge accounting or are not designated hedges are recorded through earnings in the consolidated statements of operations.

While the Company hedges certain of its natural gas requirements under its power purchase agreements, it does not classified these forward contracts as designated hedges for accounting purposes. Therefore, the Company records the change in the fair value of its forward contracts in cost of revenue on the consolidated statements of operations. The fair value of the forward contracts is recorded on the consolidated balance sheets as a component of accrued other current liabilities and as derivative liabilities. As the forward contracts are considered economic hedges, the changes in the fair value of the forward contracts are classified as operating activities within the statement of cash flows, which is consistent with the classification of the cash flows of the hedged item.

The Company’s interest rate swap arrangements qualify as cash flow hedges for accounting purposes as they effectively convert variable rate obligations into fixed rate obligations. The Company evaluates and calculates the effectiveness of the hedge at each reporting date. The effective change is recorded in accumulated other comprehensive income (loss) and will be recognized as interest expense on settlement. Ineffectiveness is recorded in other income (expense), net. If a cash flow hedge is discontinued due to changes in the forecasted hedged transactions, hedge accounting is discontinued prospectively and any unrealized gain or loss on the related derivative is recorded in accumulated other comprehensive loss and is reclassified into earnings in the same period during which the hedged forecasted transaction affects earnings. The fair value of the swap arrangement is recorded on the consolidated balance sheets as a component of accrued other current liabilities and as derivative liabilities. The changes in fair value of swap agreement are classified as operating activities within the statement of cash flows, which is consistent with the classification of the cash flows of the hedged item.

The Company issued convertible notes with conversion features. These conversion features were evaluated under ASC topic 815-40, were determined to be embedded derivatives and were bifurcated from the debt and were classified prior to the IPO as liabilities on the consolidated balance sheets. The Company recorded these derivative liabilities at fair value and adjusted the carrying value to their estimated fair value at each reporting date with the increases or decreases in the fair value recorded as a gain (loss) on revaluation of warrant liabilities and embedded derivatives in the consolidated statements of operations. Upon the IPO, the final valuation of the embedded derivative was calculated as of the date of the IPO and was reclassified from a derivative liability to additional paid-in capital.

Customer Financing Receivables - The contractual terms of Company's customer financing receivables are primarily contained within the PPA Entities' customer lease agreements. Leases are classified as either operating or sales-type leases in accordance with the relevant accounting guidelines and customer financing receivables are generated by Energy Servers leased to PPA Entities’ customers in leasing arrangements that qualify as sales-type leases. Customer financing receivables represents the gross minimum lease payments to be received from customers and the system’s estimated residual value, net of unearned income and allowance for estimated losses. Initial direct costs for sales-type leases are recognized as cost of revenue when the Energy Servers are placed in service.

The Company reviews its customer financing receivables by aging category to identify significant customer balances with known disputes or collection issues. In determining the allowance, the Company makes judgments about the creditworthiness of a majority of its customers based on ongoing credit evaluations. The Company also considers its historical level of credit losses as well as current economic trends that might impact the level of future credit losses. The Company writes off customer financing receivables when they are deemed uncollectible. The Company does not maintain an allowance for doubtful accounts to reserve for potentially uncollectible customer financing receivables as historically all of its receivables on the consolidated balance sheets have been collected in full.

Accounts Receivable - Accounts receivable primarily represents trade receivables from sales to customers recorded at net realizable value. As it does for its customer financing receivables, the Company reviews its accounts receivable by aging category to identify significant customer balances with known disputes or collection issues. In determining the allowance, the Company makes judgments about the creditworthiness of a majority of its customers based on ongoing credit evaluations. The Company also considers its historical level of credit losses as well as current economic trends that might impact the level of future credit losses. The Company writes off accounts receivable when they are deemed uncollectible. The Company does not maintain an allowance for doubtful accounts to reserve for potentially uncollectible accounts receivable as historically all of its receivables on the consolidated balance sheets have been collected in full.

Inventories - Inventories consist principally of raw materials, work-in-process and finished goods and are stated on a first-in, first-out basis at the lower of cost or net realizable value.

The Company records inventory excess and obsolescence provisions for estimated obsolete or unsellable inventory, including inventory from purchase commitments, equal to the difference between the cost of inventory and estimated net realizable value based upon assumptions about market conditions and future demand for product generally expected to be utilized over the next 12 to 24 months, including product needed to fulfill the Company's warranty obligations. If actual future demand for the Company's products is less than currently forecasted, additional inventory provisions may be required. Once a provision is recorded, it is maintained until the product to which it relates to is sold or otherwise disposed. The inventory reserves were $13.0 million and $15.7 million as of December 31, 2018 and 2017 , respectively.

Property, Plant and Equipment - Property, plant and equipment, including leasehold improvements, are stated at cost less accumulated depreciation. Energy Servers are depreciated to their residual values over the terms of the power purchase and tariff agreements. Leasehold improvements are depreciated over the shorter of the lease term or their estimated depreciable lives. Buildings are amortized over the shorter of the lease or property term or their estimated depreciable lives. Assets under construction are capitalized as costs are incurred and depreciation commences after the assets are put into service within their respective asset class.

Depreciation is calculated using the straight-line method over the estimated depreciable lives of the respective assets as follows:

	Depreciable Lives
Energy Servers	15-21 years
Computers, software and hardware	3-5 years
Machinery and equipment	5-10 years
Furniture and fixtures	3-5 years
Leasehold improvements	1-10 years
Buildings	35 years

When assets are retired or disposed, the assets and related accumulated depreciation and amortization are removed from the Company's general ledger and the resulting gain or loss is reflected in the consolidated statements of operations.

Foreign Currency Transactions - The functional currency of the Company's foreign subsidiaries is the U.S. dollar since they are considered financially and operationally integrated with their domestic parent. Foreign currency monetary assets and liabilities are remeasured into U.S. dollars at end-of-period exchange rates. Any currency transaction gains and losses are included as a component of other expense, net in the Company's consolidated statements of operations and have not been significant for any period presented.

Preferred Stock Warrants - The Company accounted for freestanding warrants to purchase shares of its convertible preferred stock as liabilities on the consolidated balance sheets at fair value upon issuance. In accordance with ASC 480 - *Distinguishing Liability from Equity* (ASC 480), these warrants were classified within warrant liability in the consolidated balance sheets as the underlying shares of convertible preferred stock were contingently redeemable which, therefore, may have obligated the Company to transfer assets at some point in the future. These warrants were valued on the date of issuance, using the Probability-Weighted Expected Return Model (PWERM). The warrants were subject to remeasurement to fair value at each balance sheet date or immediately prior to exercise. Any change in fair value was recognized in the consolidated statements of operations. The Company's convertible preferred stock warrants were converted into common stock warrants upon the completion of the IPO. At that time, the convertible preferred stock warrant liability was reclassified to additional paid-in capital.

Allocation of Profits and Losses of Consolidated Entities to Noncontrolling Interests - The Company generally allocates profits and losses to noncontrolling interests under the hypothetical liquidation at book value (HLBV) method. HLBV is a balance sheet-oriented approach for applying the equity method of accounting when there is a complex structure, such as the flip structure of the PPE Entities. Refer to Note 12 - *Power Purchase Agreement Programs* for more information.

The determination of equity in earnings under the HLBV method requires management to determine how proceeds, upon a hypothetical liquidation of the entity at book value, would be allocated between its investors. The noncontrolling interest balance is presented as a component of permanent equity in the consolidated balance sheets.

Noncontrolling interests with redemption features, such as put options, that are not solely within the Company's control are considered redeemable noncontrolling interests. Exercisability of put options are solely dependent upon the passage of time, and hence, such put options are considered to be probable of becoming exercisable. The Company elected to accrete changes in the redemption value over the period from the date it becomes probable that the instrument will become redeemable to the earliest redemption date of the instrument by using an interest method. The balance of redeemable noncontrolling interests on the balance sheets is reported at the greater of its carrying value or its maximum redemption value at each reporting date. The redeemable noncontrolling interests are classified as temporary equity and therefore are reported in the mezzanine section of the consolidated balance sheets as redeemable noncontrolling interests.

For income tax purposes, the Equity Investors of the PPA Entities receive a greater proportion of the share of losses and other income tax benefits. This includes the allocation of investment tax credits which are distributed to the Equity Investors through an Investment Company subsidiary of the Company. Allocations are initially based on the terms specified in each respective partnership agreement until either a specific date or the Equity Investors' targeted rate of return specified in the partnership agreement is met (the "flip" of the flip structure) whereupon the allocations change. In some cases after the Equity Investors receive their contractual rate of return, the Company receives substantially all of the remaining value attributable to the long-term recurring customer payments and the other incentives.

Recent Accounting Pronouncements

Revenue Recognition - In May 2014, the FASB issued new authoritative guidance on revenue from contracts with customers. The new standard provides principles for recognizing revenue for the transfer of promised goods or services to customers with the consideration to which the entity expects to be entitled in exchange for those goods or services, as well as guidance on the recognition of costs related to obtaining and fulfilling customer contracts. The standard also requires expanded disclosures about the nature, amount, timing, and uncertainty of revenues and cash flows arising from customer contracts, including significant judgments and changes in judgments. The standard is effective for the Company's annual periods beginning January 1, 2019, and for its interim periods beginning on January 1, 2020. The standard can be adopted using either of two methods: (i) retrospective to each prior reporting period presented with the option to elect certain practical expedients as defined within the guidance ("full retrospective method"); or (ii) retrospective with the cumulative effect of initially applying the guidance recognized at the date of initial application and providing certain additional disclosures as defined per the guidance ("modified retrospective method"). The Company will adopt the standard for its fiscal year ended December 31, 2019 using the modified retrospective method, resulting in a cumulative-effect adjustment to retained earnings on January 1, 2019.

The Company is currently evaluating whether the standard will have a material impact on its consolidated financial statements and expects the adoption of the standard to have an impact related to the costs of obtaining its contracts, customer deposits, and deferred revenue. Further, in preparation for the new standard, the Company will update its accounting policies, processes, internal controls over financial reporting, and system requirements.

Leases - In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), which provides new authoritative guidance on lease accounting. Among its provisions, the standard requires lessees to recognize right-of-use assets and lease liabilities on the balance sheet for operating leases and also requires additional qualitative and quantitative disclosures about lease arrangements. ASU 2016-02 will be effective for the Company beginning in fiscal 2020, and requires the modified retrospective method of adoption. Early adoption is permitted. The Company is currently evaluating whether this standard will have a material impact on its consolidated financial statements.

Financial Instruments - In June 2016, the FASB issued ASU 2016-13, Financial Instruments—Credit Losses (Topic 326). The pronouncement was issued to provide more decision-useful information about the expected credit losses on financial instruments and changes the loss impairment methodology. This pronouncement will be effective for the Company from fiscal year 2021. A prospective transition approach is required for debt securities for which an other than temporary impairment had been recognized before the effective date. The Company is currently evaluating the impact of the adoption of this update on its financial statements.

Statement of Cash Flows - In August 2016, the FASB issued ASU 2016-15, Classification of Certain Cash Receipts and Cash Payments (Topic 230), which clarifies the classification of the activity in the consolidated statements of cash flows and how the predominant principle should be applied when cash receipts and cash payments have more than one class of cash flows. This pronouncement will be effective for the Company from fiscal year 2019, with early adoption permitted. Adoption will be applied retrospectively to all periods presented. The Company is currently evaluating the impact this guidance will have on the consolidated financial statements and related disclosures.

Income Taxes - In October 2016, the FASB issued ASU 2016-16, Income Taxes—Intra-Entity Transfers of Assets Other Than Inventory (Topic 740), which requires that entities recognize the income tax consequences of an intra-entity transfer of an asset, other than inventory, when the transfer occurs. The standard is effective for the Company in its annual report on Form 10-K for the fiscal year ended December 31, 2019 and is required to be applied on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings as of the beginning of the adoption period. The Company is currently evaluating the impact of its pending adoption of this standard on its consolidated financial statements.

Statement of Cash Flows - In November 2016, the FASB issued ASU 2016-18, Statement of Cash Flows—Restricted Cash (Topic 230), related to the presentation of restricted cash in the statement of cash flows. The pronouncement requires that a statement of cash flows explain the change during the period in cash, cash equivalents, and amounts generally described as restricted cash. Amounts generally described as restricted cash are included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts. Refer to Note 3 - *Financial Instruments* for more information. The Company elected to early adopt the updated guidance in January 2017 resulting in the application of its requirements to all applicable periods presented. The adoption of this guidance did not have an effect on the Company's results of operations, financial position or liquidity, other than the presentation of restricted cash or restricted cash equivalents in the statements of cash flows.

Derivatives and Hedging - In August 2017, the FASB issued ASU No. 2017-12, *Derivatives and Hedging (Topic 815)* to improve on the accounting for hedging activities. The improvements include (i) alignment of risk management activities and financial reporting, and (ii) other simplifications in the application of hedge accounting guidance. The ASU is effective for interim and annual periods beginning after December 15, 2018, with early adoption permitted. The Company plans to adopt the ASU on a modified retrospective approach in January 2019. The ASU is currently not expected to have a material impact on the consolidated financial statements.

Financial Instruments - In July 2017, the FASB issued ASU 2017-11, Accounting for Certain Financial Instruments with Down Round Features and Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception. Part I of this ASU addresses the complexity of accounting for certain financial instruments with down round features. Per the ASU, a freestanding equity-linked financial instrument (or embedded conversion option) no longer would be accounted for as a derivative liability at fair value as a result of the existence of a down round feature. The ASU is effective for public entities for fiscal years beginning after December 15, 2018 and early adoption is permitted. The Company elected early adoption effective January 1, 2018. The adoption of the ASU did not have a material impact on the Company's financial statements.

Stock Compensation - In June 2018, the FASB issued ASU 2018-07, Compensation - Stock Compensation: Improvements to Nonemployee Share-Based Payment Accounting. ASU 2018-07 aligns the accounting for share-based payment awards issued to employees and nonemployees. Measurement of equity-classified nonemployee awards will now be valued on the grant date and will no longer be remeasured through the performance completion date. This amendment also changes the accounting for nonemployee awards with performance conditions to recognize compensation cost when achievement of the performance condition is probable, rather than upon achievement of the performance condition, as well as eliminating the requirement to reassess the equity or liability classification for nonemployee awards upon vesting, except for certain award types. This ASU is effective for the Company for interim and annual reporting periods beginning after December 15, 2019. Early adoption is permitted. The Company plans to adopt the ASU on a modified retrospective approach in January 2020. The Company does not expect the adoption of this standard to have a material effect on the Company's financial statements and related disclosures.

Fair Value Measurement - In August 2018, the FASB issued ASU 2018-13, Fair Value Measurement Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement. The ASU has eliminated, amended and added disclosure requirements for fair value measurements. Entities will no longer be required to disclose the amount of, and reasons for, transfers between Level 1 and Level 2 of the fair value hierarchy, the policy of timing of transfers between levels of the fair value hierarchy and the valuation processes for Level 3 fair value measurements. Companies will be required to disclose the range and weighted average used to develop significant unobservable inputs for Level 3 fair value measurements. This ASU is effective for annual and interim periods beginning after December 15, 2019. Early adoption is permitted. This ASU

will have an impact on the Company's disclosures. The Company is evaluating the effect on the Company's financial statements and related disclosures.

Internal Use Software - In August 2018, the FASB issued ASU 2018-15, Intangibles - Goodwill and Other - Internal-Use Software Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract. This ASU requires companies to defer specified implementation costs in a cloud computing arrangement that are often expensed under current U.S. GAAP and recognize these costs to expense over the noncancelable term of the arrangement. This ASU is effective for annual and interim periods beginning after December 15, 2019. Early adoption is permitted. The Company elected early adoption effective July 1, 2018. The adoption of the ASU did not have a material impact on the Company's financial statements and related disclosures.

3. Financial Instruments

Cash, Cash Equivalents and Restricted Cash

The carrying value of cash and cash equivalents approximate fair value and are as follows (in thousands):

	December 31,	
	2018	**2017**
As held		
Cash	$ 136,642	$ 101,356
Money market funds	143,843	79,256
	$ 280,485	$ 180,612
As reported		
Cash and cash equivalents	$ 220,728	$ 103,828
Restricted cash	59,757	76,784
	$ 280,485	$ 180,612

Restricted cash consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Current		
Restricted cash	$ 25,740	$ 36,418
Restricted cash related to PPA Entities	2,917	7,969
Restricted cash, current	$ 28,657	$ 44,387
Non-current		
Restricted cash	$ 3,246	$ 5,649
Restricted cash related to PPA Entities	27,854	26,748
Restricted cash, non-current	31,100	32,397
	$ 59,757	$ 76,784

Short-Term Investments

As of December 31, 2018 and 2017 , the Company had short-term investments in U.S. Treasury Bills of $104.4 million and $26.8 million , respectively.

Derivative Instruments

The Company has derivative financial instruments related to natural gas forward contracts and interest rate swaps. See Note 7 - *Derivative Financial Instruments* for a full description of the Company's derivative financial instruments.

4. Fair Value

Financial Assets and Liabilities Measured at Fair Value on a Recurring Basis

The tables below sets forth, by level, the Company's financial assets that were accounted for at fair value for the respective periods. The table does not include assets and liabilities that are measured at historical cost or any basis other than fair value (in thousands):

	Fair Value Measured at Reporting Date Using			
December 31, 2018	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets				
Cash equivalents:				
Money market funds	$ 143,843	$ —	$ —	$ 143,843
Short-term investments	104,350	—	—	104,350
Interest rate swap agreements	—	82	—	82
	$ 248,193	$ 82	$ —	$ 248,275
Liabilities				
Accrued other current liabilities	$ 1,331	$ —	$ —	$ 1,331
Derivatives:				
Natural gas fixed price forward contracts	—	—	9,729	9,729
Interest rate swap agreements	—	3,630	—	3,630
	$ 1,331	$ 3,630	$ 9,729	$ 14,690

	Fair Value Measured at Reporting Date Using			
December 31, 2017	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets				
Cash equivalents:				
Money market funds	$ 79,256	$ —	$ —	$ 79,256
Short-term investments	26,816	—	—	26,816
Interest rate swap agreements	—	52	—	52
	$ 106,072	$ 52	$ —	$ 106,124
Liabilities				
Derivatives:				
Natural gas fixed price forward contracts	$ —	$ —	$ 15,368	$ 15,368
Embedded derivative on 6% promissory notes	—	—	140,771	140,771
Interest rate swap agreements	—	5,905	—	5,905
Stock warrants:				
Preferred stock warrants	—	—	9,825	9,825
Accrued other long term liabilities	—	5,149	—	5,149
	$ —	$ 11,054	$ 165,964	$ 177,018

Money Market Funds - Money market funds are valued using quoted market prices for identical securities and are therefore classified as Level 1 financial assets.

Short-Term Investments - Short-term investments, which are comprised of U.S. Treasury Bills with maturities of 12 months or less from the purchase date, are valued using quoted market prices for identical securities and are therefore classified as Level 1 financial assets.

Interest Rate Swap Agreements - Interest rate swap agreements are valued using quoted prices for similar contracts and are therefore classified as Level 2 financial assets. Interest rate swaps are designed as hedging instruments and are recognized

at fair value on the Company's consolidated balance sheets. As of December 31, 2018 , $0.3 million of the gain on the interest rate swaps accumulated in other comprehensive income (loss) is expected to be reclassified into earnings in the next twelve months.

Natural Gas Fixed Price Forward Contracts - Natural gas fixed price forward contracts are valued using a combination of factors including the counterparty's credit rating and estimates of future natural gas prices and therefore, as no observable inputs to support market activity are available, are classified as Level 3 financial assets.

The following table provides the fair value of the Company's natural gas fixed price contracts (dollars in thousands):

	December 31,			
	2018		2017	
	Number of Contracts (MMBTU) [2]	Fair Value	Number of Contracts (MMBTU)[2]	Fair Value
Liabilities [1]				
Natural gas fixed price forward contracts (not under hedging relationships)	3,096	$9,729	4,332	$15,368

[1] Recorded in current liabilities and derivative liabilities in the consolidated balance sheets.

[2] One MMBTU is a traditional unit of energy used to describe the heat value (energy content) of fuels.

For the years ended December 31, 2018 and 2017 , the Company marked-to-market the fair value of its fixed price natural gas forward contracts and recorded a gain of $2.2 million and a loss of $1.0 million , respectively, and recorded gains on the settlement of these contracts of $3.4 million and $4.2 million , respectively, in cost of revenue on the consolidated statement of operations.

Embedded Derivative on 6% Convertible Promissory Notes - On December 15, 2015, the Company issued $160.0 million of 6% Convertible Promissory Notes (6% Notes) that mature in December 2020. In addition, on January 29, 2016 and September 20, 2016, the Company issued an additional $25.0 million and $75.0 million , respectively, of 6% Notes. The 6% Notes are convertible at the option of the holders at a conversion price of $11.25 per share. The embedded redemption feature of the 6% Notes was therefore classified as an embedded derivative.

The embedded redemption feature of the 6% Notes was valued using the binomial lattice method, which utilizes significant inputs that are unobservable in the market. The fair value was determined by estimated event dates with probabilities of likely events under the scenario based upon facts existing through the date of the Company's IPO. It was therefore classified as a Level 3 financial liability. Upon the expiration of embedded derivative features triggered by the IPO, the Company reclassified the fair value of the derivative liability into additional paid-in capital. The final valuation of the conversion feature was calculated as of the date of the IPO to be $177.2 million and was reclassified from derivative liability to additional paid-in capital on the balance sheet.

Preferred Stock Warrants - The Company estimated the fair value of the preferred stock warrants using a probability-weighted expected return model which considers various potential liquidity outcomes and assigned probabilities to each to arrive at the weighted equity value. As there were no observable inputs supported by market activity, the preferred stock warrants were therefore classified as a Level 3 financial liability.

The preferred stock warrants were converted to common stock warrants effective with the IPO and reclassified to additional paid-in capital. The fair value of the preferred stock warrants were zero and $9.8 million , respectively, as of December 31, 2018 and 2017 . The changes in fair value were recorded in gain (loss) on revaluation of warrant liabilities in the consolidated statements of operations.

There were no transfers between fair value measurement classifications during the years ended December 31, 2018 and 2017 . The changes in the Level 3 financial assets were as follows (in thousands):

	Natural Gas Fixed Price Forward Contracts	Preferred Stock Warrants	Embedded Derivative Liability	Total
Balances at December 31, 2016	$ 18,585	$ 12,885	$ 115,807	$ 147,277
Settlement of natural gas fixed price forward contracts	(4,248)	—	—	(4,248)
Embedded derivative on notes	—	—	6,804	6,804
Changes in fair value	1,031	(3,060)	18,160	16,131
Balances at December 31, 2017	$ 15,368	$ 9,825	$ 140,771	$ 165,964
Settlement of natural gas fixed price forward contracts	(3,412)	—	—	(3,412)
Embedded derivative on notes	—	—	5,533	5,533
Changes in fair value	(2,227)	(8,943)	30,904	19,734
Reclassification of preferred stock warrants liability to common stock warrants and derivative liability into additional paid-in-capital	—	(882)	(177,208)	(178,090)
Balances at December 31, 2018	$ 9,729	$ —	$ —	$ 9,729

Significant changes in any assumption input in isolation can result in a significant change in fair value measurement. Generally, an increase in the market price of the Company's shares of common stock, an increase in natural gas prices, an increase in the volatility of the Company's shares of common stock and an increase in the remaining term of the conversion feature would each result in a directionally similar change in the estimated fair value of the Company's derivative liability. Increases in such assumption values would increase the associated liability while decreases in these assumption values would decrease the associated liability. An increase in the risk-free interest rate or a decrease in the market price of the Company's shares of common stock would result in a decrease in the estimated fair value measurement and thus a decrease in the associated liability.

Financial Assets and Liabilities Not Measured at Fair Value on a Recurring Basis

Customer Receivables and Debt Instruments - The Company estimates fair value for customer financing receivables, senior secured notes, term loans and convertible promissory notes based on rates currently offered for instruments with similar maturities and terms (Level 3). The following table presents the estimated fair values and carrying values of customer receivables and debt instruments (in thousands):

	December 31, 2018		December 31, 2017	
	Net Carrying Value	Fair Value	Net Carrying Value	Fair Value
Customer receivables:				
Customer financing receivables	$ 72,676	$ 51,541	$ 77,885	$ 55,255
Debt instruments:				
Recourse				
LIBOR + 4% term loan due November 2020	3,214	3,311	4,887	5,148
5% convertible promissory note due December 2020	34,706	31,546	—	—
8% convertible promissory notes due December 2018	—	—	244,717	211,000
6% convertible promissory notes due December 2020	263,284	353,368	236,724	219,094
10% notes due July 2024	95,555	99,260	94,517	106,124
Non-recourse				
5.22% senior secured notes due March 2025	78,566	80,838	89,564	95,114
7.5% term loan due September 2028	36,319	39,892	36,940	46,713
LIBOR + 5.25% term loan due October 2020	23,916	25,441	24,364	27,206
6.07% senior secured notes due March 2030	82,337	85,917	84,032	93,264
LIBOR + 2.5% term loan due December 2021	123,384	123,040	125,596	131,817

Long-Lived Assets - The Company's long-lived assets include property, plant and equipment. The carrying amounts of the Company's long-lived assets are periodically reviewed for impairment whenever events or changes in circumstances indicate that the carrying value of these assets may not be recoverable or that the useful life is shorter than originally estimated. No material impairment of any long-lived assets was identified in the years ended December 31, 2018 and 2017 .

5. Balance Sheet Components

Accounts Receivable

Accounts receivable primarily represents trade receivables from sales to customers recorded at net realizable value. One customer accounted for 66.8% of accounts receivable at December 31, 2018 . Two customers accounted for 21.4% and 10.1% of accounts receivable at December 31, 2017 . At December 31, 2018 and 2017 , the Company did not maintain any allowances for doubtful accounts as it deemed all of its receivables fully collectible.

Inventories

The components of inventory consisted of the following (in thousands):

	December 31,	
	2018	2017
Raw materials	$ 53,273	$ 49,963
Work-in-progress	22,303	19,998
Finished goods	56,900	20,299
	$ 132,476	$ 90,260

Prepaid Expense and Other Current Assets

Prepaid expenses and other current assets consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Government incentives receivable	$ 1,001	$ 1,836
Prepaid expenses and other current assets	32,741	24,840
	$ 33,742	$ 26,676

Property, Plant and Equipment, Net

Property, plant and equipment, net consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Energy Servers	$ 511,485	$ 511,153
Computers, software and hardware	16,536	19,384
Machinery and equipment	99,209	97,158
Furniture and fixtures	4,337	4,679
Leasehold improvements	18,629	22,799
Building	40,512	40,512
Construction in progress	29,084	9,898
	719,792	705,583
Less: Accumulated depreciation	(238,378)	(207,794)
	$ 481,414	$ 497,789

The Company’s construction in progress increased $19.2 million , as compared to 2017, primarily due to the Company's move to its new corporate headquarters. Our headquarters is used for administration, research and development and sales and marketing.

The Company’s property, plant and equipment under operating leases by the PPA Entities was $397.5 million and $397.0 million as of December 31, 2018 and 2017 , respectively. The accumulated depreciation for these assets was $77.4 million and $51.9 million as of December 31, 2018 and 2017 , respectively. Depreciation expense related to property, plant and equipment for the Company was $43.5 million , $46.1 million and $43.1 million for the years ended December 31, 2018 , 2017 and 2016 , respectively.

Other Long-Term Assets

Other long-term assets consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Prepaid and other long-term assets	$ 27,086	$ 31,446
Equity-method investments	6,046	5,014
Long-term deposits	1,660	1,000
	$ 34,792	$ 37,460

Accrued Warranty

Accrued warranty liabilities consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Product warranty	$ 10,935	$ 7,661
Operations and maintenance services agreements	8,301	9,150
	$ 19,236	$ 16,811

Changes in the standard product warranty liability were as follows (in thousands):

Balances at December 31, 2015	$ 8,707
Accrued warranty, net	4,124
Warranty expenditures during period	(4,727)
Balances at December 31, 2016	8,104
Accrued warranty, net	7,058
Warranty expenditures during period	(7,501)
Balances at December 31, 2017	7,661
Accrued warranty, net	11,155
Warranty expenditures during period	(7,881)
Balances at December 31, 2018	$ 10,935

Accrued Other Current Liabilities

Accrued other current liabilities consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Compensation and benefits	$ 16,742	$ 13,121
Current portion of derivative liabilities	3,232	5,492
Managed services liabilities	5,091	3,678
Accrued installation	6,859	3,348
Sales tax liabilities	1,700	5,524
Interest payable	4,675	5,520
Other	31,236	30,966
	$ 69,535	$ 67,649

Other Long-Term Liabilities

Accrued other long-term liabilities consisted of the following (in thousands):

	December 31,	
	2018	**2017**
Delaware grant	$ 10,469	$ 10,469
Managed services liabilities	29,741	31,087
Other	15,727	11,359
	$ 55,937	$ 52,915

In March 2012, the Company entered into an agreement with the Delaware Economic Development Authority to provide a grant of $16.5 million to the Company as an incentive to establish a new manufacturing facility in Delaware and to provide employment for full time workers at the facility over a certain period of time. The Company has received $12.0 million of the grant which is contingent upon the Company meeting certain milestones related to the construction of the manufacturing facility and the employment of full time workers at the facility through September 30, 2023. As of December 31, 2018 , the Company has paid $1.5 million in October 2017 for recapture provisions and has recorded $10.5 million in other long-term liabilities for potential repayments. See Note 13 - *Commitments and Contingencies* for a full description of the grant.

The Company has entered into managed services agreements that provide for the payment of property taxes and insurance premiums on behalf of customers. These obligations are included in each agreements' contract value and are recorded as short-term or long-term liabilities based on the estimated payment dates. The long-term managed services liabilities accrued were $29.7 million and $31.1 million as of December 31, 2018 and 2017 , respectively.

Customer Financing Leases, Receivable

The components of investment in sales-type financing leases consisted of the following (in thousands):

	December 31,	
	2018	2017
Total minimum lease payments to be received	$ 100,816	$ 109,431
Less: Amounts representing estimated executing costs	(25,180)	(27,815)
Net present value of minimum lease payments to be received	75,636	81,616
Estimated residual value of leased assets	1,051	1,051
Less: Unearned income	(4,011)	(4,781)
Net investment in sales-type financing leases	72,676	77,886
Less: Current portion	(5,594)	(5,209)
Non-current portion of investment in sales-type financing leases	$ 67,082	$ 72,677

The future scheduled customer payments from sales-type financing leases were as follows as of December 31, 2018 (in thousands):

	2019	2020	2021	2022	2023	Thereafter
Future minimum lease payments, less interest	$ 5,594	$ 6,022	$ 6,415	$ 6,853	$ 7,310	$ 39,431

6. Outstanding Loans and Security Agreements

The following is a summary of the Company's debt as of December 31, 2018 (in thousands):

	Unpaid Principal Balance	Net Carrying Value			Unused Borrowing Capacity
		Current	Long-Term	Total	
LIBOR + 4% term loan due November 2020	$ 3,286	$ 1,686	$ 1,528	$ 3,214	$ —
5% convertible promissory note due December 2020	33,104	—	34,706	34,706	—
6% convertible promissory notes due December 2020	296,233	—	263,284	263,284	—
10% notes due July 2024	100,000	7,000	88,555	95,555	—
Total recourse debt	432,623	8,686	388,073	396,759	—
5.22% senior secured term notes due March 2025	79,698	11,994	66,572	78,566	—
7.5% term loan due September 2028	40,538	2,200	34,119	36,319	—
LIBOR + 5.25% term loan due October 2020	24,723	827	23,089	23,916	—
6.07% senior secured notes due March 2030	83,457	2,469	79,868	82,337	—
LIBOR + 2.5% term loan due December 2021	125,456	3,672	119,712	123,384	—
Letters of Credit due December 2021	—	—	—	—	1,220
Total non-recourse debt	353,872	21,162	323,360	344,522	1,220
Total debt	$ 786,495	$ 29,848	$ 711,433	$ 741,281	$ 1,220

The following is a summary of the Company's debt as of December 31, 2017 (in thousands):

	Unpaid Principal Balance	Net Carrying Value			Unused Borrowing Capacity
		Current	Long-Term	Total	
LIBOR + 4% term loan due November 2020	$ 5,000	$ 1,690	$ 3,197	$ 4,887	$ —
8% convertible promissory notes due December 2018	244,717	—	244,717	244,717	—
6% convertible promissory notes due December 2020	286,069	—	236,724	236,724	—
10% notes due July 2024	100,000	—	94,517	94,517	—
Total recourse debt	635,786	1,690	579,155	580,845	—
5.22% senior secured term notes due March 2025	91,086	11,389	78,175	89,564	—
7.5% term loan due September 2028	41,927	1,389	35,551	36,940	—
LIBOR + 5.25% term loan due October 2020	25,599	876	23,488	24,364	—
6.07% senior secured notes due March 2030	85,303	1,846	82,186	84,032	—
LIBOR + 2.5% term loan due December 2021	128,403	2,946	122,650	125,596	—
Letters of Credit due December 2021	—	—	—	—	1,784
Total non-recourse debt	372,318	18,446	342,050	360,496	1,784
Total debt	$ 1,008,104	$ 20,136	$ 921,205	$ 941,341	$ 1,784

Recourse debt refers to debt that Bloom Energy Corporation has an obligation to pay. Non-recourse debt refers to debt that is recourse to only specified assets or subsidiaries of the Company. The differences between the unpaid principal balances and the net carrying values apply to debt discounts and deferred financing costs. The Company was in compliance with all financial covenants as of December 31, 2018 and 2017 .

Recourse Debt Facilities

LIBOR + 4% Term Loan due November 2020 - In May 2013, the Company entered into a $5.0 million credit agreement and a $12.0 million financing agreement to help fund the building of a new facility in Newark, Delaware. The $5.0 million credit agreement expired in December 2016. The $12.0 million financing agreement has a term of 90 months, payable monthly at a variable rate equal to one-month LIBOR plus the applicable margin. The weighted average interest rate as of December 31, 2018 and 2017 was 5.9% and 5.1% , respectively. The loan requires monthly payments and is secured by the manufacturing facility. In addition, the credit agreements also include a cross-default provision which provides that the remaining balance of borrowings under the agreements will be due and payable immediately if a lien is placed on the Newark facility in the event the Company defaults on any indebtedness in excess of $100,000 individually or $300,000 in the aggregate. Under the terms of these credit agreements, the Company is required to comply with various restrictive covenants. As of December 31, 2018 and 2017 , the debt outstanding was $3.3 million and $4.9 million , respectively.

5% Convertible Promissory Notes due 2020 (Originally 8% Convertible Promissory Notes due December 2018) - Between December 2014 and June 2016, the Company issued $193.2 million of three -year convertible promissory notes ("8% Notes") to certain investors. The 8% Notes had a fixed interest rate of 8% compounded monthly, due at maturity or at the election of the investor with accrued interest due in December of each year.

On January 18, 2018, amendments were finalized to extend the maturity dates for all the 8% Notes to December 2019. At the same time, the portion of the notes that was held by Constellation NewEnergy, Inc. (Constellation) was extended to December 2020 and the interest rate decreased from 8% to 5% ("5% Notes").

Investors held the right to convert the unpaid principal and accrued interest of both the 8% and 5% notes to Series G convertible preferred stock at any time at the price of $38.64 . In July 2018, upon the Company’s IPO, the $221.6 million of principal and accrued interest of outstanding 8% Notes automatically converted into additional paid-in capital, the conversion of which included all the related-party noteholders. The 8% Notes converted to shares of Series G convertible preferred stock and, concurrently, each such share of Series G convertible preferred stock converted automatically into one share of Class B common stock. Upon the Company's IPO, conversions of 5,734,440 shares of Class B common stock were issued and the 8% Notes were retired. Constellation, the holder of the 5% convertible promissory notes, have not elected to convert as of December 31, 2018 . The outstanding unpaid principal and accrued interest debt balance of the 5% Note of $34.7 million was classified as non-current as of December 31, 2018 , and the outstanding unpaid principal and accrued interest debt balances of the 8% Notes of $244.7 million was classified as non-current as of December 31, 2017 .

6% Convertible Promissory Notes due December 2020 - Between December 2015 and September 2016, the Company issued $260.0 million convertible promissory notes due December 2020, ("6% Notes") to certain investors. The 6% Notes bore a 5% fixed interest rate, payable monthly either in cash or in kind, at the Company’s election. We amended the terms of the 6% Notes in June 2017 to increase the interest rate from 5% to 6% and to reduce the collateral securing the notes.

As of December 31, 2018 and 2017 , the amount outstanding on the 6% Notes, which includes interest paid in kind through the IPO date, was $296.2 million and $286.1 million , respectively. Upon the IPO, the debt is convertible at the option of the holders at the conversion price of $11.25 per share into common stock at any time through the maturity date. In January 2018, the Company amended the terms of the 6% Notes to extend the convertible put option, which investors could elect only if the IPO did not occur prior to December 2019. After the IPO, the Company paid the interest in cash when due and no additional interest accrued on the consolidated balance sheet on the 6% Notes.

On or after July 27, 2020, we may redeem, at the Company's option, all or part of the 6% Notes if the last reported sale price of our common stock has been at least $22.50 for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending within the three trading days immediately preceding the date on which we provide written notice of redemption In certain circumstances, the 6% Notes are also redeemable at the Company's option in connection with a change of control.

Under the terms of the indenture governing the 6% Notes, the Company is required to comply with various restrictive covenants, including meeting reporting requirements, such as the preparation and delivery of audited consolidated financial statements, and restrictions on investments. In addition, the Company is required to maintain collateral which secures the 6% Notes in an amount equal to 200% of the principal amount of and accrued and unpaid interest on the outstanding notes. This minimum collateral test is not a negative covenant and does not result in a default if not met. However, the minimum collateral test does restrict the Company with respect to investing in non-PPA subsidiaries. If the Company does not meet the minimum collateral test, the Company cannot invest cash into any non-PPA subsidiary that is not a guarantor of the notes. The 6% Notes also include a cross-acceleration provision which provides that the holders of at least 25% of the outstanding principal amount of the 6% Notes may cause such notes to become immediately due and payable if we or any of our subsidiaries default on any indebtedness in excess of $15.0 million such that the repayment of such indebtedness is accelerated.

In connection with the issuance of the 6% Notes, the Company agreed to issue to J.P. Morgan and CPPIB, upon the occurrence of certain conditions, warrants to purchase the Company's common stock up to a maximum of 146,666 shares and 166,222 shares, respectively. On August 31, 2017, J.P. Morgan transferred its rights to CPPIB. Upon completion of the IPO, the 312,888 warrants were net exercised for 312,575 shares of Class B Common stock.

10% Notes due July 2024 - In June 2017, the Company issued $100.0 million of senior secured notes ("10% Notes"). The 10% Notes mature between 2019 and 2024 and bear a 10.0% fixed rate of interest, payable semi-annually. The 10% Notes have a continuing security interest in the cash flows payable to the Company as servicing, operations and maintenance fees and administrative fees from the five active power purchase agreements in the Company's Bloom Electrons program. Under the terms of the indenture governing the notes, the Company is required to comply with various restrictive covenants including, among other things, to maintain certain financial ratios such as debt service coverage ratios, to incur additional debt, issue guarantees, incur liens, make loans or investments, make asset dispositions, issue or sell share capital of our subsidiaries and pay dividends, meet reporting requirements, including the preparation and delivery of audited consolidated financial statements, or maintain certain restrictions on investments and requirements in incurring new debt. In addition, the Company is required to maintain collateral which secures the 10% Notes based on debt ratio analyses. This minimum collateral test is not a negative covenant and does not result in a default if not met. However, the minimum collateral test does restrict the Company with respect to investing in non-PPA subsidiaries. If the Company does not meet the minimum collateral test, the Company cannot invest cash into any non-PPA subsidiary that is not a guarantor of the notes.

Non-recourse Debt Facilities

5.22% Senior Secured Term Notes - In March 2013, PPA Company II refinanced its existing debt by issuing 5.22% Senior Secured Notes due March 30, 2025. The total amount of the loan proceeds was $144.8 million , including $28.8 million to repay outstanding principal of existing debt, $21.7 million for debt service reserves and transaction costs and $94.3 million to fund the remaining system purchases. The loan is a fixed rate term loan that bears an annual interest rate of 5.22% payable quarterly. The loan has a fixed amortization schedule of the principal, payable quarterly, which began March 30, 2014 that requires repayment in full by March 30, 2025. The Note Purchase Agreement requires the Company to maintain a debt service reserve, the balance of which was $11.2 million and $11.3 million as of December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. The notes are secured by all the assets of PPA II.

7.5% Term Loan due September 2028 - In December 2012 and later amended in August 2013, PPA IIIa entered into a $46.8 million credit agreement to help fund the purchase and installation of Energy Servers. The loan bears a fixed interest rate of 7.5% payable quarterly. The loan requires quarterly principal payments which began in March 2014. The credit agreement requires the Company to maintain a debt service reserve for all funded systems, the balance of which was $3.7 million and $3.7 million as of December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. The loan is secured by all assets of PPA IIIa.

LIBOR + 5.25% Term Loan due October 2020 - In September 2013, PPA IIIb entered into a credit agreement to help fund the purchase and installation of Energy Servers. In accordance with that agreement, PPA IIIb issued floating rate debt based on LIBOR plus a margin of 5.2% , paid quarterly. The aggregate amount of the debt facility is $32.5 million . The loan is secured by all assets of PPA IIIb and requires quarterly principal payments which began in July 2014. The credit agreement requires the Company to maintain a debt service reserve for all funded systems, the balance of which was $1.7 million and $1.7 million December 31, 2018 and 2017 , respectively, and which was included as part of long-term restricted cash in the consolidated balance sheets. In September 2013, PPA IIIb entered into pay-fixed, receive-float interest rate swap agreement to convert the floating-rate loan into a fixed-rate loan.

6.07% Senior Secured Notes due March 2025 - In July 2014, PPA IV issued senior secured notes amounting to $99.0 million to third parties to help fund the purchase and installation of Energy Servers. The notes bear a fixed interest rate of 6.07% payable quarterly which began in December 2015 and ends in March 2030. The notes are secured by all the assets of the PPA IV. The Note Purchase Agreement requires the Company to maintain a debt service reserve, the balance of which was $7.5 million as of December 31, 2018 and $7.0 million as of December 31, 2017 , and which was included as part of long-term restricted cash in the consolidated balance sheets.

LIBOR + 2.5% Term Loan due December 2021 - In June 2015, PPA V entered into a $131.2 million credit agreement to fund the purchase and installation of Energy Servers. The lenders are a group of five financial institutions and the terms included commitments to a letter of credit (LC) facility (see below). The loan was initially advanced as a construction loan during the development of the PPA V Project and converted into a term loan on February 28, 2017 (the "Term Conversion Date"). As part of the term loan's conversion, the LC facility commitments were adjusted.

In accordance with the credit agreement, PPA V was issued a floating rate debt based on LIBOR plus a margin, paid quarterly. The applicable margins used for calculating interest expense are 2.25% for years 1-3 following the Term Conversion Date and 2.5% thereafter. For the Lenders' commitments to the loan and the commitments to the LC loan, the PPA V also pays

commitment fees at 0.50% per annum over the outstanding commitments, paid quarterly. The loan is secured by all the assets of the PPA V and requires quarterly principal payments which began in March 2017. In connection with the floating-rate credit agreement, in July 2015 the PPA V entered into pay-fixed, receive-float interest rate swap agreements to convert its floating-rate loan into a fixed-rate loan.

Letters of Credit due December 2021 - In June 2015, PPA V entered into a $131.2 million term loan due December 2021. The agreement also included commitments to a letter of credit (LC) facility with the aggregate principal amount of $6.4 million , later adjusted down to $6.2 million . The amount reserved under the letter of credit as of December 31, 2018 and 2017 was $5 million and $4.4 million , respectively. The unused capacity as of December 31, 2018 and 2017 was and $1.2 million and $1.8 million , respectively.

Related Party Debt

Portions of the above described recourse and non-recourse debt is held by various related parties. See Note 15 - *Related Party Transactions* for a full description.

Repayment Schedule and Interest Expense

The following table presents detail of the Company's entire outstanding loan principal repayment schedule as of December 31, 2018 (in thousands):

2019	$	29,878
2020		391,060
2021		153,639
2022		40,059
2023		44,209
Thereafter		127,650
	$	786,495

Interest expense of $85.8 million , $108.6 million and $81.2 million for the years ended December 31, 2018 , 2017 and 2016 , respectively, was recorded in interest expense on the consolidated statements of operations.

7. Derivative Financial Instruments

Interest Rate Swaps

The Company uses various financial instruments to minimize the impact of variable market conditions on its results of operations. The Company uses interest rate swaps to minimize the impact of fluctuations of interest rate changes on its outstanding debt where LIBOR is applied. The Company does not enter into derivative contracts for trading or speculative purposes.

The fair values of the derivatives designated as cash flow hedges as of December 31, 2018 and 2017 on the Company's consolidated balance sheets were as follows (in thousands):

	December 31,	
	2018	2017
Assets		
Prepaid expenses and other current assets	$ 42	$ —
Other long-term assets	40	52
	$ 82	$ 52
Liabilities		
Accrued other current liabilities	$ 4	$ 844
Derivative liabilities	3,626	5,061
	$ 3,630	$ 5,905

PPA Company IIIb - In September 2013, PPA Company IIIb entered into an interest rate swap arrangement to convert a variable interest rate debt to a fixed rate. The Company designated and documented its interest rate swap arrangement as a cash flow hedge. The swap's term ends on October 1, 2020, which is concurrent with the final maturity of the debt floating interest rates reset on a quarterly basis. The Company evaluates and calculates the effectiveness of the hedge at each reporting date. The effective change was recorded in accumulated other comprehensive income (loss) and was recognized as interest expense on settlement. The notional amounts of the swap were $24.7 million and $25.6 million as of December 31, 2018 and 2017 , respectively. The Company measures the swap at fair value on a recurring basis. Fair value is determined by discounting future cash flows using LIBOR rates with appropriate adjustment for credit risk.

The Company recorded a loss of $68,000 , a loss of $64,000 and a loss of $57,000 during the years ended December 31, 2018 , 2017 and 2016 , respectively, attributable to the change in swap's fair value. These gains and losses were included in other expense, net in the consolidated statement of operations.

PPA Company V - In July 2015, PPA Company V entered into nine interest rate swap agreements to convert a variable interest rate debt to a fixed rate. The loss on the swaps prior to designation was recorded in current-period earnings. In July 2015, the Company designated and documented its interest rate swap arrangements as cash flow hedges. Three of these swaps matured in 2016, three will mature on December 21, 2021 and the remaining three will mature on September 30, 2031. The Company evaluates and calculates the effectiveness of the hedge at each reporting date. The effective change was recorded in accumulated other comprehensive income (loss) and was recognized as interest expense on settlement. The notional amounts of the swaps were $186.6 million and $188.5 million as of December 31, 2018 and 2017 , respectively.

The Company measures the swaps at fair value on a recurring basis. Fair value is determined by discounting future cash flows using LIBOR rates with appropriate adjustment for credit risk. The Company recorded a gain of $138,000 , a gain of $126,000 and a gain of $72,000 attributable to the change in valuation during the years ended December 31, 2018 , 2017 and 2016 , respectively. These gains were included in other income (expense), net in the consolidated statement of operations.

The changes in fair value of the derivative contracts designated as cash flow hedges and the amounts recognized in accumulated other comprehensive income (loss) and in earnings for the years ended December 31, 2018 and 2017 were as follows (in thousands):

Balances at December 31, 2016	$	6,937
Loss recognized in other comprehensive loss		669
Amounts reclassified from other comprehensive loss to earnings		(1,563)
Net gain recognized in other comprehensive income (loss)		(894)
Gain recognized in earnings		(191)
Balances at December 31, 2017		5,852
Gain recognized in other comprehensive income (loss)		(1,729)
Amounts reclassified from other comprehensive income (loss) to earnings		(369)
Net gain recognized in other comprehensive income (loss)		(2,098)
Gain recognized in earnings		(206)
Balances at December 31, 2018	$	3,548

Natural Gas Derivatives

On September 1, 2011, the Company entered into a fixed price fixed quantity fuel forward contract with a gas supplier. This fuel forward contract is used as part of the Company's program to manage the risk for controlling the overall cost of natural gas. The Company's PPA Company I is the only PPA Company for which natural gas was provided by the Company. The fuel forward contract meets the definition of a derivative under U.S. GAAP. The Company has not elected to designate this contract as a hedge and, accordingly, any changes in its fair value is recorded within cost of revenue in the statements of operations. The fair value of the contract is determined using a combination of factors including the counterparty's credit rate and estimates of future natural gas prices.

For the years ended December 31, 2018 , 2017 and 2016 , the Company marked-to-market the fair value of its fixed price natural gas forward contract and recorded a gain of $2.2 million , a loss of $1.0 million and a loss of $1.6 million , respectively. For the years ended December 31, 2018 , 2017 and 2016 , the Company recorded gains of $3.4 million , $4.2 million and $4.7 million , respectively, on the settlement of these contracts. Gains and losses are recorded in cost of revenue on the consolidated statement of operations.

6% Convertible Promissory Notes

On December 15, 2015, January 29, 2016, and September 10, 2016, the Company issued $160.0 million , $25.0 million , and $75.0 million , respectively, of 6% Convertible Promissory Notes (6% Notes) that mature in December 2020. The 6% Notes are contractually convertible at the option of the holders at a conversion price per share equal to the lower of $20.61 or 75% of the offering price of the Company's common stock sold in an initial public offering. Upon the IPO, the options are convertible at the option of the holders at the conversion price of $11.25 per share.

The valuation of this embedded put feature was recorded as a derivative liability in the consolidated balance sheet, measured each reporting period. Fair value was determined using the binomial lattice method. The Company recorded a loss of $30.9 million , a gain of $2.6 million and a gain of $2.6 million attributable to the change in valuation for the years ended December 31, 2018 , 2017 and 2016 , respectively. These gains and losses were included within loss on revaluation of warrant liabilities and embedded derivatives in the consolidated statement of operations. Upon the IPO, the final valuation of the conversion feature was calculated as of the date of the IPO and was reclassified from a derivative liability to additional paid-in capital. The fair value of the embedded derivatives within the notes was $177.2 million at conversion.

8. Convertible Notes, Convertible Preferred Stock and Common and Preferred Stock Warrants

8% Convertible Promissory Notes (" 8% Notes")

In July 2018, upon the Company's IPO, the $221.6 million including principal and accrued interest of outstanding 8% Notes automatically converted into shares of Class B common stock. See Note 6 - *Outstanding Loans and Security Agreements* for details. The original 8% Notes converted to shares of Series G convertible preferred stock at a conversion price of $38.64 per share and, concurrently, each such share of Series G convertible preferred stock converted automatically into one share of Class B common stock. Upon the IPO, 5,734,440 shares of Class B common stock were issued as a result of the note conversions. The Company recorded the debt retirement with a charge of $221.6 million to additional paid-in capital.

Convertible Preferred Stock

The following table summarizes the Company's convertible preferred stock as of the conversion date (in thousands, except share data):

	Shares Authorized	Shares Issued and Outstanding	Carrying Value at Conversion
Series A preferred	9,374,101	9,374,101	$ 8,956
Series B preferred	7,868,854	7,868,854	11,941
Series C preferred	5,979,062	5,979,062	44,928
Series D preferred	6,443,818	6,443,818	102,648
Series E preferred	9,486,362	9,486,362	198,264
Series F preferred	14,597,248	13,885,893	376,962
Series G preferred	26,712,107	18,702,072	722,142
	80,461,552	71,740,162	$ 1,465,841

The shares of the Company's convertible preferred stock converted into an equal number of shares of Class B common stock upon the completion of the IPO and the Company issued 71,740,162 shares of Class B common stock. As of December 31, 2018 , no shares of convertible preferred stock were outstanding.

Preferred Stock Warrants

The following table summarizes preferred stock warrants outstanding (in thousands, except warrants outstanding):

	December 31,			
	2018		2017	
	Warrants Outstanding	Fair Value	Warrants Outstanding	Fair Value
Series F	—	$ —	581,182	$ 8,378
Series G	—	—	279,606	1,447
	—	$ —	860,788	$ 9,825

The Company recorded a gain of $8.9 million, $3.1 million, and $0.8 million during the years ended December 31, 2018 , 2017 and 2016, respectively, attributable to the changes in the warrants' fair value which was included in other income (expense), net in the consolidated statement of operations.

The warrants for the Company's convertible preferred stock were exercisable into an equal number of shares of Class B common stock upon the completion of the IPO in July 2018 . The 860,788 preferred stock warrants were converted to common stock warrants of Class B shares and the warrant liability of $0.9 million was eliminated from the consolidated balance sheet with a charge to additional paid-in capital as a result of the conversion.

Common Stock Warrants

Common Stock Warrants - 860,788 preferred stock warrants, described above, converted to warrants to purchase 860,788 shares of Class B common stock upon the Company's IPO. After expiration of 100,000 preferred stock warrants at IPO, a total of 760,788 warrants remain outstanding at December 31, 2018. These warrants are not subject to further remeasurement for fair value post IPO.

CPPIB Common Stock Warrants - In connection with the issuance of the 6% Convertible Promissory Notes in December 2015 and September 2016, the Company issued warrants to purchase up to a maximum of 146,666 shares and 166,222 shares of the Company's common stock to J.P. Morgan and CPPIB, respectively. During 2017, the fair value of the common stock warrants was re-measured and $0.2 million in warrant expense was charged to the consolidated statement of operations. On August 31, 2017, J.P. Morgan assigned their warrants to CPPIB and the Company concurrently reclassified $9.4 million of accrued warrant liabilities to additional paid-in capital. The warrants were not subject to further remeasurement for fair value. Effective with the IPO, all 312,888 warrants were net exercised for 312,575 shares of Class B common stock.

Other Common Stock Warrants - During 2014 and in connection with a dispute settlement with the principals of a securities placement agent, the Company issued warrants to purchase 33,333 shares of the Company's common stock at $38.64 per share. The fair value of $3.3 million was recorded as expense in the consolidated statements of operations in 2013 when it was determined that the obligation became probable. The common stock warrants were immediately exercisable for Class B common shares effective with the IPO, subject to the debt repayment requirements in the settlement agreement, and have not been exercised.

9. Income Taxes

The components of income (loss) before the provision for income taxes are as follows (in thousands):

	Years Ended December 31,		
	2018	**2017**	**2016**
United States	$ (259,787)	$ (283,710)	$ (337,449)
Foreign	1,835	3,081	1,862
Total	$ (257,952)	$ (280,629)	$ (335,587)

The provision for income taxes is comprised of the following (in thousands):

	Years Ended December 31,		
	2018	**2017**	**2016**
Current:			
Federal	$ —	$ —	$ —
State	191	25	42
Foreign	1,407	621	702
Total current	1,598	646	744
Deferred:			
Federal	—	—	—
State	—	—	—
Foreign	(61)	(10)	(15)
Total deferred	(61)	(10)	(15)
Total provision for income taxes	$ 1,537	$ 636	$ 729

A reconciliation of the U.S. federal statutory income tax rate to our effective tax rate is as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Tax at federal statutory rate	$ (54,170)	$ (95,414)	$ (114,100)
State taxes, net of federal effect	191	25	42
Impact on noncontrolling interest	3,725	6,347	19,264
Non-U.S. tax effect	960	(437)	54
Nondeductible expenses	6,637	5,698	4,426
Stock-based compensation	3,892	4,854	4,243
U.S. tax reform impact	—	239,117	—
U.S. tax on foreign earnings	127	—	—
Change in valuation allowance	40,175	(159,554)	86,800
Provision for income taxes	$ 1,537	$ 636	$ 729

For the year ended December 31, 2018, the Company recorded an expense for income taxes of $1.5 million on a pre-tax loss of $258.0 million , for an effective tax rate of (0.6)% . For the year ended December 31, 2017, the Company recorded an expense for income taxes of $0.6 million on a pre-tax loss of $280.6 million , for an effective tax rate of (0.2)% . For the year ended December 31, 2016, the Company recorded an expense for income taxes of $0.7 million on a pre-tax loss of $335.6 million , for an effective tax rate of (0.2)% . The effective tax rate for 2018, 2017 and 2016 is lower than the statutory federal tax rate primarily due to a full valuation allowance against U.S. deferred tax assets.

Significant components of the Company's deferred tax assets and liabilities consist of the following (in thousands):

	December 31,	
	2018	2017
Tax credits and NOLs	$ 468,612	$ 457,718
Depreciation and amortization	9,631	10,811
Deferred revenue	17,415	27,195
Accruals and reserves	14,103	17,163
Stock-based compensation	62,793	18,956
Derivative liability	—	33,200
Other items	24,834	16,218
Gross deferred tax assets	597,388	581,261
Valuation allowance	(566,442)	(542,409)
Net deferred tax assets	30,946	38,852
Investment in PPA entities	(21,587)	(25,252)
Debt issuance cost	(8,586)	(12,827)
Gross deferred tax liabilities	(30,173)	(38,079)
Net deferred tax asset	$ 773	$ 773

Income taxes are recorded using the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income (or loss) in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

A valuation allowance is provided for the amount of deferred tax assets that, based on available evidence, is not more-likely-than-not to be realized. Management believes that, based on available evidence, both positive and negative, it is not more likely than not that the net U.S. deferred tax assets will be utilized. As a result, a full valuation allowance has been recorded.

The valuation allowance for deferred tax assets was $566.4 million and $542.4 million as of December 31, 2018 and 2017, respectively. The net change in the total valuation allowance for the years ended December 31, 2018 and December 31, 2017 was an increase of $24.0 million and a decrease of $141.3 million , respectively. There were no releases from the valuation allowance in either period.

At December 31, 2018, the Company had federal and state net operating loss carryforwards of $1.7 billion and $1.5 billion , respectively, which will expire, if unused, beginning in 2022 and 2028 , respectively. In addition, the Company had approximately $17.7 million of federal research credit, $6.6 million of federal investment tax credit, and $12.6 million of state research credit carryforwards. The federal tax credit carryforwards begin to expire in 2022 . The state credit carryforwards may be carried forward indefinitely. The Company has not reflected deferred tax assets for the federal and state research credit carryforwards as the entire amount of the carryforwards represent unrecognized tax benefits.

Internal Revenue Code Section 382 (“Section 382”) limits the use of net operating loss and tax credit carryforwards in certain situations in which changes occur in the capital stock ownership of the Company. Any annual limitation may result in the expiration of net operating losses and credits before utilization. If the Company should have an ownership change as defined by the tax law, utilization of the net operating loss and credit carryforwards could be significantly reduced. The Company completed a Section 382 analysis through December 31, 2018. Based on this analysis, Section 382 limitations will not have a material impact on the Company’s net operating loss and credit carryforwards related to any ownership changes which occurred during the period covered by the analysis.

During the year ended December 31, 2018 , the amount of uncertain tax positions increased by $1.9 million . The Company has not recorded any uncertain tax liabilities associated with its tax positions.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits were as follows (in thousands):

	Years Ended December 31,	
	2018	**2017**
Unrecognized tax benefits beginning balance	$ 28,331	$ 27,136
Gross decrease for tax positions of prior year	(468)	—
Gross increase for tax positions of prior year	353	—
Gross increase for tax positions of current year	2,095	1,195
Unrecognized tax benefits end balance	$ 30,311	$ 28,331

If fully recognized in the future, there would be no impact to the effective tax rate, and $27.7 million would result in adjustments to the valuation allowance. The Company does not have any tax positions that are expected to significantly increase or decrease within the next 12 months.

Interest and penalties, to the extent there are any, are included in income tax expense and there was no interest or penalties accrued during or for the years ended December 31, 2018 and 2017 .

The Company is subject to taxation in the United States and various states and foreign jurisdictions. The Company currently does not have any tax examinations in progress nor has it had any tax examinations since its inception. All of the Company’s tax years will remain open for examination by federal and state authorities for three and four years from the date of utilization of any net operating losses and tax credits.

On December 22, 2017, the Tax Cuts and Jobs Act (the "Tax Act") was enacted into law, which significantly changes existing U.S. tax law and includes many provisions applicable to us, such as reducing the U.S. federal statutory tax rate, imposing a one-time transition tax on deemed repatriation of deferred foreign income, and adopting a territorial tax system. The Tax Act reduced the U.S. federal statutory tax rate from 35% to 21% effective January 1, 2018.

Given the significance of the legislation, the U.S. Securities and Exchange Commission (the "SEC") staff issued Staff Accounting Bulletin No. 118 ("SAB 118"), which allows registrants to record provisional amounts during a one year “measurement period” similar to that used when accounting for business combinations. However, the measurement period is deemed to have ended earlier when the registrant has obtained, prepared, and analyzed the information necessary to finalize its accounting. During the measurement period, impacts of the law are expected to be recorded at the time a reasonable estimate

for all or a portion of the effects can be made, and provisional amounts can be recognized and adjusted as information becomes available, prepared, or analyzed. During December 2017, we recorded tax charges from the impact of the Tax Act effects using the current available information and technical guidance on the interpretations of the Tax Act. As permitted by SAB 118, we recorded provisional estimates in 2017 and finalized our accounting for these provisional estimates based on guidance, interpretations and all of the available data in the quarter ended December 31, 2018. The Company finalized the provisional amounts recorded for the one-time mandatory repatriation transition tax. The previously recorded provisional amount was reduced by an adjustment of $0.6 million , however this adjustment was offset by a corresponding adjustment to the valuation allowance resulting in no net impact to the tax provision.

The Tax Act also includes a provision referred to as Global Intangible Low-Taxed Income ("GILTI") which generally imposes a tax on foreign income in excess of a deemed return on tangible assets. FASB guidance issued in January, 2018, allows companies to make an accounting policy election to either (i) account for GILTI as a component of tax expense in the period in which the tax is incurred (the "period cost method"), or (ii) account for GILTI in the measurement of deferred taxes (the "deferred method"). The Company elects to account for the tax effects of this provision using the period cost method.

The accumulated undistributed foreign earnings of the Company as of December 31, 2017 have been subject to the deemed one-time mandatory repatriation under the Tax Act for U.S. tax purposes. If the Company were to make actual distributions of some or all of these earnings, including earnings accumulated after December 31, 2017, the Company would generally incur no additional U.S. income tax but could incur U.S. state income tax and foreign withholding taxes. The Company has not accrued for these potential U.S. state income tax and foreign withholding taxes because the Company intends to permanently reinvest its foreign earnings in its international operations. However, any additional income tax associated with the distribution of these earnings would be immaterial.

10. Net Loss per Share Attributable to Common Stockholders

Net loss per share (basic) attributable to common stockholders is calculated by dividing net loss attributable to common stockholders by the weighted-average shares of common stock outstanding for the period. Net loss per share (diluted) is computed by using the "if-converted" method when calculating the potential dilutive effect, if any, of convertible shares whereby net loss attributable to common stockholders is adjusted by the effect of dilutive securities such as awards under equity compensation plans and inducement awards under separate restricted stock unit ("RSU") award agreements. Net loss per share (diluted) attributable to common stockholders is then calculated by dividing the resulting adjusted net loss attributable to common stockholders by the combined weighted-average number of fully diluted common shares outstanding.

In July 2018 , the Company completed an initial public offering of its common shares wherein 20,700,000 shares of Class A common stock were sold into the market. Added to existing shares of Class B common stock were shares mandatorily converted from various financial instruments as a result of the IPO. See Note 8 - *Convertible Notes, Convertible Preferred Stock and Common and Preferred Stock Warrants* .

There were no adjustments to net loss attributable to common stockholders in determining net loss attributable to common stockholders (diluted). Equally, there were no adjustments to the weighted average number of outstanding shares of common stock (basic) in arriving at the weighted average number of outstanding shares (diluted), as such adjustments would have been antidilutive.

Net loss per share is the same for each class of common stock as they are entitled to the same liquidation and dividend rights with the exception of voting rights. As a result, net loss per share (basic) and net loss per share (diluted) attributed to common stockholders are the same for both Class A and Class B common stock and are combined for presentation. The following table sets forth the computation of the Company's net loss per share (basic) and net loss per share (diluted) attributable to common stockholders (in thousands, except per share amounts):

	Years Ended December 31,		
	2018	2017	2016
Numerator:			
Net loss attributable to Class A and Class B common stockholders	$ (241,753)	$ (262,599)	$ (279,658)
Less: noncumulative dividends to preferred stockholders	—	—	—
Less: undistributed earnings to participating securities	—	—	—
Net loss attributable to common stockholders (basic)	(241,753)	(262,599)	(279,658)
Add: adjustments to undistributed earnings to participating securities	—	—	—
Net loss attributable to Class A and Class B common stockholders (diluted)	$ (241,753)	$ (262,599)	$ (279,658)
Denominator:			
Weighted average shares of common stock (basic)	53,268	10,248	10,046
Effect of potentially dilutive stock options	—	—	—
Weighted average shares of common stock (diluted)	53,268	10,248	10,046
Net loss per share attributable to Class A and Class B common stockholders:			
Basic and diluted	$ (4.54)	$ (25.62)	$ (27.84)

The following common stock equivalents (in thousands) were excluded from the computation of net loss per share attributable to common shareholders (diluted) for the periods presented as their inclusion would have been antidilutive:

	Years Ended December 31,		
	2018	2017	2016
Convertible and non-convertible redeemable preferred stock and convertible notes	27,230	85,476	84,551
Stock options to purchase common stock	4,962	2,950	2,668
Convertible redeemable preferred stock warrants	—	60	59
Convertible redeemable common stock warrants	—	312	313
	32,192	88,798	87,591

11. Stock-Based Compensation and Employee Benefit Plan

2002 Stock Plan

The Company's 2002 Stock Plan (the "2002 Plan") was approved in April 2002 and amended in June 2011. In August 2012 and in connection with the adoption of the 2012 Plan, shares authorized for issuance under the 2002 Plan were cancelled, except for those shares reserved for issuance upon exercise of outstanding stock options. Any outstanding stock options granted under the 2002 Plan remain outstanding, subject to the terms of the 2002 Plan, until such shares are issued under those awards (by exercise of stock options) or until the awards terminate or expire by terms.

Grants under the 2002 Plan generally vest ratably over a four -year period from the vesting commencement date and expire ten years from grant date. Original grants under the 2002 Plan were for "common stock". Pursuant to the Twelfth Amended and Restated Articles of Incorporation authorized in July 2018, all such shares automatically converted to Class B shares of common stock.

As of December 31, 2018 , options to purchase 2,371,247 shares of Class B common stock were outstanding under the 2002 Plan and no additional awards had been or were available for grant for the year. As of December 31, 2018 , the weighted average exercise price of outstanding options was $20.19 per share.

2012 Equity Incentive Plan

The Company's 2012 Equity Incentive Plan (the "2012 Plan") was approved in August 2012. The 2012 Plan provided for the grant of incentive stock options, non-statutory stock options, stock appreciation rights and restricted stock awards ("RSUs"), all of which may be granted to employees, including officers, and to non-employee directors and consultants except the Company may grant incentive stock options only to employees. Under the 2012 Plan, incentive and nonqualified stock options may be granted at a price not less than fair value and 85% of the fair value of common stock, respectively, and at 110% of fair value to holders of 10% or more of voting stock.

Grants under the 2012 Plan generally vest ratably over a four -year period from the vesting commencement date and expire ten years from grant date. Original grants under the 2012 Plan were for "common stock". Pursuant to the Twelfth Amended and Restated Articles of Incorporation authorized in July 2018, all such shares automatically converted to Class B shares of common stock. As of December 31, 2018 , options to purchase 10,952,351 shares of Class B common stock were outstanding under the 2012 Plan and no shares were available for future grant. As of December 31, 2018 , the weighted average exercise price of outstanding options under the 2012 Plan was $27.13 per share. As of December 31, 2018 , the Company had outstanding RSUs that may be settled for 15,202,179 shares of Class B common stock under the plan.

2018 Equity Incentive Plan

The 2018 Equity Incentive Plan (the "2018 Plan") was approved in April, 2018. The 2018 Plan became effective upon the IPO and will serve as the successor to the 2012 Plan. The Company has reserved 20,278,268 shares of Class A common stock under the 2018 Plan and no more than 26,666,667 shares of Class A common stock will be issued pursuant to the exercise of incentive stock options.

The 2018 Plan authorizes the award of stock options, restricted stock awards, stock appreciation rights, RSUs, performance awards and stock bonuses. The 2018 Plan provides for the grant of awards to employees, directors, consultants,

independent contractors and advisors provided the consultants, independent contractors, directors and advisors render services not in connection with the offer and sale of securities in a capital-raising transaction. The exercise price of stock options is at least equal to the fair market value of Class A common stock on the date of grant. Grants under the 2018 Plan generally vest ratably over a four -year period from the vesting commencement date and expire ten years from grant date.

As of December 31, 2018 , options to purchase 1,234,822 shares of Class A common stock were outstanding under the 2018 Plan and 17,457,847 shares were available for future grant. As of December 31, 2018 , the weighted average exercise price of outstanding options under the 2018 Plan was $26.33 per share. As of December 31, 2018 , the Company had outstanding RSUs that may be settled for 1,582,621 shares of Class A common stock which were granted pursuant to the plan.

Stock-Based Compensation Expense

The Company used the following weighted-average assumptions in applying the Black-Scholes valuation model:

	Years Ended December 31,		
	2018	**2017**	**2016**
Risk-free interest rate	2.49% - 3.06%	1.95% -2.08%	1.23% -1.69%
Expected term (years)	6.18—6.69	6.08—6.62	6.00—6.54
Expected dividend yield	—	—	—
Expected volatility	52.4% -56.1%	55.6% - 61.0%	59.3% - 60.9%

The following table summarizes the components of stock-based compensation expense in the consolidated statements of operations (in thousands):

	Years Ended December 31,		
	2018	**2017**	**2016**
Cost of revenue	$ 41,481	$ 7,734	$ 6,005
Research and development	39,030	5,560	4,686
Sales and marketing	32,284	4,684	5,600
General and administrative	67,489	12,501	11,866
	$ 180,284	$ 30,479	$ 28,157

Activity

The following table summarizes the stock option activity under our stock plans during the reporting period (in thousands), except per share amounts:

	Outstanding Options			
	Number of Shares	Weighted Average Exercise Price	Remaining Contractual Life (Years)	Aggregate Intrinsic Value
				(in thousands)
Balances at December 31, 2016	10,504,750	$ 23.85	6.11	$ 74,717
Granted	2,146,113	30.96		
Exercised	(123,153)	3.51		
Cancelled	(923,307)	10.78		
Balances at December 31, 2017	11,604,403	26.42	6.01	52,682
Granted	4,202,284	19.79		
Exercised	(398,704)	3.98		
Cancelled	(849,563)	12.51		
Balances at December 31, 2018	14,558,420	25.93	6.78	3,084
Vested and expected to vest at December 31, 2018	14,133,451	26.09	6.69	3,084
Exercisable at December 31, 2018	8,282,247	27.72	5.09	3,084

Stock-based Compensation - During the years ended December 31, 2018 , 2017 and 2016 , the Company recognized $180.3 million , $30.5 million and $28.2 million of total stock-based compensation expense, respectively. No stock-based compensation costs were capitalized in the years ended December 31, 2018 , 2017 and 2016 .

Stock Options - During the years ended December 31, 2018 , 2017 and 2016 , the Company recognized $33.3 million , $29.2 million and $27.8 million of stock-based compensation expense for stock options, respectively.

During the years ended December 31, 2018 , 2017 and 2016 , the intrinsic value of stock options exercised was $9.2 million , $3.4 million and $2.6 million , respectively.

The Company granted 2,823,266 options for Class A common stock during the year ended December 31, 2018 . The Company granted 15,252,524 options for Class B common stock during the years ended December 31, 2018 . The weighted-average grant-date fair value of the awards was $14.85 .

The Company granted 2,698,594 and 4,883,710 options for Class B common stock for the years ended and December 31, 2017 and 2016 , respectively. The weighted-average grant-date fair value of the awards was $20.25 and $23.94 , for the years ended and December 31, 2017 and 2016 , respectively.

As of December 31, 2018 and 2017 , the Company had unrecognized compensation expense related to unvested stock options of $70.4 million and $62.4 million , respectively. This expense is expected to be recognized over the remaining weighted-average period of 2.8 years and 2.4 years , respectively. The Company had no excess tax benefits in the years ended December 31, 2018 and 2017 . Cash received from stock options exercised totaled $1.6 million , $0.4 million and $1.2 million for the years ended December 31, 2018 , 2017 and 2016 , respectively.

Restricted Stock Units (RSUs) - RSU award shares under the 2012 and 2018 Plans began vesting on January 21, 2019 , the end of the lock-up period following the IPO, and the remaining shares will vest over a period of three years from such date. The estimated fair value of RSU awards is based on the fair value of the Company's common stock on the date of grant.

During the years ended December 31, 2018 , 2017 and 2016 , the Company recognized $142.4 million, $1.3 million and $0.3 million of stock-based compensation expense for RSUs, respectively.

The total weighted-average grant-date fair value of RSUs granted during the years ended December 31, 2018 , 2017 and 2016 , was $16.02 , $30.96 and $30.96 , respectively.

As of December 31, 2018 , the Company had $163.8 million of unrecognized stock-based compensation cost related to unvested RSUs. This expense is expected to be recognized over a weighted average period of 0.8 years . As of December 31, 2017 , the Company had $97.2 million of unrecognized stock-based compensation cost related to unvested RSUs. This expense was expected to be recognized over a weighted average period of 2.1 years .

A summary of the Company's RSU activity and related information is as follows:

	Number of Awards Outstanding	Weighted Average Grant Date Fair Value
Unvested Balance at December 31, 2016	2,666,446	$ 30.95
Granted	552,481	30.96
Vested	(33,896)	30.96
Forfeited	(44,453)	30.95
Unvested Balance at December 31, 2017	3,140,578	30.95
Granted	13,873,506	16.02
Vested	(17,793)	19.67
Forfeited	(211,491)	21.22
Unvested Balance at December 31, 2018	16,784,800	18.74

The following table presents the stock activity and the total number of shares available for grant under our stock plans as of December 31, 2018:

	Plan Shares Available for Grant
Balances at December 31, 2016	2,768,450
Added to plan	647,159
Granted	(2,698,594)
Exercised	—
Cancelled	967,760
Expired	(647,159)
Balances at December 31, 2017	1,037,616
Added to plan	40,924,861
Granted	(18,075,790)
Exercised	—
Cancelled	1,061,054
Expired	(7,489,894)
Balances at December 31, 2018	17,457,847

2018 Employee Stock Purchase Plan

In April 2018, the Company adopted the 2018 Employee Stock Purchase Plan ("ESPP"). The ESPP became effective upon the Company's IPO in July 2018 . The ESPP is intended to qualify under Section 423 of the Internal Revenue Code. A total of 3,333,333 shares of Class A common stock were initially reserved for issuance under the plan. The number of shares reserved for issuance under our ESPP will increase automatically on the 1st day of January of each of the first nine years following the first offering date by the number of shares equal to 1% of the total outstanding shares of our common stock and common stock equivalents as of the immediately preceding December 31 (rounded to the nearest whole share). The aggregate number of our shares that may be issued over the term of our ESPP is 33,333,333 Class A common stock.

The ESPP allows eligible employees to purchase shares, subject to purchase limits of 2,500 shares during each six-month period or $25,000 worth of stock for each calendar year, of the Company's Class A common stock through payroll

deductions at a price per share equal to 85% of the lesser of the fair market value of the Company's Class A common stock (i) on the first trading day of the applicable purchase period and (ii) the last trading day of each purchase period in the offering period. The ESPP provides for four 6-month purchase periods beginning in February 15 and August 15 of each year within each twenty-four month offering period. The initial offering period began in July 2018 and ends on August 14, 2020. Subsequent offering periods begin each February 15 and August 15.

For the first offering period, which began on July 14, 2018, the fair market value of the common stock used for the first offering period was $15.00 per share, the IPO price of the Company's Class A common stock. As of December 31, 2018 , the Company recognized $4.6 million of compensation expense related to the ESPP plan.

We use the Black-Scholes option pricing model to determine the fair value of shares purchased under the 2018 ESPP with the following weighted average assumptions on the date of grant:

	Year Ended December 31,
	2018
Risk-free interest rate	2.20% - 2.67%
Expected term (years)	0.56—2.05
Expected dividend yield	—
Expected volatility	47.0% - 52.7%

Employee Benefit Plan

The Company maintains a tax-qualified 401(k) retirement plan for all employees who satisfy certain eligibility requirements including requirements relating to age. Under the 401(k) plan, employees may elect to defer up to 60% of eligible compensation, subject to applicable annual Code limits. The Company does not match any contributions made by employees, including executives, but has the discretion to do so. Therefore, the costs of the plan were immaterial for the years ended December 31, 2018 and 2017. The Company intends for the 401(k) plan to qualify under Section 401(a) and 501(a) of the Internal Revenue Code so that contributions and income earned on contributions are not taxable to employees until withdrawn from the plan.

Common Stock Warrants

In connection with the 6% Convertible Promissory Notes, the Company agreed to issue common stock warrants to related parties J.P. Morgan and CPPIB for the right to purchase the Company's common stock up to a maximum of 146,666 shares and 166,222 shares, respectively. On August 31, 2017, J.P. Morgan assigned their warrants to CPPIB giving all 312,888 warrant shares to CPPIB and the warrants were net exercised for 312,575 net shares of Class B Common stock upon the completion of the IPO in July 2018 .

12. Power Purchase Agreement Programs

Overview

In mid-2010, the Company began offering its Energy Servers through its Bloom Electrons program, which the Company denotes as Power Purchase Agreement Programs, financed via investment entities. Under these arrangements, an operating entity is created (the "Operating Company") which purchases the Energy Server from the Company. The end customer then enters into a power purchase agreement ("PPA") with the Operating Company to purchase the power generated by the Energy Server(s) at a specified rate per kilowatt hour for a specified term which can range from 10 to 21 years. In some cases similar to direct purchases and leases, the standard one -year warranty and performance guaranties are included in the price of the product. The Operating Company also enters into a master services agreement ("MSA") with the Company following the first year of service to extend the warranty services and guaranties over the term of the PPA. In other cases, the MSA including warranties and guaranties are billed on a quarterly basis starting in the first quarter following the placed-in-service date of the energy server(s) and continuing over the term of the PPA. The first of such arrangements was considered a sales-type lease and the product revenue from that agreement was recognized up front in the same manner as direct purchase and lease transactions. Substantially all of the Company's subsequent PPAs have been accounted for as operating leases with the related revenue under those agreements recognized ratably over the PPA term as electricity revenue. The Company recognizes the cost of revenue, primarily product costs and maintenance service costs, over the shorter of the estimated useful life of the Energy Server or the term of the PPA.

The Company and its third-party equity investors (together "Equity Investors") contribute funds into a limited liability investment entity (Investment Company) that owns and is parent to the Operating Company (together, the "PPA Entities"). The PPA Entities constitute variable investment entities ("VIEs") under U.S. GAAP. The Company has considered the provisions within the contractual agreements which grant it power to manage and make decisions affecting the operations of these VIEs. The Company considers that the rights granted to the Equity Investors under the contractual agreements are more protective in nature rather than participating. Therefore, the Company has determined under the power and benefits criterion of ASC 810 - *Consolidations* that it is the primary beneficiary of these VIEs.

As the primary beneficiary of these VIEs, the Company consolidates in its financial statements the financial position, results of operations and cash flows of the PPA Entities, and all intercompany balances and transactions between the Company and the PPA Entities are eliminated in the consolidated financial statements.

The Company established six different PPA Entities to date. The contributed funds are restricted for use by the Operating Company to the purchase of Energy Servers manufactured by the Company in its normal course of operations. Prior to the start of 2017, all six PPA Entities utilized their entire available financing capacity and have completed the purchase of their Energy Servers. Any debt incurred by the Operating Companies is non-recourse to the Company. Under these structures, each Investment Company is treated as a partnership for U.S. federal income tax purposes. Equity Investors receive investment tax credits and accelerated tax depreciation benefits.

The Operating Company acquires Energy Servers from the Company for cash payments that are made on a similar schedule as if the Operating Company were a customer purchasing an Energy Server from the Company outright. In the consolidated financial statements, the sale of Energy Servers by the Company to the Operating Company are treated as intercompany transactions after the elimination of intercompany balances. The acquisition of Energy Servers by the Operating Company is accounted for as a non-cash reclassification from inventory to Energy Servers within property, plant and equipment, net on the Company’s consolidated balance sheets. In arrangements qualifying for sales-type leases, the Company reduces these recorded assets by amounts received from U.S. Treasury Department cash grants and from similar state incentive rebates.

The Operating Company sells the electricity to end customers under PPAs. Cash generated by the electricity sales, as well as receipts from any applicable government incentive program, is used to pay operating expenses (including the management and services the Company provides to maintain the Energy Servers over the term of the PPA) and to service the non-recourse debt with the remaining cash flows distributed to the Equity Investors. In transactions accounted for as sales-type leases, the Company recognizes subsequent customer billings as electricity revenue over the term of the PPA and amortizes any applicable government incentive program grants as a reduction to depreciation expense of the Energy Server over the term of the PPA. In transactions accounted for as operating leases, the Company recognizes subsequent customer payments and any applicable government incentive program grants as electricity revenue over the term of the PPA.

Upon sale or liquidation of a PPA Entity, distributions would occur in the order of priority specified in the contractual agreements.

The table below shows the details of the Investment Companies from inception to the periods indicated (dollars in thousands):

	PPA I	PPA Company II	PPA Company IIIa	PPA Company IIIb	PPA Company IV	PPA Company V
Overview:						
Maximum size of installation (in megawatts)	25	30	10	6	21	40
Term of power purchase agreements (years)	10	21	15	15	15	15
First system installed	Sep-10	Jun-12	Feb-13	Aug-13	Sep-14	Jun-15
Last system installed	Mar-13	Nov-13	Jun-14	Jun-15	Mar-16	Dec-16
Income (loss) and tax benefits allocation to Equity Investor	99%	99%	99%	99%	90%	99%
Cash allocation to Equity Investor	80%	99%	99%	99%	90%	90%
Income (loss), tax and cash allocations to Equity Investor after the flip date	22%	5%	5%	5%	No flip	No flip
Equity Investor [1]	Credit Suisse	Credit Suisse	US Bank	US Bank	Exelon Corporation	Exelon Corporation
Put option date [2]	10th anniversary of initial funding date	10th anniversary of initial funding date	1st anniversary of flip point	1st anniversary of flip point	N/A	N/A
Activity as of December 31, 2018:						
Installed size (in megawatts)	5	30	10	5	19	37
Company cash contributions	$ 180,699	$ 22,442	$ 32,223	$ 22,658	$ 11,669	$ 27,932
Company non-cash contributions [3]	$ —	$ —	$ 8,655	$ 2,082	$ —	$ —
Equity Investor cash contributions	$ 100,000	$ 139,993	$ 36,967	$ 20,152	$ 84,782	$ 227,344
Distributions to Equity Investor	$ (81,016)	$ (116,942)	$ (4,063)	$ (1,807)	$ (4,568)	$ (66,745)
Debt financing	$ —	$ 144,813	$ 44,968	$ 28,676	$ 99,000	$ 131,237
Debt repayment—principal	$ —	$ (65,114)	$ (4,431)	$ (3,953)	$ (15,543)	$ (5,780)
Activity as of December 31, 2017:						
Installed size (in megawatts)	5	30	10	5	19	37
Company cash contributions	$ 180,699	$ 22,442	$ 32,223	$ 22,658	$ 11,669	$ 27,932
Company non-cash contributions [3]	$ —	$ —	$ 8,655	$ 2,082	$ —	$ —
Equity Investor cash contributions	$ 100,000	$ 139,993	$ 36,967	$ 20,152	$ 84,782	$ 227,344
Distributions to Equity Investor	$ (81,016)	$ (111,296)	$ (3,324)	$ (1,404)	$ (2,565)	$ (60,286)
Debt financing	$ —	$ 144,813	$ 44,968	$ 28,676	$ 99,000	$ 131,237
Debt repayment—principal	$ —	$ (53,726)	$ (3,041)	$ (3,077)	$ (13,697)	$ (2,834)
Activity as of December 31, 2016:						
Installed size (in megawatts)	5	30	10	5	19	37
Company cash contributions	$ 180,699	$ 22,442	$ 32,223	$ 22,658	$ 11,669	$ 27,932
Company non-cash contributions [3]	$ —	$ —	$ 8,655	$ 2,082	$ —	$ —
Equity Investor cash contributions	$ 100,000	$ 139,993	$ 36,967	$ 20,152	$ 84,782	$ 213,692
Distributions to Equity Investor	$ (81,016)	$ (107,336)	$ (2,584)	$ (1,002)	$ (180)	$ (50,827)
Debt financing	$ —	$ 144,813	$ 44,968	$ 28,676	$ 99,000	$ 131,237
Debt repayment—principal	$ —	$ (39,759)	$ (2,129)	$ (2,356)	$ (12,426)	$ —

[1] Investor name represents ultimate parent of subsidiary financing the project.

[2] Investor right on the certain date, upon giving the Company advance written notice, to sell the membership interests to the Company or resign or withdraw from the Company.

[3] Non-cash contributions consisted of warrants that were issued by the Company to respective lenders to each PPA Entity, as required by such entity's credit agreements. The corresponding values are amortized using the effective interest method over the debt term.

Some of the Company's PPA Entities contain structured provisions whereby the allocation of income and equity to the Equity Investors changes at some point in time after the formation of the PPA Entity. The change in allocations to Equity

Investors (or the "flip") occurs based either on a specified future date or once the Equity Investors reaches its targeted rate of return. For PPA Entities with a specified future date for the flip, the flip occurs January 1 of the calendar year immediately following the year that includes the fifth anniversary of the date the last site achieves commercial operation. The Company had full ownership of PPA Company I for the years ended December 31, 2018, and 2017.

The noncontrolling interests in PPA Company II, PPA Company IIIa and PPA Company IIIb are redeemable as a result of the put option held by the Equity Investors. The redemption value is the put amount. At December 31, 2018 , and 2017 , the carrying value of redeemable noncontrolling interests of $57.3 million and $58.2 million , respectively, exceeded the maximum redemption value.

PPA Entities' Aggregate Assets and Liabilities

Generally, Operating Company assets can be used to settle only the Operating Company obligations and Operating Company creditors do not have recourse to the Company. The aggregate carrying values of the PPA Entities' assets and liabilities in the Company's consolidated balance sheets, after eliminations of intercompany transactions and balances, were as follows (in thousands):

	December 31,	
	2018	**2017**
Assets		
Current assets:		
Cash and cash equivalents	$ 5,295	$ 9,549
Restricted cash	2,917	7,969
Accounts receivable	7,516	7,680
Customer financing receivable	5,594	5,209
Prepaid expenses and other current assets	4,909	6,365
Total current assets	26,231	36,772
Property and equipment, net	399,060	430,464
Customer financing receivable, non-current	67,082	72,677
Restricted cash	27,854	26,748
Other long-term assets	2,692	3,767
Total assets	$ 522,919	$ 570,428
Liabilities		
Current liabilities:		
Accounts payable	$ 724	$ 520
Accrued other current liabilities	1,442	2,378
Deferred revenue and customer deposits	786	786
Current portion of debt	21,162	18,446
Total current liabilities	24,114	22,130
Derivative liabilities	3,626	5,060
Deferred revenue	8,696	9,482
Long-term portion of debt	323,360	342,050
Other long-term liabilities	1,798	1,226
Total liabilities	$ 361,594	$ 379,948

As stated above, the Company is a minority shareholder in the PPA Entities for the administration of the Company's Bloom Electrons program. PPA Entities contain debt that is non-recourse to the Company. The PPA Entities also own Energy Server assets for which the Company does not have title. Although the Company will continue to have Power Purchase Agreement Program entities in the future and offer customers the ability to purchase electricity without the purchase of Energy Servers, the Company does not intend to be a minority investor in any new Power Purchase Agreement Program entities.

The Company believes that by presenting assets and liabilities separate from the PPA Entities, it provides a better view of the true operations of the Company's core business. The table below provides detail into the assets and liabilities of Bloom Energy separate from the PPA Entities. The following table shows Bloom Energy's stand-alone, the PPA Entities combined and the Company's consolidated balances as of December 31, 2018 , and December 31, 2017 (in thousands):

	December 31, 2018			December 31, 2017		
	Bloom	PPA Entities	Consolidated	Bloom	PPA Entities	Consolidated
Assets						
Current assets	$ 646,350	$ 26,231	$ 672,581	$ 383,209	$ 36,772	$ 419,981
Long-term assets	220,399	496,688	717,087	267,350	533,656	801,006
Total assets	$ 866,749	$ 522,919	$ 1,389,668	$ 650,559	$ 570,428	$ 1,220,987
Liabilities						
Current liabilities	$ 246,866	$ 2,952	$ 249,818	$ 247,464	$ 3,684	$ 251,148
Current portion of debt	8,686	21,162	29,848	1,690	18,446	20,136
Long-term liabilities	293,739	14,120	307,859	513,367	15,768	529,135
Long-term portion of debt	388,073	323,360	711,433	579,155	342,050	921,205
Total liabilities	$ 937,364	$ 361,594	$ 1,298,958	$ 1,341,676	$ 379,948	$ 1,721,624

13. Commitments and Contingencies

Commitments

Facilities Leases

The Company leases its facilities, office buildings and equipment under operating leases that expire at various dates through December 2028. Our lease for our former corporate offices in Sunnyvale, California expired in December 2018. We entered into a lease for our new corporate headquarters located in San Jose, California, for 181,000 square feet of office space commencing January 2019 and expiring in December 2028. Our headquarters is used for administration, research and development and sales and marketing.

Additionally, we lease various manufacturing facilities in Sunnyvale, California. Our current lease for our Sunnyvale manufacturing facilities, entered into in April 2005, expires in 2020. Our current lease for our manufacturing facilities at Moffett Field, entered into in December 2011, expires in December 2019. These plants together comprise approximately 487,228 square feet of space. We lease additional office space as field offices in the United States and around the world including in India, the Republic of Korea, China and Taiwan.

During the years ended December 31, 2018 , 2017 and 2016 , rent expense for all occupied facilities was $6.3 million , $5.2 million and $5.1 million , respectively.

At December 31, 2018 , future minimum lease payments under operating leases were as follows (in thousands):

2019	$ 23,490
2020	24,945
2021	22,464
2022	22,107
2023	21,910
Thereafter	72,245
	$ 187,161

Equipment Leases - Beginning in December 2015, the Company is a party to master lease agreements that provide for the sale of Energy Servers to third parties and the simultaneous leaseback of the systems which the Company then subleases to customers. The lease agreements expire on various dates through 2025 and there was no recorded rent expense for the years ended December 31, 2018 , 2017 and 2016 .

Purchase Commitments with Suppliers and Contract Manufacturers - In order to reduce manufacturing lead-times and to ensure an adequate supply of inventories, the Company has agreements with its component suppliers and contract manufacturers to allow long lead-time component inventory procurement based on a rolling production forecast. The Company is contractually obligated to purchase long lead-time component inventory procured by certain manufacturers in accordance with its forecasts. The Company can generally give notice of order cancellation at least 90 days prior to the delivery date. However, the Company issues purchase orders to its component suppliers and third-party manufacturers that may not be cancelable. As of December 31, 2018 and 2017 , the Company had no material open purchase orders with its component suppliers and third-party manufacturers that are not cancelable.

Power Purchase Agreement Program - Under the terms of the Bloom Electrons program (see Note 12 - *Power Purchase Agreement Programs*), customers agree to purchase power from the Company's Energy Servers at negotiated rates, generally for periods of up to twenty-one years. The Company is responsible for all operating costs necessary to maintain, monitor and repair the Energy Servers, including the fuel necessary to operate the systems under certain PPA contracts. The risk associated with the future market price of fuel purchase obligations is mitigated with commodity contract futures.

The PPA Entities guarantee the performance of Energy Servers at certain levels of output and efficiency to its customers over the contractual term. The PPA Entities monitor the need for any accruals arising from such guaranties, which are calculated as the difference between committed and actual power output or between natural gas consumption at warranted efficiency levels and actual consumption, multiplied by the contractual rates with the customer. Amounts payable under these guaranties are accrued in periods when the guaranties are not met and are recorded in cost of service revenue in the consolidated statements of operations. The Company paid $0.9 million , $3.7 million and $4.8 million for the years ended December 31, 2018 , 2017 and 2016 , respectively.

In June 2015, PPA V entered into a $131.2 million credit agreement to fund the purchase and installation of Energy Servers. The lenders have commitments to a letter of credit (LC) facility with the aggregate principal amount of $6.2 million . The LC facility is to fund the Debt Service Reserve Account. The amount reserved under the letter of credit as of December 31, 2018 and 2017 was $5 million and $4.4 million , respectively.

Contingencies

Indemnification Agreements - The Company enters into standard indemnification agreements with its customers and certain other business partners in the ordinary course of business. The Company's exposure under these agreements is unknown because it involves future claims that may be made against the Company but have not yet been made. To date, the Company has not paid any claims or been required to defend any action related to its indemnification obligations. However, the Company may record charges in the future as a result of these indemnification obligations.

Warranty Costs - The Company generally warrants its products sold to its direct customers for one year following the date of acceptance of the products under a standard one-year warranty. As part of its MSAs, the Company provides output and efficiency guaranties (collectively "performance guaranties") to its customers when systems operate below contractually specified levels of efficiency and output. Such amounts have not been material to date.

The standard one-year warranty covers defects in materials and workmanship under normal use and service conditions, and against manufacturing or performance defects. The Company accrues this warranty expense using its best estimate of the amount necessary to settle future and existing warranty claims as of the balance sheet date.

The Company's obligations under its standard one-year warranty and MSA agreements are generally in the form of product replacement, repair or reimbursement for higher customer electricity costs. Further, if the Energy Servers run at a lower efficiency or power output than the Company committed under its performance guaranty, the Company will reimburse the customer for the underperformance. The Company's aggregate reimbursement obligation for this performance guaranty for each order is capped at a portion of the purchase price. Prior to fiscal year 2014, certain MSAs with direct customers were accounted for as separately-priced warranty contracts under ASC 605-20-25 Separately Priced Extended Warranty and Product Maintenance Contracts (formerly FTB 90-1), in which the Company recorded an accrual for any expected costs that exceed the contracted revenues for that one-year service renewal arrangement, and is included as a component of the accrued warranty liability. Customers may renew the MSAs leading to future expense that is not recognized under GAAP until the renewal occurs. Over time, as the Company's service offering evolved and the Company began managing the Energy Servers taking into consideration individual customer arrangements as well as the Company's Energy Server fleet management objectives, the Company's service offering evolved to the point that our services changed, becoming a more strategic offering for both the Company and its customers. Additionally, virtually all of the Company's sales arrangements included bundled sales of maintenance service agreements along with the Energy Servers. The result is that the Company allocates a certain portion of the contractual revenue related to the Energy Servers to the MSAs based on the Company's BESP compared to the stated amount in the service contracts.

Delaware Economic Development Authority - In March 2012, the Company entered into an agreement with the Delaware Economic Development Authority to provide a grant of $16.5 million as an incentive to establish a new manufacturing facility in Delaware and to provide employment for full time workers at the facility over a certain period of time. The grant contains two types of milestones that the Company must complete to retain the entire amount of the grant proceeds. The first milestone was to provide employment for 900 full time workers in Delaware by the end of the first recapture period of September 30, 2017 . The second milestone was to pay these full time workers a cumulative total of $108.0 million in compensation by September 30, 2017 . There are two additional recapture periods at which time the Company must continue to employ 900 full time workers and the cumulative total compensation paid by the Company is required to be at least $324.0 million by September 30, 2023 . As of December 31, 2018 , the Company had 335 full time workers in Delaware and paid $86.0 million in cumulative compensation. As of December 31, 2017 , the Company had 305 full time workers in Delaware and paid $69.3 in cumulative compensation. The Company has so far received $12.0 million of the grant which is contingent upon meeting the milestones through September 30, 2023 . In the event that the Company does not meet the milestones, it may have to repay the Delaware Economic Development Authority, including up to $5.0 million on September 30, 2021 and up to an additional $2.5 million on September 30, 2023 . As of December 31, 2018 , the Company paid $1.5 million for recapture provisions and has recorded $10.5 million in other long-term liabilities for potential recapture.

Self-Generation Incentive Program (SGIP) - The Company's PPA Entities' customers receive payments under the SGIP which is a program specific to the State of California that provides financial incentives for the installation of qualifying new self-generation equipment that the Company owns. The SGIP program issues 50% of the fully anticipated amount in the first year the equipment is placed into service. The remaining incentive is then paid based on the size of the equipment (i.e., nameplate kilowatt capacity) over the subsequent five years .

The SGIP program has operational criteria primarily related to fuel mixture and minimum output for the first five years after the qualified equipment is placed in service. If the operational criteria are not fulfilled, it could result in a partial refund of funds received. However, for certain PPA Entities, the Company makes SGIP reservations on behalf of the PPA Entity and, therefore, the PPA Entity bears the risk of loss if these funds are not paid.

Investment Tax Credits (ITCs) - The Company's Energy Servers are eligible for federal ITCs that accrued to qualified property under Internal Revenue Code Section 48 when placed into service. However, the ITC program has operational criteria that extend for five years. If the energy property is disposed or otherwise ceases to be qualified investment credit property before the close of the five year recapture period is fulfilled, it could result in a partial reduction of the incentives. The Company's purchase of Energy Servers were by the PPA Entities and, therefore, the PPA Entities bear the risk of repayment if the assets placed in service do not meet the ITC operational criteria in the future.

Legal Matters - From time to time, the Company is involved in disputes, claims, litigation, investigations, proceedings and/or other legal actions consisting of commercial, securities and employment matters that arise in the ordinary course of business. The Company reviews all legal matters at least quarterly and assesses whether an accrual for loss contingencies needs to be recorded. The assessment reflects the impact of negotiations, settlements, rulings, advice of legal counsel and other information and events pertaining to a particular situation. The Company records an accrual for loss contingencies when management believes that it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. Legal matters are subject to uncertainties and are inherently unpredictable, so the actual liability in any such matters may be materially different from the Company's estimates. If an unfavorable resolution were to occur, there exists the possibility of a material adverse impact on the Company's consolidated financial condition, results of operations or cash flows for the period in which the resolution occurs or on future periods.

In July 2018, two former executives of Advanced Equities, Inc., Keith Daubenspeck and Dwight Badger, filed a Statement of Claim with the American Arbitration Association in Santa Clara, CA, against the Company, Kleiner Perkins, Caufield & Byers, LLC ("KPCB"), New Enterprise Associates, LLC ("NEA") and affiliated entities of both KPCB and NEA seeking to compel arbitration and alleging a breach of a confidential agreement executed between the parties on June 27, 2014 ("Confidential Agreement"). This Statement of Claim sought, among other things, to void the indemnification and confidentiality provisions under the Confidential Agreement and to recover attorneys' fees and costs. The Statement of Claim was dismissed without prejudice on July 22, 2018. On September 19, 2018, an Amended Statement of Claim was filed by Messrs. Daubenspeck and Badger with the American Arbitration Association in Santa Clara, CA, against the parties. The Amended Statement of Claim alleges a breach of the Confidentiality Agreement and fraud in the inducement, securities fraud, racketeering and other claims. No date has yet been set for the Company's response. The Company believes the Amended Statement of Claim to be without merit and as a result, the Company has recorded no loss contingency related to this claim.

14. Segment Information and Concentration of Risk

Segments and the Chief Operating Decision Maker

The Company's chief operating decision makers ("CODMs"), the Chief Executive Officer and the Chief Financial Officer, review financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. The CODMs allocate resources and make operational decisions based on direct involvement with the Company's operations and product development efforts. The Company is managed under a functionally-based organizational structure with the head of each function reporting to the Chief Executive Officer. The CODMs assess performance, including incentive compensation, based upon consolidated operations performance and financial results on a consolidated basis. As such, the Company has a single reporting segment and operating unit structure.

Concentration of Geographic Risk

The majority of the Company's revenue and long-lived assets are attributable to operations in the United States for all periods presented. In the year ended December 31, 2018 , total revenue in the Republic of Korea was 12% of the Company's total revenue.

Concentrations of Credit Risk

Financial instruments that potentially subject the Company to a concentration of credit risk consist primarily of cash and cash equivalents, short-term investments, accounts receivables, customer financing lease receivables and counterparties to derivative instruments.

Management believes that the financial institutions that hold the Company's cash and cash equivalents are financially credit worthy and, accordingly, believes minimal credit risk exists with respect to the funds placed. Generally, such deposits may be redeemed upon demand and, therefore, bear minimal interest rate risk. Short-term investments consist of U.S. Treasury Bills .

The Company conducts periodic evaluations of the creditworthiness of its customers and the collectability of its accounts receivable and financing leases receivable and provides for potential credit losses as necessary in the consolidated financial statements. To date, the Company has neither provided an allowance for uncollectible accounts nor experienced any credit loss.

Management evaluates the credit risk of the counterparties of its derivative instruments prior to contract execution. Management believes that such counterparties are financially credit worthy and, accordingly, believes minimal credit risk exists with respect to its derivative contracts.

Concentrations of Customer Risk

The Company's Energy Servers are sold at a significant purchase price with few numerical sales in any given quarter. Consequently in any particular period, a substantial proportion of total revenue is concentrated in a relatively small number of customers. In subsequent periods, the same is true for a different set of customers. Therefore, although revenue is highly concentrated in a few customers in a single quarterly period, such is not the case when examining revenue over longer terms.

In the years ended December 31, 2018 , total revenue from The Southern Company and AT&T represented 43% and 11% , respectively, of the Company's total revenue. The Southern Company wholly owns a Third-Party PPA which purchases Bloom Energy Servers, however, such purchases and resulting revenue is made on behalf of various customers of this Third-Party PPA.

In the years ended December 31, 2017 , total revenue from The Southern Company and Delmarva represented 43% and 10% of total revenue, respectively. In the years ended December 31, 2016 , total revenue from Delmarva and Intel Corporation represented 18% and 12% , respectively, of the Company's total revenue.

Concentrations of Supply Risk

The Company's products are manufactured using a rare earth mineral. The suppliers for this raw material are primarily located in Asia. A significant disruption in the operations of one or more of these suppliers could impact the production of the Company's products which could have a material adverse effect on its business, financial condition and results of operations. In addition, a small portion of the Company's components are single sourced and any disruption from these vendors could impact the Company's production and could have a material adverse effect on it business and results of operation.

Cybersecurity Risk

All of the Company's installed Energy Servers are connected to and controlled and monitored by the Company's centralized remote monitoring service. Additionally, the Company relies on internal computer networks for many of the systems used to operate the business generally. The Company may be vulnerable to breaches, unauthorized access, misuse, computer viruses or other malicious code and cyber-attacks. The Company takes protective measures and endeavors to modify these internal systems as circumstances warrant to prevent unauthorized intrusions or disruptions.

15. Related Party Transactions

The Company's operations included the following related party transactions (in thousands):

	Years Ended December 31,		
	2018	**2017**	**2016**
Total revenue from related parties	$ 32,381	$ 2,176	$ 2,126
Interest expense to related parties	8,893	12,265	7,631
Consulting expenses paid to related parties (included in general and administrative expense)	125	206	206

As of December 31, 2018 and 2017 , the Company had $64.1 million and $107.0 million , respectively, in debt and convertible notes from investors considered to be related parties.

Bloom Energy Japan Limited

In May 2013, the Company entered into a joint venture with Softbank Corp., which is accounted for as an equity method investment. Under this arrangement, the Company sells Energy Servers and provides maintenance services to the joint venture. Accounts receivable from this joint venture was $3.3 million as of December 31, 2018 and immaterial as of December 31, 2017 .

8% Convertible Promissory Notes

In December 2014, the Company entered into a three year $132.2 million convertible promissory note agreements with certain investors, including $10.0 million each from related parties Alberta Investment Management Corporation, KPCB Holdings, Inc. and New Enterprise Associates. The loans, which bear a fixed interest rate of 8.0% compounded monthly, were due at maturity or at the election of the investor with accrued interest due in December of each year which, at the election of the investor, can be paid or accrued. Investors have the right to convert the unpaid principal and accrued interest to Series G convertible preferred stock at any time at the price of $38.64 . Under original terms, if an initial public offering occurs prior to the payment in full, the outstanding principal and accrued interest will mandatorily convert into Series G convertible preferred stock.

As of December 31, 2017 the Company had $38.3 million in 8% Convertible Promissory Notes from investors considered to be related parties. Upon completion of the initial public offering in July 2018 , the Company converted $40.1 million principal and interest outstanding into 1,038,050 shares of Series G convertible preferred stock which concurrently converted into an equal number of shares of Series B common stock.

6% Convertible Promissory Notes *(Originally 5% Convertible Promissory Notes)*

In December 2015, January 2016 and September 2016 the Company entered into promissory note agreements with related parties New Enterprise Associates, KPCB Holdings, Inc. and other non-related parties. The total value of the promissory notes is $260.0 million and originally bore a 5% fixed interest rate, compounded monthly, and are entirely due at maturity. Due to a reduction of collateral as a result of the issuance of other notes, a 1% interest increase was negotiated changing the interest rate from 5% to 6% effective July 1, 2017.

As of December 31, 2018 and 2017 , the amount outstanding to the related parties was $27.7 million and $26.8 million , respectively, including accrued interest. At the election of the investors, the accrued interest and the unpaid principal can be converted into common stock at any time. In certain circumstances, the notes are also redeemable at the Company's option, in whole or in part, in connection with a change of control or at a qualified IPO at a redemption price. In January 2018, the Company amended the terms of the 6% Notes to extend the convertible put option dates to December 2019, which investors could elect only if the IPO did not occur prior to December 2019. The Company issued these convertible notes with conversion features. These conversion features were evaluated under ASC topic 815-40, were determined to be embedded derivatives and were bifurcated from the debt and were classified prior to the IPO as liabilities on the consolidated balance sheets. The Company recorded these derivative liabilities at fair value and adjusted the carrying value to their estimated fair value at each reporting date with the increases or decreases in the fair value recorded as a gain (loss) on revaluation of warrant liabilities and embedded derivatives in the consolidated statements of operations. Upon the IPO, the final valuation of the conversion feature was calculated as of the date of the IPO and was reclassified from a derivative liability to additional paid-in capital.

Term Loan due September 2028

In 2013 and 2014, the Company obtained a $45.0 million term loan from related party Alberta Investment Management Corporation (Alberta) to fund the purchase and installation of Energy Servers related to PPA IIIa due September 2028. The Company repaid $1.4 million and $0.9 million of outstanding debt to Alberta in the years ended December 31, 2018 and 2017 , respectively. Furthermore, the Company paid $3.1 million , $3.2 million and $3.3 million of interest to Alberta in the years ended December 31, 2018 , 2017 and 2016 , respectively. The unpaid principal balance of the loan as of December 31, 2018 and 2017 was $40.5 million and $41.9 million , respectively.

Consulting Arrangement

In January 2009, the Company entered into a consulting agreement with General Colin L. Powell, a member of the Company's board of directors, pursuant to which General Powell performs certain strategic planning and advisory services for the Company. Pursuant to this consulting agreement, General Powell receives compensation of $125,000 per year and reimbursement for reasonable expenses.

Participation in IPO

In our IPO, certain of our directors, executive officers and 5% stockholders and their affiliates purchased an aggregate of shares of our common stock. Each of those purchases was made through the underwriters or through the directed share program at the IPO price of $15.00 per share. The following table sets forth the aggregate number of shares of our common stock that these directors, executive officers and 5% stockholders and their affiliates purchased in our IPO (dollars in thousands):

Purchaser	Shares of Class A Common Stock	Total Purchase Price
John T. Chambers	333,333	$ 5,000
L. John Doerr	1,333,333	20,000
Colin Powell	333,333	5,000
Entities affiliated with New Enterprise Associates	1,333,333	20,000
Total		$ 50,000

16. Subsequent Events

On March 20, 2019, a class action was filed in the Superior Court of the State of California, Santa Clara County, by the Lincolnshire Police Pension Fund, individually and on behalf of all others similarly situated ("Plaintiff"), against the Company, certain of its directors and officers, and the underwriters of the Company's IPO in July 2018. The Plaintiff alleges violations of Sections 11 and 15 of the Securities Act of 1933, as amended, in connection with the purchase of the Company's common stock pursuant or traceable to the Form S-1 Registration Statement and Prospectus issued in connection with the Company's IPO.

There have been no other subsequent events that occurred during the period subsequent to the date of these financial statements that would require adjustment to or disclosure in the financial statements as presented.

Unaudited Quarterly Supplemental Financial Information

The consolidated statements of operations, presented on a quarterly basis for the years ended December 31, 2018 and 2017 , are unaudited. These statements have been prepared in accordance with U.S. GAAP for interim financial information and, in the opinion of management, reflect all adjustments, which include only normal recurring adjustments, necessary for a fair statement of the results of operations for the periods presented.

The following presents the Company's consolidated statements of operations by quarter (in thousands) (unaudited):

	2018				2017			
	Dec. 31	Sept. 30	June 30	March 31	Dec. 31	Sept. 30	June 30	March 31
Revenue								
Product	$ 156,671	$ 125,690	$ 108,654	$ 121,307	$ 66,913	$ 45,255	$ 39,935	$ 27,665
Installation	21,363	29,690	26,245	14,118	21,601	14,978	14,354	12,293
Service	21,752	20,751	19,975	19,907	19,927	19,511	18,875	18,591
Electricity	13,820	14,059	14,007	14,029	14,810	14,021	13,619	13,648
Total revenue	213,606	190,190	168,881	169,361	123,251	93,765	86,783	72,197
Cost of revenue								
Product	128,076	95,357	70,802	80,355	70,450	53,923	47,545	38,855
Installation	31,819	40,118	37,099	10,438	16,933	14,696	14,855	13,445
Service	28,475	22,651	19,260	24,253	14,012	30,058	21,308	18,219
Electricity	7,988	8,679	8,949	10,649	9,806	10,178	8,881	10,876
Total cost of revenue	196,358	166,805	136,110	125,695	111,201	108,855	92,589	81,395
Gross profit (loss)	17,248	23,385	32,771	43,666	12,050	(15,090)	(5,806)	(9,198)
Operating expenses								
Research and development	32,970	27,021	14,413	14,731	15,181	12,374	12,368	11,223
Sales and marketing	24,983	21,476	8,254	8,262	9,346	6,561	8,663	7,845
General and administrative	47,471	40,999	15,359	14,988	14,818	13,652	14,325	12,879
Total operating expenses	105,424	89,496	38,026	37,981	39,345	32,587	35,356	31,947
Income (loss) from operations	(88,176)	(66,111)	(5,255)	5,685	(27,295)	(47,677)	(41,162)	(41,145)
Interest income	1,996	1,467	444	415	—	—	—	—
Interest expense	(16,178)	(17,191)	(12,688)	(11,390)	(27,846)	(26,946)	(16,140)	(16,847)
Interest expense to related parties	(1,628)	(1,628)	(13,923)	(12,062)	(1,961)	(1,953)	(9,414)	(7,516)
Other income (expense), net	635	762	559	(629)	175	(40)	14	119
Gain (loss) on revaluation of warrant liabilities and embedded derivatives	(13)	1,655	(19,197)	(4,034)	(15,114)	572	(668)	215
Net loss before income taxes	(103,364)	(82,513)	(50,060)	(22,015)	(72,041)	(76,044)	(67,370)	(65,174)
Income tax provision (benefit)	1,079	(3)	128	333	(120)	314	228	214
Net loss	(104,443)	(82,510)	(50,188)	(22,348)	(71,921)	(76,358)	(67,598)	(65,388)
Net loss attributable to noncontrolling interests and redeemable noncontrolling interests	(4,662)	(3,931)	(4,512)	(4,632)	(4,160)	(4,527)	(4,123)	(5,856)
Net loss attributable to Class A and Class B common stockholders	$ (99,781)	$ (78,579)	$ (45,677)	$ (17,716)	$ (67,761)	$ (71,831)	$ (63,475)	$ (59,532)
Net loss per share attributable to Class A and Class B common stockholders, basic and diluted	$ (0.91)	$ (0.97)	$ (4.34)	$ (1.70)	$ (6.56)	$ (6.97)	$ (6.22)	$ (5.87)
Weighted average shares used to compute net loss per share attributable to Class A and Class B common stockholders, basic and diluted	109,416	81,321	10,536	10,403	10,333	10,305	10,209	10,143

ITEM 9 - CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A - CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports made as defined in Rules 13-a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (Exchange Act), is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer as appropriate, to allow for timely decisions regarding required disclosure.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act), as of December 31, 2018 . Based on such evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that as of December 31, 2018 , controls and procedures were effective to provide reasonable assurance that information required to be disclosed in the reports we file and submit under the Exchange Act is recorded, processed, summarized and reported as and when required, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, to allow timely decisions regarding its required disclosure.

This annual report does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of the company's registered public accounting firm due to a transition period established by rules of the Securities and Exchange Commission for newly public companies.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting identified in management's evaluation pursuant to Rules 13a-15(d) or 15d-15(d) of the Exchange Act during the period covered by this Annual Report on Form 10-K that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitation on Effectiveness of Controls and Procedures

Our management, including our Chief Executive Officer and Chief Financial Officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. A controls system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the objectives of the controls system are met. Further, the design of a controls system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all controls systems, no evaluation of controls can provide absolute assurance that all controls issues and instances of fraud, if any, within our Company have been detected. Accordingly, our disclosure controls and procedures provide reasonable assurance of achieving their objectives.

ITEM 9B - OTHER INFORMATION

None.

Part III

ITEM 10 - DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this ITEM 10 of Annual Report on Form 10-K is incorporated by reference to our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2018 .

ITEM 11 - EXECUTIVE COMPENSATION

The information required by this ITEM 11 of Annual Report on Form 10-K is incorporated by reference to our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2018 .

ITEM 12 - SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this ITEM 12 of Annual Report on Form 10-K is incorporated by reference to our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2018 .

ITEM 13 - CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required by this ITEM 13 of Annual Report on Form 10-K is incorporated by reference to our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2018 .

ITEM 14 - PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this ITEM 14 of Annual Report on Form 10-K is incorporated by reference to our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2018 .

Part IV

ITEM 15 - EXHIBITS AND FINANCIAL STATEMENTS SCHEDULES

(a) The following documents are filed as part of this report:

1. Financial Statements

   See "Index to Consolidated Financial Statements and Supplementary Data" within the Consolidated Financial Statements herein.

2. Financial Statement Schedules

   All financial statement schedules have been omitted since the required information was not applicable or was not present in amounts sufficient to require submission of the schedules, or because the information required is included in the consolidated financial statements or the accompanying notes.

3. Exhibits

   See the following Index to Exhibits.

Index to Exhibits

The exhibits listed below are filed or incorporated by reference as part of this Annual Report on Form 10-K.

			Incorporated by Reference			
Exhibit Number		**Description**	**Form**	**File No.**	**Exhibit**	**Filing Date**
3.1		Restated Certificate of Incorporation.	10-Q	001-38598	3.1	9/7/2018
3.2		Restated Bylaws, as adopted April 27, 2018 and as effective July 27, 2018	10-Q	001-38598	3.2	9/7/2018
4.1		Form of Common Stock Certificate of the Registrant	S-1/A	333-225571	4.1	7/9/2018
4.2		Indenture by and among the Registrant, certain guarantors party thereto and U.S. Bank National Association, as trustee, dated as of December 15, 2015	S-1	333-225571	4.4	6/12/2018

4.3		Form of 5% Convertible Senior Secured PIK Note due 2020 (included in Exhibit 4.2)	S-1	333-225571	4.4	6/12/2018
4.4		Security Agreement by and among the Registrant, certain guarantors party thereto and U.S. Bank National Association, as collateral agent, dated as of December 15, 2015	S-1	333-225571	4.6	6/12/2018
4.5		Agreement and Warrant to Purchase Common Stock by and between Keith Daubenspeck and the Registrant, dated June 27, 2014	S-1	333-225571	4.7	6/12/2018
4.6		Agreement and Warrant to Purchase Common Stock by and between Dwight Badger and the Registrant, dated June 27, 2014	S-1	333-225571	4.8	6/12/2018
4.7		Plain English Warrant Agreement by and between Triplepoint Capital LLC, a Delaware limited liability company, and the Registrant, dated December 31, 2010	S-1	333-225571	4.9	6/12/2018
4.8		Amended and Restated Plain English Warrant Agreement by and between Triplepoint Capital LLC, a Delaware limited liability company, and the Registrant, dated December 15, 2011	S-1	333-225571	4.10	6/12/2018
4.9		Agreement and Warrant to Purchase Series F Preferred Stock by and between PE12GVVC (US Direct) Ltd. and the Registrant, dated July 1, 2014	S-1	333-225571	4.11	6/12/2018
4.10		Agreement and Warrant to Purchase Series F Preferred Stock by and between PE12PXVC (US Direct) Ltd. and the Registrant, dated July 1, 2014	S-1	333-225571	4.12	6/12/2018
4.11		Warrant to Purchase Preferred Stock by and between Atel Ventures, Inc., in its capacity as Trustee for its assignee affiliated funds, and the Registrant, dated December 31, 2012	S-1	333-225571	4.13	6/12/2018
4.12		Agreement and Warrant to Purchase Series G Preferred Stock by and between Keith Daubenspeck and the Registrant, dated June 27, 2014	S-1	333-225571	4.15	6/12/2018
4.13		Agreement and Warrant to Purchase Series G Preferred Stock by and between Dwight Badger and the Registrant, dated June 27, 2014	S-1	333-225571	4.16	6/12/2018
4.14		First Supplemental Indenture by and among Registrant, certain guarantor party thereto and U.S. Bank National Association, as trustee, dated as of September 20, 2016	S-1	333-225571	4.19	6/12/2018
4.15		Indenture by and among the Registrant, certain guarantors party thereto and U.S. Bank National Association, as trustee, dated as of June 29, 2017	S-1	333-225571	4.20	6/12/2018
4.16		Form of 10% Senior Secured Note due 2024 (included in Exhibit 4.15)	S-1	333-225571	4.20	6/12/2018
4.17		Security Agreement by and among the Registrant, U.S. Bank National Association, as trustee and U.S. Bank National Association, as collateral agent, dated as of June 29, 2017	S-1	333-225571	4.22	6/12/2018
4.18		Second Supplemental Indenture, Omnibus Amendment to Notes and Limited Waiver by and among the Registrant, certain guarantors party thereto and U.S. Bank National Association, as trustee, dated as of June 29, 2017	S-1	333-225571	4.24	6/12/2018
4.19		Third Supplemental Indenture and Omnibus Amendment to Notes by and among the Registrant, certain guarantors party thereto and U.S. Bank National Association, as trustee, dated as of January 18, 2018	S-1	333-225571	4.25	6/12/2018
4.20		Form of Holder Voting Agreement, between KR Sridhar and certain parties thereto	S-1/A	333-225571	4.26	7/9/2018

4.21		Amended and Restated Subordinated Secured Convertible Promissory Note by and between the Registrant and Constellation NewEnergy, Inc., dated as of January 18, 2018	S-1	333-225571	4.28	6/12/2018
10.1	^	2002 Equity Incentive Plan and form of agreements used thereunder	S-1	333-225571	10.2	6/12/2018
10.2	^	2012 Equity Incentive Plan and form of agreements used thereunder	S-1	333-225571	10.3	6/12/2018
10.3	^	2018 Equity Incentive Plan and form of agreements used thereunder	S-1	333-225571	10.4	7/9/2018
10.4	^	2018 Employee Stock Purchase Plan and form of agreements used thereunder	S-1/A	333-225571	10.5	7/9/2018
10.5		Standard Industrial Lease dated April 5, 2005 by and between the Registrant and The Realty Associates Fund III, L.P., as amended as of April 22, 2005, January 12, 2010, April 30, 2015 and December 7, 2015	S-1	333-225571	10.7	6/12/2018
10.6		Ground Lease by and between 1743 Holdings, LLC and the Registrant dated as of March 2012	S-1	333-225571	10.8	6/12/2018
10.7	^	Offer Letter by and between the Registrant and Randy Furr, dated April 9, 2015	S-1	333-225571	10.10	6/12/2018
10.8	†	Second Amended and Restated Limited Liability Company Agreement of Diamond State Generation Holdings, LLC, dated as of March 20, 2013 (PPA II)	S-1	333-225571	10.12	6/12/2018
10.9	†	Guaranty by the Registrant, dated as of March 16, 2012 (PPA II)	S-1	333-225571	10.13	6/12/2018
10.10	†	Master Operation and Maintenance Agreement by and between Diamond State Generation Partners, LLC and the Registrant, dated as of April 13, 2012 (PPA II)	S-1	333-225571	10.14	6/12/2018
10.11		Equity Contribution Agreement by and among the Registrant, Diamond State Generation Partners, LLC, and Deutsche Bank Trust Company Americas, dated as of March 20, 2013 (PPA II)	S-1	333-225571	10.15	6/12/2018
10.12	†	Note Purchase Agreement by and between Diamond State Generation Partners, LLC and the Purchasers thereunder, dated as of March 20, 2013 (PPA II)	S-1	333-225571	10.16	6/12/2018
10.13	†	Master Energy Server Purchase Agreement between the Registrant and Diamond State Generation Partners, LLC, dated as of April 13, 2012 (PPA II)	S-1	333-225571	10.17	6/12/2018
10.14		Omnibus First Amendment to MESPA, MOMA and ASA by and among the Registrant, Diamond State Generation Partners, LLC and Diamond State Generation Holdings, LLC, dated as of March 20, 2013 (PPA II)	S-1	333-225571	10.18	6/12/2018
10.15	†	Equity Capital Contribution Agreement with respect to Diamond State Generation Holdings, LLC, by and among Clean-Technologies II, LLC, Diamond State Generation Holdings, LLC, Diamond State Generation Partners, LLC, and Mehetia Inc., dated as of March 16, 2012 (PPA II)	S-1	333-225571	10.19	6/12/2018
10.16	†	First Amendment to the Equity Capital Contribution Agreement with respect to Diamond State Generation Holdings, LLC dated as of April 13, 2012 (PPA II)	S-1	333-225571	10.20	6/12/2018
10.17	†	Administrative Services Agreement by and between Registrant, Diamond State Generation Holdings, LLC, and Diamond State Generation Partners, LLC, dated as of April 13, 2012 (PPA II)	S-1	333-225571	10.21	6/12/2018

10.18	†	Depositary Agreement among Diamond State Generation Partners, LLC, Deutsche Bank Trust Company Americas, and Deutsche Bank Trust Company Americas, dated as of March 20, 2013 (PPA II)	S-1	333-225571	10.22	6/12/2018
10.19		Amendment No.1 to Depository Agreement by and among Diamond State Generation Partners, LLC, Deutsche Bank Trust Company Americas and Deutsche Bank Trust Company Americas, dated as of March 21, 2017 (PPA II)	S-1	333-225571	10.25	6/12/2018
10.20		First Amendment to Second Amended and Restated Limited Liability Company Agreement of Diamond State Generation Holdings, LLC, dated as of September 25, 2013 (PPA II)	S-1	333-225571	10.26	6/12/2018
10.21		Consent, Authorization, Waiver and First Amendment to Note Purchase Agreement by and between Diamond State Generation Partners, LLC and the holders, dated as of June 24, 2013 (PPA II)	S-1	333-225571	10.27	6/12/2018
10.22		Second Amendment to Note Purchase Agreement by and among Diamond State Generation Partners, LLC and the Holders thereto, dated March 13, 2018 (PPA II)	S-1	333-225571	10.28	6/12/2018
10.23		Net Lease Agreement, dated as of April 4, 2018, by and between the Registrant and 237 North First Street Holdings, LLC	S-1	333-225571	10.29	6/12/2018
10.24		Consulting Agreement between the Registrant and Colin L. Powell, dated as of January 29, 2009	S-1	333-225571	10.31	6/12/2018
10.25		Grant Agreement by and between the Delaware Economic Development Authority and the Registrant, dated March 1, 2012	S-1	333-225571	99.1	6/12/2018
10.26		Form of Indemnification Agreement	10-Q	001-38598	10.1	9/7/2018
10.27	*	Form of Offer Letter				
10.28	* †	Preferred Distributor Agreement by and between Registrant and SK Engineering & Construction Co., Ltd dated November 14, 2018				
10.29	* †	Third Amended and Restated Purchase, Use and Maintenance Agreement between Registrant and 2016 ESA Project Company, LLC, dated as of September 26, 2018				
10.30	*	Amendment No.1 to Third Amended and Restated Purchase, Use and Maintenance Agreement by and between Registrant and 2016 ESA Project Company, LLC dated as of September 28, 2018				
10.31	*	Amendment No.2 to Third Amended and Restated Purchase, Use and Maintenance Agreement by and between Registrant and 2016 ESA Project Company, LLC dated as of December 19, 2018				
21.1	*	List of Subsidiaries				
23.1	*	Consent of Independent Registered Public Accounting Firm, PricewaterhouseCoopers LLP				
31.1	*	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) and 15d-14(a) of the Securities and Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				
31.2	*	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) and 15d-14(a) of the Securities and Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				

32.1	**	Certification of the Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				
101.INS	*	XBRL Instance Document				
101.SCH	*	XBRL Taxonomy Extension Schema Document				
101.CAL	*	XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF	*	XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB	*	XBRL Taxonomy Extension Label Linkbase Document				
101.PRE	*	XBRL Taxonomy Extension Presentation Linkbase Document				

^ Executive Compensation Plans and Arrangements.

* Filed herewith.

** The certifications furnished in Exhibit 32.1 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.

† Confidential treatment requested with respect to portions of this exhibit.

ITEM 16 - FORM 10-K SUMMARY

Not applicable.

Signatures

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

BLOOM ENERGY CORPORATION

Date:	March 21, 2019	By:	/s/ KR Sridhar KR Sridhar Founder, President, Chief Executive Officer and Director (Principal Executive Officer)
Date:	March 21, 2019	By:	/s/ Randy Furr Randy Furr Executive Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Date:	March 21, 2019	/s/ KR Sridhar KR Sridhar Founder, President, Chief Executive Officer and Director (Principal Executive Officer)
Date:	March 21, 2019	/s/ Randy Furr Randy Furr Executive Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)
Date:	March 21, 2019	/s/ Kelly A. Ayotte Kelly A. Ayotte Director
Date:	March 21, 2019	/s/ Mary K. Bush Mary K. Bush Director
Date:	March 21, 2019	/s/ John T. Chambers John T. Chambers Director
Date:	March 21, 2019	/s/ L. John Doerr L. John Doerr Director
Date:	March 21, 2019	/s/ Colin L. Powell Colin L. Powell Director
Date:	March 21, 2019	/s/ Scott Sandell Scott Sandell Director
Date:	March 21, 2019	/s/ Peter Teti Peter Teti Director
Date:	March 21, 2019	/s/ Eddy Zervigon Eddy Zervigon Director

Bloomenergy

Date, 2019

Name
Address
Address

Dear Name,

I am pleased to conditionally offer you the position of **Business Title (HR title: XXX, Grade: XXX)** with Bloom Energy Corporation (the "Company"). In this full-time, salaried (exempt) position, you will report to **Manager Name** and will be based out of your XXX (enter state) home office OR our San Jose Corporate headquarters facility. Your annual salary will be **$ XX** , less applicable withholdings and deductions, and you will be paid every other Friday in accordance with the Company's normal payroll practices. Pursuant to the terms of Bloom Energy's Employee Incentive (Bonus) Plan, you are eligible to receive a discretionary bonus which is a **XX%** target of your eligible compensation. The Incentive Plan payout is based on achievement of company metrics and individual performance. The Incentive Plan is measured and administered every quarter with an annual component at the end of each year (5 eligible payouts per year). You will receive a sign-on bonus in the amount of **$XX** , less applicable withholdings and deductions, payable along with your first paycheck. You will also receive reimbursement of up to **$XX** for your expenses to relocate to the Bay Area.

We will recommend that the Company's Board of Directors grant you a non-qualified option to purchase **XX** shares of the Company's Class A Common Stock pursuant to the 2018 Equity Incentive Plan ("Plan"). The exercise price will be the closing price of the Class A Common Stock on the date of grant. Upon approval, the stock options will be granted on the 15 th day (or the next trading day) of the month following your date of hire. Twenty-Five percent (25%) of the stock options granted will vest on the first year anniversary of the grant date. The remaining will vest at a rate of 1/36 th per month until the option is fully vested over four years. The grant is subject to your continued employment and the Company's standard terms and conditions.

We will recommend that the Company's Board of Directors grant you Restricted Stock Units ("RSUs") for **XXX** shares of the Company's Class A Common Stock pursuant to the 2018 Equity Incentive Plan ("Plan"). Upon approval, the RSUs will be granted on the 15th day (or the next trading day) of the month following your date of hire. Twenty-Five percent (25%) of the shares subject to RSUs shall vest on the one-year anniversary of the grant date and the remaining shares shall vest quarterly over the next three years until the RSU is fully vested after four years from the grant date. The grant is subject to your continued employment and the Company's standard terms and conditions.

You will also be eligible to receive benefits that the Company generally provides to its employees, consistent with the eligibility terms of those programs. A more detailed description of these benefits will be provided to you upon joining the Company.

Your offer of employment is conditioned upon a satisfactory (in the Company's discretion) reference check, background check, and upon proof of your right to work in the US. Your employment with the Company is further subject to the terms and conditions specified in "Attachment A" to this letter. This offer of employment is valid for seven days.

This letter and Attachment A set forth the terms of your employment with the Company and supersede any prior representations or agreements including, but not limited to, any representations made during your recruitment, interviews or pre-employment negotiations, whether written or oral. This letter and its attachments may not be modified or amended except by a written agreement signed by the Sr. Director, Human Resources and you.

We are very excited about you joining our team and look forward to a mutually rewarding relationship.

By signing below you are accepting the Company's offer of employment pursuant to the terms and conditions specified in this letter and in Attachment A. After signing and dating this letter below, please return all pages by email or by confidential fax (408-543-1004).

Sincerely, Agreed to and accepted by:

Signature: __

Sriram Dorai Print Name: __

Sr. Director, Human Resources Date: __

Bloom Energy Corporation Start Date: __

ATTACHMENT A

In addition to the terms outlined in the attached offer letter, your employment at Bloom Energy is conditioned upon the following.

At-Will Employment . You will be an "at will" employee of the Company. This means that either you or the Company may terminate your employment at any time, for any reason or no reason, with our without cause or notice. Regular employment at the Company is for no specified period of time and the Company makes no guarantee or contract of continued employment. Although your job duties, title, compensation, and benefits, as well as the Company's personnel policies, may change from time to time, the "at will" nature of your employment may not be changed except in an express written agreement signed by you and the President of the Company. In the event that you choose to resign from the Company, we request that you give us at least two weeks' notice.

Stock Options/RSUs . If approved by the Board, your stock options and/or RSUs will be subject to the terms and conditions of the Company's 2018 Equity Incentive Plan and the equity award agreement. You will be provided with a copy of the Equity Incentive Plan and your equity award agreement following the Board's approval of your grant. No right to any stock is earned or accrued until such time that vesting occurs, nor does the grant confer any right to continued vesting or employment. All grants are subject to the Company's Insider Trading Policy, trading window and will be subject to the participant's continuous employment.

Incentive Plan (Bonus). Pursuant to the terms of Bloom Energy's Employee Incentive Plan, your eligible compensation is defined as your annual base pay at the end of the eligible period, times the bonus target percent divided by 5 (the number of incentive opportunities in a year). This calculation will be adjusted to include any proration based on start date or Leave of Absence in an eligible period. You must be on active status for at least 30 days of the quarter to be eligible for a bonus and at least 30

days of the year to be eligible for the annual bonus. To be eligible for the bonus, you must also be employed by BE on the date of payout. Your bonus is subject to the discretion and approval of the Board of Directors and will be paid in accordance with the Company's normal bonus payment practices.

Sign-Bonus. In consideration of the bonus investment made by the Company, you agree to refund the full amount to the Company in the event that, prior to the first anniversary of receipt of such bonuses, you voluntarily terminate your employment or are terminated by the Company for cause.

Relocation . We will be pleased to pay for reasonable moving expenses up to the maximum described in this offer letter. Moving expenses are to be completed within one year of start date and cannot be reimbursed for expenses incurred after that date. Relocation Reimbursement Form is to be submitted to Payroll detailing moving expenses with all receipts. In line with company policy, reimbursement claims must be submitted within 60 days of date the expenses are incurred. The IRS considers all moving expenses to be taxable fringe benefits and they will be reimbursed through payroll net of taxes. Should you have questions, our payroll department would be pleased to discuss this with you.

In consideration of the investment made by the Company for your relocation, you agree to refund your relocation reimbursement in full to the Company in the event that, prior to your first anniversary of employment with the Company, you voluntarily terminate your employment or are terminated by the Company for cause.

References . The Company reserves the right to conduct background investigations and/or reference checks on all of its potential employees. Your job offer, therefore, is contingent upon a clearance of such a background investigation and/or reference check, if any.

Right to Work . For purposes of federal immigration law, you will be required to provide to the Company documentary evidence of your identity and eligibility for employment in the United States. Such documentation must be provided to us within three (3) business days of your date of hire, or our employment relationship with you may be terminated.

Prior Employment . We also ask that, if you have not already done so, you disclose to the Company any and all agreements relating to your prior employment that may affect your eligibility to be employed by the Company or limit the manner in which you may be employed. It is the Company's understanding that any such agreements will not prevent you from performing the duties of your position and you represent that such is the case. Moreover, you agree that, during the term of your employment with the Company, you will not engage in any other employment, occupation, consulting or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of your employment, nor will you engage in any other activities that conflict with your obligations to the Company. Similarly, you agree not to bring any third party confidential information to the Company, including that of your former employer, and that in performing your duties for the Company you will not in any way utilize any such information.

Company Policies . As a Company employee, you will be expected to abide by the Company's policies. Specifically, you will be required to sign an acknowledgment that you have read and that you understand the Company's policies which are included in the Company Handbook.

Intellectual Property . As a condition of your employment, you are also required to sign and comply with the Company's "Employment, Confidential Information, Invention Assignment and Arbitration Agreement," which requires, among other provisions, the assignment of patent rights to any invention made during your employment at the Company, and non-disclosure of Company proprietary information. Please note that we must receive your signed Agreement on your first day of employment.

Arbitration . (a) Any dispute or controversy between you and the Company arising out of or relating solely to your employment relationship with the Company, including any dispute or allegation regarding the enforceability, unconscionability, interpretation, construction or breach of this Agreement, will be settled by final and binding arbitration through Judicial Arbitration and Mediation Services ("JAMS") by a single arbitrator to be held in Santa Clara County, California, in accordance with the JAMS rules for resolution of employment disputes then in effect, except as provided herein. This means that we both give up the right to have disputes decided in court by a jury; instead, a neutral arbitrator whose decision is final and binding will resolve it, subject to judicial review as provided by law. The arbitrator selected shall have the authority to grant any party all remedies otherwise available by law, including injunctions, but shall not have the power to grant any remedy that would not be available in a state or federal court in California. The arbitrator shall be bound by and shall strictly enforce the terms of this section and may not limit, expand or otherwise modify its terms. The arbitrator shall make a good faith effort to apply the substantive law (and the law of remedies, if applicable) of the state of California, or federal law, or both, as applicable, without reference to its conflicts of laws provisions, but an arbitration decision shall not be subject to review because of errors of law. The arbitrator is without jurisdiction to apply any different substantive law. The arbitrator shall have the authority to hear and rule on dispositive motions (such as motions for summary adjudication or summary judgment). The arbitrator shall have the powers granted by California law and the rules of JAMS which conducts the arbitration, except as modified or limited herein.

(b) Notwithstanding anything to the contrary in the rules of JAMS, the arbitration shall provide (i) for written discovery and depositions as provided in California Code of Civil Procedure Section 1283.05 and (ii) for a written decision by the arbitrator that includes the essential findings and conclusions upon which the decision is based which shall be issued no later than thirty (30) days after a dispositive motion is heard and/or an arbitration hearing has completed. Except in disputes where you assert a claim otherwise under a state or federal statute prohibiting discrimination in employment ("a Statutory Discrimination Claim"), the Company shall pay all fees and administrative costs charged by the arbitrator and JAMS. In disputes where you assert a Statutory Discrimination Claim against the Company, you are required to pay the American Arbitration Association's filing fee only to the extent such filing fee does not exceed the fee to file a complaint in state or federal court. The Company shall pay the balance of the arbitrator's fees and administrative costs.

(c) You and the Company shall have the same amount of time to file any claim against any other party as such party would have if such a claim had been filed in state or federal court. In conducting the arbitration, the arbitrator shall follow the rules of evidence of the State of California (including but not limited to all applicable privileges), and the award of the arbitrator must follow California and/or federal law, as applicable.

(d) The arbitrator shall be selected by the mutual agreement of the parties. If the parties cannot agree on an arbitrator, the parties shall alternately strike names from a list provided by JAMS until only one name remains.

(e) The decision of the arbitrator will be final, conclusive and binding on the parties to the arbitration. The prevailing party in the arbitration, as determined by the arbitrator, shall be entitled to recover her or its reasonable attorneys' fees and costs, including the costs or fees charged by the arbitrator and JAMS. In disputes where you assert a Statutory Discrimination Claim, reasonable attorneys' fees shall be awarded by the arbitrator based on the same standard as such fees would be awarded if the Statutory Discrimination Claim had been asserted in state or federal court. Judgment may be entered on the arbitrator's decision in any court having jurisdiction.

(f) In the event of (1) a California Private Attorney General Action claim or (2) any claim determined by the arbitrator to be not properly in arbitration pursuant to applicable law, such claim(s) shall be brought as a civil action and shall be stayed pending resolution of all claims that are properly in arbitration.

[***] Certain confidential information contained in this document, marked by brackets has been omitted and filed separately with Securities and Exchange Commission pursuant to Rule 406 of the Securities Act of 1933, as amended.

Preferred Distributor Agreement

This Preferred Distributor Agreement (the "Agreement") is entered into as of November 14, 2018 (the "Effective Date") by and between Bloom Energy Corporation ("Company"), a corporation established under the laws of the State of Delaware, United States of America, and SK Engineering & Construction Co., Ltd, a corporation established under the laws of the Republic of Korea ("Distributor"). Each of Company and Distributor are a "Party" and together are the "Parties".

RECITALS

WHEREAS, Company develops, manufactures and supplies certain Products in connection with electric power facilities. Distributor is experienced and engaged in the business of engineering, procuring, and constructing electric power facilities on a turnkey basis, including the distribution of electric power generation components integrated into such facilities; and

WHEREAS, the Parties desire to set forth the terms and conditions pursuant to which Distributor shall acquire Products from Company and distribute them to Customers located in the Republic of Korea pursuant to the turnkey development, engineering, procurement, and construction of solid oxide fuel cell generation facilities, all as further described herein.

NOW, THEREFORE, in consideration of the mutual covenants, representations, warranties and agreements hereinafter set forth, and intending to be legally bound hereby, the Parties agree as follows:

AGREEMENT

1. Definitions and Rules of Interpretation.

(a) Definitions.

"Ancillary Equipment" means, collectively, the Company-Required Ancillary Equipment and the Distributor-Procured Ancillary Equipment.

"Bloom Energy Server" means the solid oxide fuel cell server manufactured by Company, consisting of the exterior box and all components inside, including without limitation the fuel cell stack and power electronics.

"Bundang Standard" means a limitation of liability in each service year equal to [***] of the annual LTSA service fee for such service year; provided, that if liability for liquidated damages in any year exceed the foregoing limitation, then such underperformance will be debited from the performance bank for the following service year.

"Business Day" means Monday through Friday, between 9am and 5pm in the location of the Project site, excluding Korean holidays.

"Claims" shall have the meaning given to it in Section 11(b) hereof.

"Commissioning Capacity Specification" means the Rated Capacity specification required for Products to pass the Commissioning Test applicable to such Products, as defined in the Purchase Order for such Products.

"Commissioning Completion" shall have the meaning given to it in Section 4(a) hereof.

"Commissioning Duration Specification" means the period of time during which the Commissioning Test for Products is performed, as defined in the Purchase Order for such Products.

"Commissioning Efficiency Specification" means the Efficiency specification required for Products to pass the Commissioning Test applicable to such Products, as defined in the Purchase Order for such Products.

"Commissioning Test" means the testing of the Products for a Project to determine whether it achieves the Commissioning Efficiency Specification when brought to the Commissioning Capacity Specification for the Commissioning Duration Specification, calculated by dividing (a) the AC electrical output (expressed in Therms) of the Products as measured at the Products' transformers, by (b) the total LHV fuel input (expressed in Therms) of the Products, as measured at the Products' Company-designated gas meter. The Commissioning Test includes the pre-power up check, fuel flow test, water system test, communication system test, and items as may be specified in a Purchase Order.

"Company Performance LD Cap" shall have the meaning given to it in Section 3(c)(ii) hereof.

"Company-Required Ancillary Equipment" means equipment for a Project, other than the Bloom Energy Server, which Distributor must purchase from Company to enable installation and operation, including without limitation equipment set forth on Exhibit A, as may be updated and delivered to Distributor from time to time.

"Company Trademarks" shall have the meaning given to it in Section 9(f) hereof.

"Confidential Information" shall mean (i) any information disclosed by Company to Distributor that is in written, graphic, machine readable or other tangible form and is marked "Confidential," "Proprietary" or in some other manner to indicate its confidential nature; (ii) oral information disclosed by Company to Distributor pursuant to this Agreement that is designated as confidential at the time of disclosure, and reduced to a writing marked as confidential and delivered by Company to Distributor within a reasonable time; (iii) any information a reasonable person in the circumstances would understand to be confidential, including without limitation non-public information contained in an RFP submission and the pricing terms of this Agreement. Notwithstanding any failure to so identify it, all non-public information embodied in the Products, including without limitation the source code underlying object code and bitmaps embodied in the Products, shall be Confidential Information.

"Customer" means any third party that obtains a Product integrated into a solid oxide fuel cell power facility in the Territory for the purpose of generating electricity, and not for further distribution or resale.

"Customer Agreement" means an agreement between a Customer and Distributor for the supply of Products. Where Distributor is the EPC Contractor for a Project, the Customer Agreement may be an EPC Agreement. Where Distributor is not the EPC Contractor for a Project, the Customer Agreement is not required to be the EPC Agreement.

"Delivery" shall have the meaning given to it in Section 7(d)(i) hereof.

[***].

"Distributor-Procured Ancillary Equipment" means equipment for a Project, not including the Bloom Energy Server and Company-Required Ancillary Equipment, which Distributor may procure from suppliers other than Company, for use in the installation of a Project.

"Documentation" means published written documentation related to the specifications, performance, installation, use or maintenance of the Products provided by Company or a Supplier under this Agreement.

"EPC" means "engineering, procurement, and construction."

"EPC Contractor" is the entity responsible for engineering, procuring and constructing each Project.

"Exception" shall mean Exceptions to Distributor ROFR and Exceptions to Company ROFR.

[***].

"Force Majeure" means any act or circumstance that delays or interferes with the affected Party's performance of its obligations in accordance with this Agreement, if such act or event is beyond the reasonable control, and not the result of the fault or negligence, of the affected Party. "Force Majeure" shall include the following acts or events:

(i) acts of God;

(ii) acts of civil or military authority, war, riot, or other civil disturbances;

(iii) fire or explosions not caused by the Products;

(iv) the elements, extraordinarily extreme weather, and acts of nature, or environmental factors including storms, floods, dust, lightning and earthquakes;

(v) failure to maintain gas pressure or gas quality requirements at the input of the Product;

(vi) a malfunction or failure of the electric grid at the applicable site of the Project (e.g. a brownout or blackout), including without limitation, the failure of the electric grid to comply with, as applicable, the standards set forth in the IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power System, as may be amended from time to time;

(vii) sabotage, vandalism, theft, accident or destruction caused by a third party (other than a contractor retainer by either Party), that materially impair either Party's ability to perform its obligations under this Agreement;

(viii) any issues caused by the addition or operation of onsite generation or electrical infrastructure not comprising the Products;

(ix) strikes, walkouts, lockouts or similar labor actions or disputes;

(x) or any other cause or causes which are beyond such Party's reasonable control; or

(xi) the inability to connect to the internet, or any other failure or unavailability of internet connectivity or availability for any cause whatsoever, including fiber optic cable cuts, interruption or failure of digital transmission links, hacker attacks.

"Force Majeure" shall not include a Party's financial inability to perform under this Agreement.

"GenCo" means a generation company owned by the government of the Republic of Korea.

"Indemnified Parties" shall have the meaning given to it in Section 11(b) hereof.

"Indemnifying Party" shall have the meaning given to it in Section 11(b) hereof.

"Initial Term" shall have the meaning given to it in Section 13(a) hereof.

"Invoice Due Date" means, for invoices issued by Company (a) prior to January 1, 2019, within sixty (60) days of receipt of such invoice; and (b) on or after January 1, 2019, within forty-five (45) days of receipt of such invoice.

"kW" means kilowatts, and "MW" means megawatts. All references to kW and MW of Projects refer to the rated output of such Projects.

[***].

"Licensed Material" means (a) the Products, and (b) all documentation delivered hereunder by Company to Distributor for use pursuant to the terms and conditions of this Agreement.

"Limited License" shall have the meaning set forth in Section 9(b) hereof.

"LTSA" means the "long term service agreement" pursuant to which O&M services for a Project are rendered.

"Major Subcontract" means any subcontract or series of subcontracts for the performance of Distributor's obligations under this Agreement or under a Customer Agreement, having an aggregate value in excess of fifty percent (50%) of the engineering and construction budget for such Project.

"Market" means Projects in the Territory that are not subject to an Exception.

"Marketing Materials" shall have the meaning set forth in Section 9(h) hereof.

"Non-EPC Project" shall have the meaning given to it in Section 3(d)(iii) hereof.

"Notice of Commissioning Completion" shall have the meaning given to it in Section 4(a) hereof.

"O&M" shall have the meaning given to it in Section 3(a) hereof.

"Performance Insurance" means a policy of insurance covering Company's non-payment of amounts due to Customer pursuant to a LTSA in connection with a refund, repurchase, or similar consideration for passage of title and possession to the applicable Products to Company.

"Permitted Subcontractor" means a subcontractor set forth on Exhibit B, or otherwise approved by Company in writing, not to be unreasonable withheld, delayed, or denied; provided, however, that in no event shall a competitor or potential competitor to Company be a Permitted Subcontractor".

"Pre-Commissioning Completion Warranty" shall have the meaning given to it in Section 4(b)(i) hereof.

"Pre-Commissioning Completion Warranty Period" shall have the meaning given to it in Section 4(b)(i) hereof.

"Product" means any of the Bloom Energy Server and Company-Required Ancillary Equipment and any Software, Documentation or Updates provided pursuant to this Agreement.

"Product Price" shall have the meaning given to it in Section 6(a)(i) hereof.

"Prohibited Activities" shall have the meaning set forth in Section 9(c) hereof.

"Project" means a fuel cell energy generation project composed of Bloom Energy Servers, together with applicable Company-Required Ancillary Equipment and Distributor-Procured Ancillary Equipment.

"Purchase Order" shall have the meaning given to it in Section 7(b) hereof.

"Rated Capacity" means the aggregate rated capacity (expressed in kW) of the Bloom Energy Servers included in the Project, as set forth in a duly-accepted Purchase Order.

"Renewal Term" shall have the meaning given to it in Section 13(a) hereof.

"ROFR" shall have the meaning given to it in Section 2(a) hereof.

"ROFR Exercise Period" shall have the meaning given to it in Section 2(a) hereof.

"Standard Performance Commitments" means:

(a) Performance Guarantee (i.e. remedy is payment of liquidated damages): (i) [***] lifetime cumulative total output factor with banking (pre-transformer); (ii) if required by Customer, [***] lifetime cumulative LHV efficiency with banking (pre-transformer); and

(b) Performance Warranty (i.e. remedy is repair, replacement, repurchase): (i) [***] lifetime cumulative total output factor with banking (pre-transformer); (ii) if required by Customer, [***] lifetime cumulative LHV efficiency with banking (pre-transformer).

"Software" means the software provided by Company or a Supplier pursuant to this Agreement.

"Suppliers" means any providers of third party software that is included with Software provided under this Agreement.

"Technical Advisor" shall have the meaning give to it in Section 4(c) hereof.

"Term" shall have the meaning given to it in Section 13(a) hereof.

"Territory" means the Republic of Korea.

"Third Party Software" has the meaning given to it in Section 9(d) hereof.

"Updates" means any corrections, enhancements, bug fixes or other modifications for the Products provided to Distributor by Company pursuant to this Agreement.

"Warranty Correction" shall have the meaning given to it in Section 4(b)(ii) hereof.

(b) Rules of Interpretation. Unless a clear contrary intention appears, (i) the singular includes the plural and vice versa; (ii) "include" or "including" means including without limiting the generality of the description preceding such term; (iii) the word "or" is not exclusive, unless otherwise expressly stated; (iv) headings are provided for the convenience of the parties and shall not affect the interpretation of a provision; (v) all references to days or time shall mean such day or time in California, U.S.A., except as may be expressly set forth in a Purchase Order; (vi) all references to money shall be in United States dollars; except as may be expressly set forth in a Purchase Order; and (vii) all references to "Korea" refer to the Republic of Korea. References to sections, exhibits and schedules are, unless otherwise indicated, references to sections, exhibits, and schedules to this Agreement. References to an exhibit shall mean the referenced exhibit and any sub-exhibits, schedules, sub-parts, components or attachments included therewith. References to a section shall mean the referenced

section and all sub-sections thereof. All exhibits attached to this Agreement are incorporated herein by this reference and made a part hereof for all purposes.

2. ROFR; Appointment of Distributor.

(a) Mutual Right of First Refusal. Distributor shall have the right of first refusal during the Term (the "Distributor ROFR") to serve as the distributor of the Products for any fuel cell generation project in the Territory that is not subject to an Exception to Distributor ROFR. Company shall have the right of first refusal during the Term (the "Company ROFR"; and each of Distributor ROFR and Company ROFR, a "ROFR") to serve as Distributor's supplier of the generation equipment for any fuel cell generation project in the Territory that is not subject to an Exception to Company ROFR. Each ROFR is exercisable within ninety (90) days ("ROFR Exercise Period") from the date that Company or Distributor, as applicable, delivers written notice to the counterparty, requesting such counterparty's determination of whether it will exercise its ROFR for such project. When a Party requests the counterparty's determination of whether it will exercise its ROFR for a project, then notwithstanding whether the ROFR Exercise Period for such project is terminated pursuant to Section 2(e)(ii)(1)b, the Party requesting such determination shall continue to serve as the supplier or distributor (as applicable to Company or Distributor, respectively) for such project.

(b)A Party's ROFR will automatically terminate, and the counterparty proposing such fuel cell generation project may determine whether to pursue such project, by itself or with third parties, without the involvement of Party holding such ROFR, if the Party holding such ROFR does not deliver written notice within the ROFR Exercise Period that it wishes to exercise right to serve as supplier or distributor (as applicable to Company and Distributor, respectively), for such project. The ROFR is not a right to require that Company or Distributor consummate any particular sales or service transaction for any particular Project. Company and Distributor may each, in its sole discretion and for any reason, determine whether to pursue or consummate any Project and enter into a Purchase Order. If a Party chooses not to pursue or consummate any transaction for which it has exercised the ROFR within the ROFR Exercise Period, such Party shall not thereafter pursue or consummate such Project by itself or with a third party. For the avoidance of doubt, a Party shall have no right with respect to any project for which it does not exercise its right to serve as supplier or distributor (as applicable to Company and Distributor, respectively) within the ROFR Exercise Period.

(c) Exceptions to Right of First Refusal.

(i) During the Initial Term of this Agreement:

(1) The following projects are exempt from Distributor's ROFR (each, an "Exception to Distributor ROFR"):

a. [***].

b. [***];

c. [***];

d. [***].

(2) The following projects are exempt from Company's ROFR (each, an "Exception to Company ROFR"):

a. [***].

b. [***]:

i. [***]

ii. [***]

iii. [***]

iv. [***]

v. [***]

vi. [***]

vii. [***]

viii. [***]

(ii) Prior to the commencement of any Renewal Term, the Parties shall mutually agree in writing regarding the Exceptions to Distributor ROFR and Exceptions to Company ROFR to be applicable during such Renewal Term.

(d) Material Breach. If either Party offers a project that subject to the counterparty's ROFR (and is not subject to an applicable Exception) herein without first sending a notice to the Party holding such ROFR in accordance with Section 2(a), it shall constitute a material breach of the Agreement, but may be cured by revoking such offer to the third party within five (5) days of written notice thereof and thereafter proceeding in accordance with ROFR procedures set forth in Section 2(a).

(e) Annual Targets and ROFR.

(i) Business Plan. The Parties shall make best efforts to attain the following annual targets of executed Purchase Orders, effective during the following years:

2018: [***]

2019: [***]

2020: [***]

2021: [***]

(ii) Business Plan Shortfall.

(1) Annual Target. If the Parties do not execute Purchase Orders meeting the annual target in 2018, 2019, or 2020 is not met and such shortfall:

a. Is less than [***] of the total target for such year, then the MW shortfall shall be added to the following year's target; or

b. Is [***] or greater of the total target for such year, either Party will have the unilateral right (but no obligation), exercisable annually within sixty (60) days of the expiration of the prior calendar year, to terminate the ROFR Exercise Period without liability; provided, however, that (1) the Parties shall work together in good faith to achieve the annual target for the following year (including such shortfall amount); (2) the MW capacity of each Purchase Order executed during such year shall first be applied to such shortfall amount, prior to being applied to the annual target (prior to the rollover of such shortfall amount); and (3) if the shortfall amount is remedied during such year, then the ROFR Exercise Period shall be automatically reinstated without necessity of action by either Party, effective as of the date on which the shortfall amount has been remedied.

(iii) Business Plan Surplus. If the Parties execute Purchase Orders in excess of the annual target in 2018, 2019, or 2020, then the MW surplus shall be subtracted from the following year's target.

(iv) GenCo RFP. If Distributor delivers written notice to Company requesting Company's determination of whether it will exercise its ROFR for a GenCo RFP, and is selected as the winner of such GenCo RFP but Company chooses not to execute a Purchase Order for such GenCo RFP, then the MW capacity of the transaction shall be applied to the annual target for such calendar year as though a Purchase Order had been executed; provided, however, that notwithstanding the foregoing, such MW capacity shall not be applied for such calendar year if the reason that Company chose not to exercise its ROFR or execute a Purchase Order arose from either (a) risks to protection of Company's intellectual property; or (b) [***].

(v) 2021. If the Parties renew for the Renewal Term, 2021 shall be subject to the terms and conditions set forth in Section 2(e)(ii), shall receive the same treatment as 2018, 2019 and 2020 receive with respect to shortfall and surplus relative to the annual targets. If the Parties do not renew for the Renewal Term, there shall be no liability for either Party arising out of the failure to achieve the annual target in 2021.

(vi) Appointment.

(1) Subject to the terms and conditions of this Agreement, Company hereby appoints Distributor, for the Term, as an authorized distributor of the Products from Company for redistribution to Customers pursuant to each Project in the Territory for which Distributor has exercised the ROFR pursuant to Section 2(a). This appointment is nonexclusive with respect to Projects outside the Territory, Projects subject to an Exception, Projects for which Distributor has not exercised the ROFR pursuant to Section 2(a), and Projects for which contracted sales occur following the expiration of the Term or earlier termination of this Agreement in accordance with its terms. In such cases, Company reserves the right to license and distribute the Products directly and through any other remarketers, dealers, distributors, sales representatives or other channels and for any purposes. In such cases, Company reserves the right to market and sell upgrades for the Products and/or other products or services to any Customer that has previously obtained a licensed Product from Distributor. Subject to the terms and conditions of this Agreement, Distributor will be free to establish its own pricing for Products.

(2) Each license of Products from Company to Distributor pursuant to this Agreement shall be subject to, and governed by, this Agreement, including without limitation the

intellectual property provisions set forth in Section 9, and the export and import restrictions set forth in forth in Section 14. Company shall not be bound by, and specifically objects to, any term, condition or other provision which is different from or in addition to the provisions of this Agreement and which is submitted by Distributor in any order, receipt, acceptance, confirmation, correspondence or otherwise, unless Company specifically agrees to such provision in a writing signed by Company.

3. Resale Terms and Conditions.

(a) Intellectual Property.

(i) Distributor shall comply with all intellectual property limitations set forth in Section 9.

(ii) Distributor shall make best efforts to ensure that the intellectual property provisions of the Customer Agreement (and, if applicable, related RFP bid materials) comply with the following requirements, and shall receive Company's written consent prior to executing a Customer Agreement (which may occur as early as submission of RFP bid materials) which does not comply with such provisions: (a) Company shall have the exclusive right to conduct all monitoring, control, operations, and maintenance activities ("O&M") for each Project during the life thereof; (b) Customer and all third parties shall otherwise comply with the Prohibited Activities; (c) Company shall have a right of re-purchase upon abandonment, or attempted sale or transfer of the Products or Project; and (d) pursuant to the terms and conditions of the LTSA, Company shall have a right of re-purchase upon termination of the LTSA for any reason.

(b) Customer Agreement.

(i) Responsibility. Any Customer Agreement consummated with respect to a Project shall be by and between Distributor and Customer, and Company shall have no obligation or liability thereunder. As between Distributor and Customer, Distributor shall be responsible for the performance of all obligations thereunder, including obligations with respect to development, permitting, engineering, procurement, and construction. Distributor shall not subcontract any obligation under the Customer Agreement or this Agreement unless such subcontractor is a Permitted Subcontractor; provided, however, that any and all Major Subcontracts shall be subject to Company's prior written consent. Distributor shall be solely responsible for the engagement, management and payment of its subcontractors, and shall be solely responsible for the acts, omissions or defaults of its subcontractors and their agents, representatives and employees.

(ii) Terms and Conditions. In the event that Customer of a Project imposes unfavorable terms and conditions in its Customer Agreement that conflicts with or deviates from this Agreement, both Parties shall use best efforts to negotiate with Customer the terms and conditions of the Customer Agreement as the equal level with this Agreement.

(iii) EPC Contractor. The Parties intend that Distributor will be the EPC Contractor for any Project for which it has exercised the ROFR. However, if Company provides its prior written consent regarding the third party chosen to serve as the EPC Contractor for such Project (a Project for which Distributor is not the EPC Contractor, a "Non-EPC Project") and the terms of such relationship, then Distributor may nonetheless exercise the ROFR for such Project and the Parties may execute a Purchase Order for such Project. All activities of any EPC Contractor (including without limitation Distributor) shall be subject to the intellectual property provisions set forth in Section 3(a), and Company (and not Distributor or any third party) shall perform all activities which

require opening a Bloom Energy Server, including without limitation in connection with the commissioning of each Project. For the avoidance of doubt, EPC Contractor pricing shall be taken into consideration by Distributor when Distributor determines whether to exercise a ROFR, and the pricing set forth in Section 5 shall not be subject to change arising out of costs and expenses related to the EPC Contractor of a Project.

(iv) Buy-Down LDs. Liquidated damages commonly referred to as "buy-down liquidated damages" and assessed prospectively for future performance of a Project based upon performance during commercial operation of such Project (e.g. one (1) year or two (2) years of commercial operation), do not form part of Company's offer for any Project. If buy-down liquidated damages are required by the rules of procurement for any project (e.g. the rules of a request for proposals), then the Parties may, by mutual written agreement, decide in writing to pursue such Project upon terms and conditions with respect to such buy-down liquidated damages which are mutually acceptable to the Parties; provided, that neither Party shall be under any obligation to enter into any such agreement.

(v) Performance Bond. If a Customer Agreement requires Distributor to post a "performance bond" or equivalent financial security to secure performance of the Delivery of the Products and the passage of the Commissioning Test (a "Performance Bond"), the Parties shall set forth in the applicable Purchase Order the requirements of such financial security, and the Parties' respective responsibility therefor; provided, that in no event shall Company's responsibility for posting a Performance Bond exceed the lesser of (a) the pro-rata percentage of the contract price under such Customer Agreement attributable to the supply of the Products; and (b) one hundred percent (100%) of the Product Price of such Products as set forth in the Purchase Order therefor. The contractual liability of Company for failure to timely Deliver the Products or for the Products to pass the Commissioning Test, together with the draw conditions for a Performance Bond posted by Company, shall be set forth in the Purchase Order. The Parties shall make best efforts to negotiate in the Customer Agreement to minimize exposure related to such liabilities.

(c)LTSA.

(i) LTSA Negotiation. Company shall be solely authorized and responsible for all marketing (including bid materials), negotiation, and execution of any LTSA for any Project that is, or is proposed to be, subject to a Customer Agreement. Distributor may not, without Company's prior written consent, make any representation on Customer's behalf with respect to any LTSA, including without limitation representation regarding pricing, performance commitments, or limitations of liability. Distributor shall have the opportunity to participate in LTSA negotiations with Company and Customer for any LTSA that is subject to [***].

(ii) Company Performance Liquidated Damages. Notwithstanding anything to the contrary in this Agreement, Company's total liability for performance liquidated damages for any Project that is not a Non-EPC Project, for the term of the LTSA of such Project, shall in no event exceed [***] (the foregoing, collectively, the "Company Performance LD Cap").

(d) [***]

(i) [***].

(ii) [***].

(iii) [***].

(iv) [***].

4. Commissioning and Pre-Commissioning Completion Warranty.

(a) Commissioning. Company shall perform the Commissioning Test at the earliest practicable date after the Products are mechanically complete as a complete Project (or, if such Project is in phases, a complete phase of such Project), and have all governmental authorizations and third party consents required to bring such Project (or phase thereof, as applicable) to operational power levels and perform the Commissioning Test. Upon passage of the Commissioning Test, Company shall deliver to Distributor a notice of commissioning completion, substantially in the form set forth in Exhibit D ("Notice of Commissioning Completion" and the date of commencement of operations set forth therein, the "Commissioning Completion Date"). If the Products fails to pass the Commissioning Test, Distributor may submit a claim under the Pre-Commissioning Completion Warranty to Company for verification pursuant to Section 4(b).

(b) Pre-Commissioning Completion Warranty.

(i) Pre-Commissioning Completion Warranty. Subject to Section 4(b)(iii), Company warrants to Distributor, that, during the period commencing upon Delivery and continuing until the achievement of Commissioning of the Products for a Project ("Pre-Commissioning Completion Warranty Period"), such Products shall be free from physical defects in design, materials and workmanship that prevent such Products from achieving Commissioning Completion (the "Pre-Commissioning Completion Warranty"). The Pre-Commissioning Completion Warranty is not transferable to any third person, including a Customer, without Company's prior written consent.

(ii) Warranty Correction. If Products fail to satisfy the Pre-Commissioning Completion Warranty during the Pre- Commissioning Completion Warranty Period, Distributor shall make a written warranty claim to Company and Company shall verify whether such warranty claim is valid. Company shall either repair or replace (as determined by Company) the applicable Products (a "Warranty Correction") and re-perform the Commissioning Test within times acceptable to Customer; provided, that if Company has commenced and thereafter diligently pursued such Warranty Correction, but the nature of the specific remedy cannot be performed at the time requested by Customer, then such period shall conform to terms and conditions under Purchase Order . Company may, as it deems necessary or appropriate, re-perform a Warranty Correction within such period (as may be extended pursuant to the foregoing sentence). Upon completion of the Warranty Correction, Company shall notify Distributor in writing, and Commissioning Test shall be re-performed. Breach of the Pre-Commissioning Completion Warranty shall not be extended to the Pre-Commissioning Completion Warranty Period after the achievement of Commissioning Completion. If Company fails to provide a Warranty Correction within the time required by the Customer Agreement, and as a result Customer rejects the Products, then Company shall pay to Distributor, as Distributor's sole and exclusive remedy, an amount equal to [***].

(iii) Exclusions. The Pre-Commissioning Completion Warranty shall not cover any obligations on the part of Company to the extent caused by or arising from (a) the Products affected by loss, vandalism, or other third-party actions or omissions after Delivery; (b) any failure relating to failure of natural gas supply to conform to the required specifications; (c) removal of any safety device by any person other than Company, (d) accidents, abuse, improper third party testing,

(e) Force Majeure Events, or (f) commissioning, operation, repair, opening or accessing, or modification of the Products by anyone other than Company or Company's authorized agents.

(c) Technical Advisor. During the period of construction, Company shall make reasonably available an employee of Company or its affiliates during business hours (telephonically, via email, or at the Site, as may be mutually agreed and coordinated) to serve as technical advisor regarding Company technology (a "Technical Advisor"). Such Technical Advisor shall provide interpretive advice to Distributor regarding the technical specifications, installation manual, and other Product-specific information. Such advice shall exclude any supervision, management, or evaluation of Distributor's or its contractors' personnel, agents or subcontractors and work relating thereto, and any responsibility for planning, scheduling or management of Distributor's work (including in connection with development or permitting).

5. Post-COD Warranty Matters. The Parties expect that, following Commissioning Completion of the Products (a) the Products shall not be within the scope of Distributor's warranty to a Customer, as set forth in the Customer Agreement; and (b) Company's performance commitments and financial responsibility under the LTSA do not include responsibility for damaged, defective, or otherwise underperforming Ancillary Equipment. If the foregoing expectation is not fulfilled in any Customer Agreement or LTSA, the Purchase Order for such Products shall reflect the Parties' respective responsibility to the other Party, if any, for the damaged, defective, or otherwise underperforming Products or Ancillary Equipment.

6. Prices and Payment.

(a) Product Pricing. Pricing applicable to Products subject to this Agreement (the "Product Price") shall be as follows:

(i) Bloom Energy Server [***].

(ii) Company-Required Ancillary Equipment: [***].

(b) [***].

(c) Invoicing. Company shall invoice Distributor the Product Price applicable to the Products set forth in a Purchase Order as follows:

(i) Deposit: [***] invoiced upon receipt of a Purchase Order.

(ii) Delivery: [***] invoiced upon Delivery of such Products.

(d) Payment. Except as expressly provided in this Agreement, payment obligations are non-cancellable, and payments made hereunder shall be irrevocable and non-refundable. Distributor shall pay all invoices by no later than the Invoice Due Date. If Distributor fails to make any payment when due, Company may, at its option and without prejudice to its other remedies, suspend performance, defer delivery or seek remedies available at law or in equity without liability to Company.

(e) Taxes. Taxes, duties or excises are not included in the fees charged for the Product, except as may be set forth in the Incoterm applicable to the shipment of such Product, as set forth in Section 7(d)(i)(1). If Company pays any taxes, duties or excises which are not included in the fees charged for the Product, Company shall itemize such taxes, duties or excises as a separate item on its invoices to Distributor, and Distributor shall reimburse Company for such taxes, duties or excises; provided, that

Distributor shall not be required to make any such reimbursement if it provides a valid tax exemption certificate to Company prior to Delivery of such Product.

(f) Late Payments. Interest shall accrue daily on amounts which are not paid by the Party owing such amount when due pursuant to this Agreement at a rate equal to the lesser of [***] per year or the highest rate permitted by Applicable Law (if less than [***] per year). In the event that any payment to Company due hereunder is overdue, Company reserves the right to suspend performance until such delinquency is corrected.

7. Supply of Products.

(a) Forecasts. During the Term, Distributor shall provide Company with a good faith rolling twelve (12) month forecast, updated quarterly, for units of the Products (in kW) to be sold by Distributor hereunder during each month in such twelve (12) month period.

(b) Purchase Orders. Distributor shall initiate purchases under this Agreement by submitting written purchase orders to Company substantially in the form set forth as Exhibit C (each, a "Purchase Order"). Purchase Orders shall state unit quantities, unit descriptions, requested delivery dates, shipping instructions, and other matters, which shall in each case be subject to the Parties' mutual agreement. Neither Party shall be obligated to execute a Purchase Order, and no Purchase Order shall be binding upon either Party until signed by each of Distributor and Company. Once executed by both Parties, Purchase Orders shall be non-cancelable for any reason other than due to a Force Majeure event that causes the cancellation of such Project or in Distributor's participation in such Project.

(c) Packing. All Products shipped by Company to Distributor under this Agreement shall be packaged in accordance with instructions set forth in the applicable Purchase Order.

(d) Title; Risk of Loss; Acceptance; and Shipment.

(i) Title, Risk of Loss, and Acceptance.

(1) Delivery. Title, risk of loss, and acceptance of the Products shall pass from Company to Distributor upon Delivery. "Delivery" shall mean:

a. First 21 MW in 2018: The first 21 MW shipped in 2018 shall pass to Distributor upon delivery at the named port of lading for shipment in accordance with Section 7(d)(ii) in the United States of America.

b. After 21 MW in 2018: All other shipments shall pass to Distributor upon delivery at the named port of unlading in the Republic of Korea, prior to unloading.

(2) Risk of Loss. For the avoidance of doubt, in the event of a conflict between Section 7(d)(i)(1) and the Incoterm specified in Section 7(d)(ii)(1) with respect to risk of loss, the risk of loss specified in Section 7(d)(i)(1) shall control over the Incoterm and shall govern the Parties' respective liabilities. As between Company and Distributor, the insurance of Distributor shall be responsible for insurable losses occurring on or after passage of risk of loss from Company to Distributor pursuant to Section 7(d)(i)(1).

(ii) Shipment Terms.

(1) All Products shall be shipped as follows:

a. First 21 MW in 2018: The first 21 MW shipped in 2018 shall be shipped Cost & Freight (CFR) (Incoterms 2010) to named port of unlading in the Republic of Korea.

b. After 21 MW in 2018: All other shipments shall be shipped Delivered At Terminal (DAT) (Incoterms 2010) to named port of unlading the Republic of Korea.

(2) Company shall pay for the cost of shipping up to the port of unlading in the Republic of Korea, and Distributor shall be the importer of record and shall responsible for all costs of import, including customs clearance, destination fees, duties, taxes, on-carrier fees, and other charges at and from the port of entry in the Republic of Korea. Regarding marine insurance, where Company ships CFR, Distributor shall pay the costs of insurance during shipment, and where Company ships DAT, Company shall pay the costs of insurance during shipment.

(e) Product Updates. Company shall have the right to make design modifications to Products from time to time and in its sole discretion, at any time prior to the execution of a Purchase Order for such Product. Following execution of a Purchase Order for a Product, Company shall not, without the prior written consent of Distributor, make design modifications to the Products set forth in such Purchase Order that represent a material change to such Products' form, fit, or function.

8. Marketing and Administration.

(a) Independent Contractor. Distributor is an independent contractor, not an employee, agent, or representative of Company. Distributor is not authorized to, and will not attempt to, create or assume any obligation or liability, express or implied, in the name of or otherwise on behalf of Company. Without limiting the generality of the foregoing, Distributor will not enter into any contract, agreement or other commitment, make any warranty or guaranty, or incur any obligation or liability in the name or otherwise on behalf of Company. This Agreement will not be interpreted or construed as creating or evidencing any agency, franchise, association, joint venture or partnership among the Parties.

(b) Marketing. Distributor shall market, promote, and distribute the Products in the Territory as Company's "preferred partner" in the Territory and as otherwise mutually agreed by the Parties. These efforts may include without limitation the use of mailings, advertising, seminars, and other customary marketing techniques. Company will provide support to Distributor for Market development activities, and may choose to engage in marketing activities.

(c) Feedback. Distributor shall provide Company with prompt written notification of any comments or complaints about the Products that are made by Customers, and of any problems with the Products or their use that Distributor becomes aware of. Such written notification shall be the property of Company, and shall be considered to be part of Company's Confidential Information.

(d) Audit. Company shall have the right to inspect and audit Distributor's marketing, use, deployment, and exploitation of the Products for compliance with the terms and conditions of this Agreement.

(e) Force Majeure. Neither Party shall be liable under any circumstance, nor be deemed to be in breach of this Agreement, for any delay or failure in performance or interruption of service resulting from Force Majeure. In the case of a delay due to an event of Force Majeure, affected deadlines shall be extended by a period of time equal to the time lost due to Force Majeure.

9. Ownership.

(a) Proprietary Rights. Company or its Suppliers own all right, title and interest (including without limitation all intellectual property rights), in and to the Products and any modifications or improvements thereto, whether or not made by Company. Distributor acknowledges that the licenses granted under this Agreement do not provide Distributor with title to or ownership of any intellectual property rights contained in or related to the Products, but only a right of limited use under the terms and conditions of this Agreement. Except as expressly set forth in Section 3 and this Section 9, Company reserves all rights and grants Distributor no licenses of any kind hereunder. Distributor hereby assigns to Company all information, including but not limited to feedback or suggestions, provided to Company with respect to the Products, and such information shall be deemed Confidential Information.

(b) License Grant. Subject to the terms and conditions of this Agreement, Company grants to Distributor a limited, non-exclusive, non-transferable, royalty-free license to market, sell and offer to sell the Products to Customers within the Market during the Term, including use of all Licensed Material for such purpose (the "Limited License").

(c) Restrictions. The Limited License does not include any rights to, and Distributor shall not (and shall not permit any Customer to) conduct any of the following activities (such activities, the "Prohibited Activities"):

(i) Disassemble, decompile or "unlock", translate, decode or otherwise reverse engineer, or attempt in any manner to reconstruct or discover, any part of the Products or other Licensed Materials;

(ii) Modify, adapt, enhance, or create a derivative work of the Products or other Licensed Materials. Only Company shall have the right to modify, adapt, enhance or create a derivative work of the Products or any other Licensed Material;

(iii) Use the Licensed Materials to develop or manufacture a product that is similar to Products or other Licensed Materials;

(iv) Open the covering, access the interior, or give others the opportunity to open the covering or access the interior, of any Products. Only Company and its authorized representatives may open or access such interior;

(v) Copy or remove any proprietary notices, labels, or marks on Licensed Materials without Company's prior written consent;

(vi) Except as expressly permitted by this Agreement, assign, sublicense, distribute, rent, lease, loan, sell, transfer, network, publish, make available, or permit any third party access to the Products or other Licensed Materials;

(vii) Develop intellectual property, or help any third party develop intellectual property, which could be asserted against Company's intellectual property in the Products or other Licensed Materials;

(viii) File any action (or directly or indirectly support or be involved in any such action) in any court or agency which in any way attack the validity, enforceability, ownership, or protectability of any intellectual property of Company (including trade secrets), Confidential Information of Company, or other proprietary Company information; or

(ix) Cause or permit any third party to do any of the foregoing.

(d) Software. Distributor acknowledges that the Software may contain or be provided with copyrighted software of Company's Suppliers as identified in associated documentation or other printed materials ("Third Party Software") which is obtained under a license from such Suppliers. All third party licensors and Suppliers retain all right, title and interest in and to such Third Party Software and all copies thereof, including all copyright and other intellectual property rights. Distributor's use and distribution of any Third Party Software shall be subject to and Distributor shall comply and cause all Customers to comply with the applicable restrictions and other terms and conditions set forth (i) in this Agreement or the Documentation applicable to the Software and (ii) in such Third Party Software documentation or printed materials.

(e) Proprietary Notices. Distributor will ensure that all copies of the Products will incorporate copyright and other proprietary notices in the same manner that Company incorporates such notices in the Products or in any manner reasonably requested by Company. Distributor will not remove any copyright or other proprietary notices incorporated on or in the Products by Company.

(f) Use of Trademarks. During the term of this Agreement, Distributor may advertise the Products under the trademarks, marks, and trade names that Company may provide from time to time (the "Company Trademarks"). Distributor understands that Company has applied for applicable federal and state registration of certain of its trademarks and agrees, upon Company's request, to so indicate on the Products and in any advertisement, promotional materials or other documents that contain the Products' names. Nothing herein will grant to Distributor any right, title or interest in Company Trademarks. At no time during or after the term of this Agreement will Distributor challenge or assist others to challenge Company Trademarks or the registration thereof or attempt to register any trademarks, marks or trade names confusingly similar to those of Company. Distributor will follow reasonable trademark usage guidelines communicated by Company, will provide examples of its usage of Company Trademarks upon request by Company, and will promptly correct any deviations from such guidelines upon notification by Company of such deviations.

(g) Use of Trade Names. Distributor will present and promote the sale of the Products fairly. Distributor may represent itself as an authorized Distributor of Company and use Company's product names in Distributor's advertising and promotional media provided (i) that Distributor conspicuously indicates in all such media that such names are trademarks of Company and (ii) that Distributor submits all such media to Company for prior approval and satisfies the requirements set forth in paragraph (c) above. Upon termination of this Agreement for any reason, Distributor will immediately cease all use of the Products' names and Company Trademarks and, at Distributor's election, destroy or deliver to Company all materials in Distributor's control or possession which bear such names and trademarks, including any sales literature. Distributor will not challenge any intellectual property rights claimed by Company in such trademarks.

(h) Use of Marketing Materials. Company may provide Distributor with marketing materials, such as marketing literature, Company logos, and/or artwork, as Company may determine in its sole discretion (the "Marketing Materials"). Company hereby grants Distributor permission to use, reproduce, translate, and distribute the Marketing Materials solely in connection with Distributor's distribution of Products hereunder. Distributor hereby assigns to Company all intellectual property rights in any and all translations of the Marketing Materials. Upon termination of this Agreement for any reason, Distributor will immediately cease all use of the Marketing Materials and, at Distributor's election, destroy or deliver to Company all Marketing Materials in Distributor's control or possession.

10. Confidentiality.

(a) Confidential Information. During the period this Agreement is in effect and for ten (10) years thereafter, the Parties shall hold Confidential Information of the other Party in confidence and use the same degree of care, but in no event less than reasonable care, to avoid disclosure of Confidential Information as it uses with respect to its own confidential and proprietary information of similar type and importance. The receiving Party agrees to disclose Confidential Information only to its employees or other agents who have a bona fide need to know solely to perform its obligations or exercise its rights hereunder, who will each agree to comply with this section. The receiving Party shall not sell, license, sublicense, publish, display, distribute, disclose or otherwise make available the Confidential Information to any third party nor use such information except as authorized by this Agreement. The receiving Party shall immediately notify the disclosing Party of the unauthorized disclosure or use of the Products or Confidential Information and to assist Company in remedying such unauthorized use or disclosure. It is further understood and agreed that any breach of this Section 10 or Section 9(c) is a material breach of this Agreement and any such breach would cause irreparable harm to the disclosing Party, entitling the disclosing Party to injunctive relief in addition to all other remedies available at equity or law. Notwithstanding the above, non-public information contained in an RFP and the prices hereunder shall be Confidential Information of both Parties.

(b) Exceptions. Notwithstanding the above, receiving Party shall be under no obligation not to disclose any information that it can prove: (i) was in the public domain at the time it was disclosed or has entered the public domain through no fault of the receiving Party; (ii) was known to the receiving Party, without restriction, at the time of disclosure, as demonstrated by files in existence at the time of disclosure; (iii) is disclosed with the prior written approval of the disclosing Party; (v) becomes known to receiving Party, without restriction, from a source other than the disclosing Party without breach of this Agreement by receiving Party; or (vi) is disclosed pursuant to the order or requirement of a court, administrative agency, other governmental body, or the requirements of a public stock exchange; provided, however, that receiving Party shall provide prompt notice thereof to disclosing Party to enable disclosing Party to seek a protective order or otherwise prevent or restrict such disclosure.

11. Indemnification.

(a) Intellectual Property Indemnification.

(i) Company shall indemnify, defend and hold Distributor harmless against any third party action (including a Customer) alleging that the Products infringe any valid U.S. patent or copyright, and Company shall pay all settlements entered into, and all final judgments and costs (including reasonable attorneys' fees) awarded against Distributor in connection with such action, provided Distributor (i) notifies Company promptly in writing of any such action, (ii) gives Company exclusive control and authority over the defense or settlement of such action, (iii) does not enter into any settlement or compromise of any such action without the prior written consent of Company and (iv) provides all reasonable assistance to Company at the request and expense of Company. If any Licensed Material becomes, or in the opinion of Company may become, the subject of an infringement claim, Company may, at its option, (i) procure for Distributor the right to continue using such Licensed Material, (ii) modify or replace such Licensed Material with substantially equivalent non-infringing products, or (iii) require the return of such Licensed Material and refund to Distributor a pro-rata portion of the Product Price of such Licensed Material on a depreciated basis, without depreciation for the first year after achievement of Commissioning, and thereafter on a straight line amortization of the Product Price equal to the term of the LTSA (e.g. nineteen year amortization for

a twenty-year LTSA); with the provision of remedies pursuant to this Section 11(a)(i) being the sole and exclusive remedies for an infringement claim subject to this Section 11(a).

(ii) Company shall have no indemnification obligations with respect to any third party action alleging that (i) the use of any Products, or any part of them, in combination with products or technology not supplied by Company, or (ii) any service or other process utilizing any Products, infringes any third party intellectual property right, and in such event Distributor will indemnify, defend and hold harmless Company, and its officers, directors and employees, against any such action, and Distributor will pay all settlements entered into, and all final judgments and costs (including reasonable attorneys' fees) awarded against such party in connection with such action, provided Company (i) notifies Distributor promptly in writing of any such action, (ii) gives Distributor exclusive control and authority over the defense or settlement of such action, (iii) does not enter into any settlement or compromise of any such action without Distributor's prior written consent and (iv) provides all reasonable assistance to Distributor at the request and expense of Distributor.

(b) Mutual Indemnification. Except as otherwise set forth in this Agreement, each Party (such Party providing indemnification, the "Indemnifying Party") shall indemnify, defend and hold harmless the other Party and its affiliates, and each of their respective directors, officers, members, shareholders, employees and contractors (collectively, the "Indemnified Parties"), from and against all third party (not including affiliates, third party beneficiaries, or persons with an equity or security interest the Indemnified Party or its assets) claims, demands, actions, causes of action, and proceedings ("Claims") for injury or death of any person or loss or damage to property, in each case to the extent caused by the Indemnifying Party's gross negligence or willful misconduct; provided, that the Indemnified Party shall provide the Indemnifying Party prompt notice of any such Claim, authorize the Indemnifying Party to settle or defend such Claim, provide the Indemnifying Party control of the defense of such Claim, and assist such defense (at the Indemnifying Party's reasonable expense) upon request of the Indemnifying Party. Notwithstanding the foregoing, an Indemnifying Party shall not be required to indemnify, defend or hold harmless for any Claim arising out of the negligence, willful misconduct or breach of this Agreement by the Indemnified Party. The provision of remedies pursuant to this Section 11(b) are the sole and exclusive remedies for an indemnification claim subject to this Section 11(b).

12. Limited Warranties. EXCEPT AS EXPRESSLY PROVIDED PURSUANT TO THE PRE-COMMISSIONING COMPLETION WARRANTY SET FORTH IN SECTION 4(b) AND SECTION 5 HEREIN, THE PRODUCTS ARE PROVIDED "AS IS", AND COMPANY AND ITS SUPPLIERS MAKE NO WARRANTY, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, WITH RESPECT TO PRODUCTS OR ANY PART THEREOF, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF TITLE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THOSE ARISING FROM COURSE OF PERFORMANCE, DEALING, USAGE OR TRADE. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, NEITHER COMPANY NOR ANY OF ITS SUPPLIERS WARRANT THAT THE PRODUCTS OR ANY PART THEREOF WILL MEET DISTRIBUTOR'S REQUIREMENTS OR BE UNINTERRUPTED, OR ERROR-FREE, OR THAT ANY ERRORS IN THE PRODUCTS WILL BE CORRECTED.

13. Term and Termination.

(a) The term of this Agreement shall commence on the Effective Date and terminate on December 31st, 2021 (the "Initial Term"). Thereafter, this Agreement shall be renewed automatically

for three (3) year renewal terms (each a "Renewal Term"), unless not extended by either Party pursuant to the following sentence (the Initial Term and any Renewal Term, together, the "Term"). Commencing six (6) months prior to the expiration of the Initial Term or any Renewal Term, the Parties shall discuss whether to extend the Term for the immediately succeeding Renewal Term, upon mutually-agreed terms; provided, that if the annual target established pursuant to Section 2(e) for the concluding year has been satisfied, neither Party may prevent the Term for extending for the immediately succeeding Renewal Term. During each such six (6) month period, neither Party may terminate this Agreement. Subject to the foregoing, if the annual target for the concluding year has not been satisfied, then upon the conclusion of such six (6) month period, either Party may, without liability, terminate the Agreement by written notice to the other Party, with such termination to become effective upon the expiration of such calendar year (without renewal).

(b) Termination for Cause. Except as set forth in the last sentence of this Section 13(b), if either Party defaults in the performance of any material provision of this Agreement, then the non-defaulting Party may give written notice to the defaulting Party that if the default is not cured within thirty (30) days the Agreement will be terminated. If the non-defaulting Party gives such notice and the default is not cured during the thirty-day period, then the Agreement shall automatically terminate at the end of that period. Notwithstanding the foregoing, if Distributor breaches the provisions of Section 9 hereof, then the Company shall be entitled to terminate this Agreement effective immediately upon delivery of written notice to Distributor.

(c)Termination for Insolvency and Related Events. This Agreement shall terminate, without notice, (i) upon the institution by or against either Party of insolvency, receivership or bankruptcy proceedings or any other proceedings for the settlement of such Party's debts, (ii) upon either Party's making an assignment for the benefit of creditors, or (iii) upon either Party's dissolution or ceasing to do business.

(d) Effect of Termination. Purchase orders and services contracted during the Term shall survive the expiration or earlier termination of the Agreement. Subject to the foregoing, if this Agreement is terminated, then all of Distributor's rights and licenses with respect to the Products shall terminate, provided that each Customer license granted in accordance with this Agreement shall survive in accordance with its terms, subject to termination for default in accordance with its terms. Upon termination, Distributor must destroy all any and all promotional literature, price quotations, order forms, data, information and other items received by Distributor from Company in connection with this Agreement.

(e) Limitation of Liability. In the event of termination by either Party in accordance with any of the provisions of this Agreement, neither Party shall be liable to the other, because of such termination, for compensation, reimbursement or damages on account of the loss of prospective profits or anticipated sales or on account of expenditures, inventory, investments, leases or commitments in connection with the business or goodwill of either Party. Termination shall not, however, relieve either Party of any obligations incurred prior to the termination, including, without limitation, i) the obligation of Distributor to pay Company for Products purchased prior to such termination or ii) the obligation of Company to provide purchased Products to Distributor.

(f) Survival of Certain Terms. The provisions of Sections 1 and Sections 9-13, and Section 17-18 of this Agreement, and all payment obligations incurred during the term of this Agreement, shall survive the expiration or termination of this Agreement for any reason. All other rights and obligations of the parties shall cease upon termination of this Agreement.

14. Import and Export Requirements. Distributor shall, at its own expense, pay all import and export licenses and permits, customs charges and duty fees, if any, and shall take all other actions, if any, required to accomplish the export and import of the Products purchased by Distributor. The Products are specifically subject to U.S. Export Administration Regulations. Distributor agrees to strictly comply with all export, re-export and import restrictions and regulations of the Department of Commerce or other agency or authority of the United States or the Territory or other applicable countries, and not to transfer, or authorize the transfer of, directly or indirectly, the Products or any direct product thereof to a prohibited country or otherwise in violation of any such restrictions or regulations. Distributor agrees to ensure that the Products provided hereunder are only installed in the Territory. Distributor's failure to comply with this Section is a material breach of this Agreement.

15. Compliance with Laws; Business Practices.

(a)Each Party shall comply with, and ensure that its contractors and employees comply with, all laws and regulations of the United States and all other jurisdictions in which such Party carries out activities under or related to this Agreement, including laws prohibiting bribery and other unethical business practices. Without limitation, the Parties' performance of this Agreement shall comply with including, but not limited to the Foreign Corrupt Practices Act of 1977 of the United States and, as applicable, the Improper Solicitation and Graft Act (Kim Young Ran Act), and, all other applicable anti-corruption legal requirements and with all applicable embargo and other economic sanctions legal requirements.

(b)Notwithstanding any provisions herein to the contrary, each Party shall indemnify, defend and hold harmless the other Party and its officers, directors, Affiliates, employees and representatives from and against any claim, loss, damages, liability, expense or cost of whatever nature, including reasonable attorneys' fees and costs, arising out of or related to such Party's or its employee's or agent's failure to comply with applicable law as provided in this Section 15(a). The obligation of each Party under this Section 15 shall survive the termination or expiration of this Agreement. Any breach or threatened breach of Section 15(a) by a Party shall give the other Party the immediate right to terminate this Agreement.

16. Export Compliance. Distributor shall not export, re-export, resell, ship or divert directly or indirectly any portion of the Products or other technical information supplied hereunder in any form, including without limitation any technical data furnished hereunder, to any country except as the laws of the United States of America expressly permit, or for which an export license or other governmental approval is required, without first obtaining such license or approval. This obligation shall survive any termination of this Agreement.

17. Limitation of Liability.

(a) NEITHER COMPANY NOR DISTRIBUTOR SHALL BE LIABLE TO THE OTHER BY REASON OF LOSS OF PROFITS, OR FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, PUNITIVE OR INDIRECT DAMAGES (OR DIRECT DAMAGES IN THE CASE OF THE SUPPLIERS) ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, TORT (INCLUDING WITHOUT LIMITATION NEGLIGENCE), STRICT LIABILITY OR OTHERWISE ARISING OUT OF OR UNDER THIS AGREEMENT OR ANY USE OR INABILITY TO USE THE PRODUCTS OR EQUIPMENT, OR FOR BREACH OF THIS AGREEMENT.EACH PARTIES' TOTAL LIABILITY ARISING OUT OF OR UNDER THIS AGREEMENT, OR FOR BREACH OF THIS AGREEMENT, WHETHER IN CONTRACT, TORT (INCLUDING WITHOUT LIMITATION NEGLIGENCE), STRICT LIABILITY OR

OTHERWISE, SHALL NOT EXCEED FOR ANY PURCHASE ORDER THE CONTRACT AMOUNT PURSUANT TO SUCH PURCHASE ORDER.

(b). Notwithstanding the limitations of liability set forth in Section 17(a), such limitations of liability shall not apply to or limit in anyway any liability of Distributor or Company (i) arising from fraud or willful misconduct or gross negligence of such Party; or (ii) in respect of any obligation of such Party to indemnify for third party claims pursuant to Section 11 (including without limitation in respect of costs and expense incurred by the indemnified Party in respect of such third party claim)

18. General.

(a) Governing Law. This Agreement is governed and interpreted in accordance with the laws of the State of California and the United States of America without reference to conflicts of laws principles and excluding the United Nations Convention on Contracts for the Sale of Goods.

(b) Dispute Resolution.

(i) All controversies, claims, disputes or difference in connection with this Agreement shall be finally settled by arbitration administered by the Korean Commercial Arbitration Board ("KCAB") in accordance with the International Arbitration Rules of the KCAB. The venue of arbitration proceedings and seat of arbitration shall be Seoul, the Republic of Korea.

(ii) The number of arbitrators shall be three, with Company and Distributor nominating one arbitrator each and the two arbitrators shall jointly nominate the third arbitrator.

(c) Assignment. Distributor shall not transfer, assign or delegate this Agreement or any rights or obligations hereunder, whether voluntarily, by operation of law or otherwise, without the prior written consent of Company. Subject to the foregoing, the terms and conditions of this Agreement shall be binding upon and inure to the benefit of the parties to it and their respective heirs, successors, assigns and legal representatives.

(d) Merger, Modification and Waiver. This Agreement constitutes the entire agreement between Company and Distributor with respect to the subject matter hereof, and merges all prior negotiations and drafts of the parties with regard thereto. No modification of or amendment to this Agreement, nor any waiver of any rights under this Agreement, by Company shall be effective unless in writing. If there is any conflict between the terms and conditions of this Agreement and the terms and conditions of any Purchase Order or other document, the terms and conditions of this Agreement shall prevail; provided, that if a specific provision of a Purchase Order expressly states that it prevails in the event of conflict with the terms and conditions of this Agreement, then such specific provision of such Purchase Order shall prevail. The waiver of one breach or default or any delay in exercising any rights shall not constitute a waiver of any subsequent breach or default.

(e) Severability. If any of the provisions of this Agreement is held by a court of competent jurisdiction to be invalid or unenforceable under any applicable statute or rule of law, it shall be replaced with the valid provision that most closely reflects the intent of the parties and the remaining provisions shall continue in full force and effect.

(f) Notices. All notices permitted or required under this Agreement shall be in writing and shall be delivered in person; by courier, overnight delivery, or confirmed fax; or mailed by first class, registered or certified mail, postage prepaid, to the address of the Party specified in this Agreement or

such address as either Party may specify in writing. Such notice shall be deemed to have been given upon receipt.

Company	**Distributor**
Bloom Energy Corporation	SK Engineering & Construction Co., Ltd.
1299 Orleans Drive	32, Insadong 7-gil, Jongno-gu
Sunnyvale, California 94089	Seoul 03149, Korea
Attn: General Counsel	Attn: WangJae (Justin) Lee

(g) Counterparts. This Agreement may be executed in any number of separate counterparts and delivered by electronic means (including in Portable Document Format (.PDF) and digital signature formats such as DocuSign), each of which shall be deemed an original and all of which together shall constitute one instrument.

(h) Advice of Legal Counsel. Each Party acknowledges and represents that, in executing this Agreement, it has had the opportunity to seek advice as to its legal rights from legal counsel and that the person signing on its behalf has read and understood all of the terms and provisions of this Agreement. This Agreement shall not be construed against any Party by reason of the drafting or preparation thereof.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives.

COMPANY	**DISTRIBUTOR**
BLOOM ENERGY CORPORATION	**SK ENGINEERING & CONSTRUCTION CO., LTD.**
By: _____	By: _____
Name: KR Sridhar	Name: Jaehyun (Jason) Ahn
Title: Chairman & CEO	Title: President & CEO
Date: November 14, 2018	Date: November 14, 2018

EXHIBIT A
to Preferred Distributor Agreement

COMPANY-REQUIRED ANCILLARY EQUIPMENT

1. Exhaust kit (only for stacked units)
2. Interface frame, stacked (only for stacked units)
3. Mechanical installation kit
4. Electrical installation kit
5. Plumbing installation kit
6. Telemetry cabinet
7. Water Distribution Module
8. Water Distribution Module installation kit
9. Cosmetic side panels
10. Cosmetic rear panels (if systems not installed back-to-back)
11. Forklift cover panels
12. Varmint protection kit
13. Signage kit
14. Installation alignment fixture

EXHIBIT B
to Preferred Distributor Agreement

PERMITTED SUBCONTRACTORS

[***]:

- [***]
- [***]
- [***]

[***]:

- [***]
- [***]
- [***]

EXHIBIT C
to Preferred Distributor Agreement

FORM OF PURCHASE ORDER

[To be agreed in writing by the Parties.]

[*Signatures Follow*]

IN WITNESS WHEREOF, the Parties have caused this Purchase Order to be executed by their duly authorized representatives.

PROPOSED:	**ACCEPTED:**
SK ENGINEERING & CONSTRUCTION CO., LTD.	**BLOOM ENERGY CORPORATION**
Signature:	Signature:
_____	_____
Name:	Name:
_____	_____
Title:	Title:
_____	_____
Date:	Date:
_____	_____

EXHIBIT D
to Preferred Distributor Agreement

FORM OF NOTICE OF COMMISSIONING COMPLETION

Installation Information and Notice of Acceptance

Customer: {Insert Contract Customer Name}

Customer Address: {Insert Site Address}
{Insert City, State, Zip}

Site Address: {Insert Site Name (Site ID)}
{Insert Site Address}
{Insert City, State, Zip}

Bloom Energy Sales Order Number: _____

Installation Information

Product	Serial Number	Shipment Date	Installation Complete Date	Full Power Date

Acceptance Details

By signing below, Bloom Energy represents that the Product in aggregate at the installation Site has passed the following Commissioning tests:

Test Name	Date	Status
Electrical Tie In Connection		Complete
Commissioning Complete		Complete
System Startup		Complete
Permission to Operate		Complete
Full Power Date		Complete

Bloom Energy Corporation

_____
Signature

_____
Name

_____
Date

[***] Certain confidential information contained in this document, marked by brackets has been omitted and filed separately with Securities and Exchange Commission pursuant to Rule 406 of the Securities Act of 1933, as amended.

EXECUTION VERSION

THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT

between

BLOOM ENERGY CORPORATION

as Seller

and

2016 ESA PROJECT COMPANY, LLC

as Buyer

dated as of October 24, 2016
amended and restated as of June 26, 2017
second amended and restated as of March 16, 2018
third amended and restated as of September 26, 2018

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EXHIBITS

SCHEDULES

THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT

This THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT (this "Agreement"), dated as of October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (the "Agreement Date"), is entered into by and between BLOOM ENERGY CORPORATION, a Delaware corporation ("Seller"), and 2016 ESA PROJECT COMPANY, LLC, a Delaware limited liability company ("Buyer"). Seller and Buyer are referred to in this Agreement individually, as a "Party" and, collectively, as the "Parties".

RECITALS

WHEREAS, Seller is in the business of designing, constructing and installing on-site solid oxide fuel cell power generating systems;

WHEREAS, Buyer is a company formed at the direction of Seller for the purpose of purchasing and owning Bloom Systems for the generation of electricity and sale of electricity generated by the Bloom Systems;

WHEREAS, Buyer desires to purchase, and Seller desires to sell, Bloom Systems to be installed in certain Facilities in connection with PPAs entered into by Buyer when and as the conditions to such installation are met as provided in this Agreement;

WHEREAS, to induce Buyer to purchase the Bloom Systems, Seller also has agreed to provide certain operations and maintenance services to or on behalf of Buyer subject to the terms and conditions of this Agreement;

WHEREAS, Buyer and Seller previously entered into that certain Purchase, Use and Maintenance Agreement, dated as of October 24, 2016, as amended by (a) that certain Amendment No. 1 to Purchase, Use and Maintenance Agreement, dated as of February 15, 2017, and (b) that certain Amendment No. 2 to Purchase, Use and Maintenance Agreement, dated as of April 28, 2017 (collectively, the "Original PUMA");

WHEREAS, Buyer and Seller amended and restated the Original PUMA in its entirety pursuant to that certain First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 26, 2017, as amended by that certain Amendment No. 1 to First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 11, 2017 (collectively, the "First A&R PUMA");

WHEREAS, Buyer and Seller amended and restated the First A&R PUMA in its entirety pursuant to that certain Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of March 16, 2018, as amended by (a) that certain Amendment No. 1 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of April 26, 2018, (b) that certain Amendment No. 2 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 22, 2018, and (c) that certain Amendment No. 3 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 30, 2018 (collectively, the "Second A&R PUMA"); and

WHEREAS, Buyer and Seller now wish to amend and restate the Second A&R PUMA in its entirety with this Agreement as of the Agreement Date, as further set forth in Section 14.17.

NOW, THEREFORE, in consideration of the mutual covenants, representations, warranties and agreements hereinafter set forth, and intending to be legally bound hereby, the Parties agree as follows:

AGREEMENT

ARTICLE I.
DEFINITIONS

Section 1.1 Definitions. As used in this Agreement, capitalized terms not otherwise defined shall have the meanings set forth below:

"Actual kWh" means the actual energy output in kWh produced by a Facility and measured by the Facility Meter, and, subject to adjustment for meter defects pursuant to a PPA, where appropriate in the context of this Agreement, aggregated together with the actual energy output of other Facilities.

"Actual Revenues" is defined in Section 4.12(j)(i).

"Adjusted Facility Recorded Adjustments" is defined in Section 4.12(f).

"Affiliate" of any Person means a Person that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with, the Person specified, provided that notwithstanding anything in this Agreement to the contrary, Seller is not an Affiliate of Buyer. For purposes of this Agreement, the direct or indirect ownership of over fifty percent (50%) of the outstanding voting securities of an entity, or the right to receive over fifty percent (50%) of the profits or earnings of an entity shall be deemed to constitute control. Such other relationships as in fact results in actual control over the management, business and affairs of an entity, shall also be deemed to constitute control.

"Agreement" is defined in the preamble.

"Agreement Date" is defined in the preamble.

"Amendment No. 2 to 2nd A&R PUMA" means that certain Amendment No. 2 to Second Amended and Restated Purchase, Use and Maintenance Agreement, by and between Buyer and Seller dated as of June 22, 2018.

"AOM" means an auxiliary output module, to be included in certain of the Facilities.

"Appraisal Procedure" means within fifteen (15) days of a Party invoking the procedure described in this definition Buyer and Seller shall engage a Qualified Appraiser, mutually acceptable to them, to conclusively determine within fifteen (15) days after appointment the Fair Market Value of a Facility.

"Approved LDC" means, with respect to each Site, the local natural gas distribution company serving the PPA Customer at such Site. For the avoidance of doubt, natural gas supplied by any Approved LDC shall be deemed to satisfy Seller's requirements regarding the quality and composition of natural gas supplied to the Bloom Systems sold to Buyer hereunder.

"Assignment Agreements" means the assignment and assumption agreements listed on Exhibit I hereto, as the same may be updated from time to time by the mutual agreement of the Parties.

"AT&T PPA" has the meaning set forth in Annex D.

"Bankruptcy" or "Bankrupt" as to any Person means the filing of a petition for relief as to any such Person as debtor or bankrupt under the Bankruptcy Code or like provision of law (except if such petition is contested by such Person and has been dismissed within sixty (60) days); insolvency of such Person as finally determined by a court proceeding; filing by such Person of a petition or application to accomplish the same or for the appointment of a receiver or a trustee for such Person or a substantial part of its Assets; commencement of any proceedings relating to such Person under any other reorganization, arrangement, insolvency, adjustment of debt or liquidation law of any jurisdiction, whether now in existence or hereinafter in effect, either by such Person or by another, provided, that, if such proceeding is commenced by another, such Person indicates its approval of such proceeding, consents thereto or acquiesces therein, or such proceeding is contested by such Person and has not been finally dismissed within sixty (60) days.

"Bankruptcy Laws" is defined in Section 11.3.

"Base Case Model" means the economic model titled "PPA VI Financial Model Q3 18 Purchase Price Adjustment 9-19-18 FINAL (TO SEND).xlsx" exchanged between the Parties on or about September 19, 2018.

"Battery Solution" means an integrated battery solution, manufactured and supplied by the Battery Solution Manufacturer as described in the specifications set forth on Exhibit A, to be included in certain of the Facilities.

"Battery Solution Manufacturer" means PowerSecure, Inc., or such replacement manufacturer as the Parties may mutually agree in writing.

"Battery Solution Supply Agreement" means that certain Supply Agreement between PowerSecure, Inc. and Seller, dated as of April 28, 2017.

"Bill of Sale" means a bill of sale in substantially the form attached hereto as Exhibit B.

"Bloom Component Defect" means any defect in parts and components supplied by Seller or any of its Affiliates to the Battery Solution Manufacturer that are used to manufacture any Battery Solution that (i) was not caused by the Battery Solution Manufacturer's misuse, including but not limited to, improper testing, assembly, and mishandling of such parts and components and (ii) results in a failure of such parts and components to perform in

accordance with any warranty(ies) provided by Seller to the Battery Solution Manufacturer.

"Bloom Systems" means all on-site solid oxide fuel cell power generating systems capable of being powered by natural gas designed, constructed and installed by Seller, which will be installed in the Facilities, and "Bloom System" means each such system.

"BOF" means, for each Site, the balance of facility items included in each Facility including, as applicable, Electrical Interconnection Facilities, the natural gas supply facilities, the water supply facilities, the data communications facilities, the foundations for the Bloom Systems and any other facilities and equipment ancillary to the Bloom Systems and installed in connection with the Facility at each Site and all other things ancillary to the Facility and required on or in the vicinity of the Site which are necessary to achieve Commencement of Operations at each such Site or which are otherwise required by the applicable PPA or Site License for such Site.

"BOF Work" is defined in Section 3.3(a).

"Business Day" means a day other than a Saturday, Sunday or other day on which banks in New York, New York, or San Francisco, California, are authorized or required to close.

"Buyer" is defined in the preamble.

"Buyer Default" is defined in Section 12.2.

"Buyer Indemnitee" is defined in Section 13.3(a).

"Buyer Manager" is defined in Section 4.8(b).

"Calculation Date" is defined in Section 4.12(a).

"Calculation Period" is defined in Section 4.12(a).

"Calendar Quarter" means each period of three months ending on March 31, June 30, September 30 and December 31.

"Capacity Warranty" means the Performance Warranty or the Performance Guaranty, as applicable.

"Claiming Party" is defined in Section 12.6.

"Code" means the Internal Revenue Code of 1986, as amended.

"Commencement of Operations" means, with respect to any Facility, the completion and the performance of all of the following activities:

(a) all Bloom Systems and related materials comprising such Facility required to complete all BOF Work have been Delivered;

(b) such Facility has been installed at the location specified in the applicable Site License and Placed in Service;

(c) (i) such Facility (A) has been attached to the load at the applicable Site, (B) is producing power at [***] of the aggregate System Capacity of all Bloom Systems included in such Facility, and (C) is operating at or above the Minimum Efficiency Level, and (ii) Seller has provided Buyer with evidence reasonably satisfactory to Buyer of each of the foregoing;

(d) Seller has (i) performed and successfully completed all necessary acts under the applicable Interconnection Agreement (including performance testing), and (ii) obtained permission from the applicable Person granting Buyer permission to interconnect such Facility with the distribution or transmission facilities of the Transmitting Utility;

(e) Seller shall have delivered Seller's Certificate of Installation to Buyer; and

(f) Seller shall have delivered to Buyer each of the Seller Deliverables indicated on Exhibit C as items for delivery prior to or at Commencement of Operations.

"Commencement of Operations Date Deadline" means December 31, 2019.

"Components" means any tangible materials and spare or replacement parts reasonably required for the construction, installation, commissioning, operation, maintenance and repair of a Facility.

"Confidential Information" is defined in Section 10.1.

"CoreSite PPA" has the meaning set forth in Annex D.

"DDP (Incoterms 2010)" means Delivered Duty Paid (DDP) as such term is used in the International Rules for the Interpretation of Trade Terms (identified as "INCOTERMS® 2010") as prepared by the International Chamber of Commerce.

"Delivery" means for each Bloom System, the physical delivery of such Bloom System to its Site. Following such Delivery, the Bloom System shall have been "Delivered."

"Delivery Date" means for each Bloom System, the date of Delivery.

"Deposit Milestone Requirements" means, for a Tranche, that:

(a) Buyer has received approval of Site plans and single-line drawings from one or more PPA Customers for Facilities with aggregate System Capacity equal to or greater than the aggregate System Capacity of Facilities included in such Tranche (and all other Tranches for which Seller previously delivered a Seller's Deposit Milestone Certificate to Buyer);

(b) Seller has received all materials required for the commencement of fabrication of Bloom Systems with aggregate System Capacity equal to or greater than the aggregate System Capacity of Facilities included in such Tranche, and all materials required as of such time to allow for completion of such fabrication in order to achieve Commencement of Operations of such Facilities (and all Facilities included in all other Tranches for which Seller previously delivered a Seller's Deposit Milestone Certificate to Buyer) within ninety (90) days; and

(c) Seller shall have delivered Seller's Deposit Milestone Certificate to Buyer, certifying the satisfaction of requirements (a) and (b) hereof.

"Documentation" means Bloom System documentation for a Facility, including testing, engineering, specifications, and operations and maintenance manuals, Training Materials, drawings, reports, standards, schematics, directions, samples and patterns, including any such Documentation required to be delivered prior to Commencement of Operations under Section 3.4(a)(iv).

"Efficiency" means the quotient of E/F, where (i) E = the electricity produced by the applicable Facility, measured in BTUs (British Thermal Units) at an assumed conversion rate of 3,412 BTUs per kWh, and (ii) F = the fuel consumed by such Facility, measured in BTUs on a lower heating value basis as determined by the mass flow controller included in the applicable Facility.

"Efficiency Warranty" is defined in Section 5.3.

"Efficiency Warranty Period" means each calendar month following the Commencement of Operations of a Facility (or, in the case of the calendar month in which Commencement of Operations occurred, the portion of such calendar month commencing on the date such Facility achieved Commencement of Operations), but shall exclude any period when such Facility (i) was subject to a Force Majeure Event, (ii) was not delivering Energy because of a failure to perform by the applicable PPA Customer, except to the extent caused or contributed to by Seller or its employees, agents, subcontractors or representatives, (iii) was required by a Legal Requirement (which for this purpose shall include any utility requirement) to be disconnected from the distribution or transmission facilities of the Transmitting Utility or otherwise required not to deliver Energy as the result of a Legal Requirement or action by or a directive from the applicable Transmitting Utility with respect to such Facility (e.g., due to a grid event), or (iv) was impacted by a failure of the Battery Solution to perform in accordance with any warranty(ies) provided by the Battery Solution Manufacturer (excluding any such failure of the Battery Solution that is attributable to a Bloom Component Defect), except, in each case, to the extent caused or contributed to by Seller or its employees, agents, subcontractors and representatives.

"Electrical Interconnection Facilities" means the equipment and facilities required to safely and reliably interconnect a Facility to the transmission system of the Transmitting Utility, including the collection system between each Bloom System, transformers and all switching, metering, communications, control and safety equipment, including the facilities described in any applicable Interconnection Agreement.

"Electronic Data Room" means the electronic dataroom known as "Project Bloom PPA" established by the Seller and made available to the Investor.

"Energy" means three-phase, 60-cycle alternating current electric energy constituting the Actual kWh.

"Environmental Law" means any Legal Requirement which pertains to health, safety, any Hazardous Material, or the environment (including but not limited to ground or air or water or noise pollution or contamination, and underground or above ground tanks) and shall include without limitation, the Solid Waste Disposal Act, 42 U.S.C. § 6901 et seq.; the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986; the Hazardous Materials Transportation Act, 49 U.S.C. § 1801 et seq.; the Federal Water Pollution Control Act, 33 U.S.C. § 1251 et seq.; the Clean Air Act, 42 U.S.C. § 7401 et seq.; the Toxic Substances Control Act, 15 U.S.C. § 2601 et seq.; the Safe Drinking Water Act, 42 U.S.C. § 300f et seq.; and any other state or federal environmental statutes, and all rules, regulations, orders and decrees now or hereafter promulgated under any of the foregoing, as any of the foregoing now exist or may be changed or amended or come into effect in the future.

"Environmental Requirements" means any Environmental Law, agreement or restriction (including but not limited to any condition or requirement imposed by any insurance or surety company), as the same now exists or may be changed or amended or come into effect in the future, which pertains to health, safety, any Hazardous Material, or the environment.

"EPC Services" is defined in Section 2.1.

"Equinix" means the PPA Customer pursuant to the Equinix PPA.

"Equinix Indemnity Agreement" means that certain letter agreement between Buyer and Equinix regarding the Equinix Landlord Consents, dated as of June 27, 2018.

"Equinix Landlord Consent(s)" means each of (i) that certain Letter Agreement between Equinix and Digital 1350 Duane, LLC regarding consent to alterations to allow installation of the Facility to be installed at 1350 Duane Avenue, Santa Clara, CA, dated as of July 25, 2018; and (ii) that certain Letter Agreement between Equinix and Digital 444 Toyama, LLC regarding consent to alterations to allow installation of the Facility to be installed at 444 Toyama Drive, Sunnyvale, CA, dated as of July 25, 2018.

"Equinix PPA" has the meaning set forth in Annex D, which, for clarity, includes the Equinix Indemnity Agreement and the Equinix Landlord Consents.

"Extended Warranty Period" means, with respect to each Facility, the period commencing on the first (1st) anniversary of the date such Facility achieves Commencement of Operations and ending on the twentieth (20th) anniversary of the date of Commencement of Operations of such Facility unless (a)(i) the applicable PPA has been renewed or extended beyond such twentieth (20th) anniversary and (ii) Buyer and Seller have agreed

on an appropriate amendment to this Agreement to provide for an extension of the term of the Extended Warranty Period for the applicable Facility(ies), in which case the Extended Warranty Period shall end on the date on which such PPA expires or terminates.

"Extension Agreement" is defined in Section 4.1(c).

"Facility" means, collectively, the Bloom Systems and the BOF at a particular Site. For the avoidance of doubt, "Facility" includes, where applicable, any AOM(s), Battery Solution, Low Pressure Gas Booster(s) and/or UPM(s) installed in connection with the Bloom Systems at a particular Site. Where a PPA provides for multiple "Phases" at a Site (i.e., discrete installations of Bloom Systems to be installed behind a single Transmitting Utility meter), each Phase shall be understood to be a separate "Facility" for purposes of this Agreement.

"Facility Meter" means (a) with respect to a Site that has a single Phase, the revenue quality electricity generation meter to be located as at the metering point (the proposed location of which is to be identified in the applicable Interconnection Agreement) and approved by the Transmitting Utility, which shall register all Energy produced by a Facility and delivered to the Interconnection Point, and (b) with respect to a Site that has multiple Phases, the revenue quality electricity generation meter that is dedicated to measuring the energy output of the applicable Phase to be located as at the metering point (the proposed location of which is to be identified in the applicable Interconnection Agreement) and approved by the Transmitting Utility, which shall register all Energy produced by the applicable Phase and delivered to the Interconnection Point.

"Facility Recorded Adjustments" is defined in Section 4.12(f).

"Facility Services" is defined in Section 4.1.

"Facility Purchase Conditions" means for a relevant Facility that the Facility has not been Placed in Service (including specifically because the events described in clauses (2), (3) and (4) of the definition of Placed in Service have not occurred), but that (a) the events described in clause (1) of the definition of Placed in Service have occurred, and (b) all of Seller's obligations under Section 3.3(a)(ii) have been performed.

"Facility Services Warranty" is defined in Section 5.1.

"Fair Market Value" means, with respect to any Facility, the price at which such asset would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or to sell, and both having reasonable knowledge of the relevant facts, and specifically with respect to the Facility or any portion thereof, as determined consistently with Section 4.05 of Revenue Procedure 2007-65.

"FedEx PPA" has the meaning set forth in Annex D.

"FERC" means the Federal Energy Regulatory Commission and any successor.

"Final Determination" means the earliest to occur of (a) the date on which a decision, judgment, decree or other order has been issued by any court of competent jurisdiction, which decision, judgment, decree, or other order has become final (i.e., all allowable appeals requested by the parties to the action have been exhausted or the time for instituting an appeal has expired or lapsed), (b) the date on which the Internal Revenue Service has reached a final administrative determination which, whether by law or agreement, is not subject to appeal, or (c) the date on which the time for instituting a claim, appeal, contest, or challenge to any notice or action by the Internal Revenue Service has expired or lapsed. Notwithstanding anything to the contrary herein, no party shall be required to pursue any appeal or action if the party has determined in good faith that such an appeal or action would not have a reasonable possibility of success, in which case any decision, decree, order, or administrative determination that is the subject of such opinion shall be deemed to be a Final Determination.

"First A&R PUMA" is defined in the recitals.

"Force Majeure Event" means any event or circumstance that (a) prevents a Party from performing its obligations under this Agreement; (b) was not reasonably foreseeable by such Party; (c) was not within the reasonable control of, or the result of the negligence of such Party or a breach of this Agreement by such Party; and (d) such Party is unable to reasonably mitigate, avoid or cause to be avoided with the exercise of due diligence. "Force Majeure Event" may include, provided that the conditions in (a) through (d) in the foregoing sentence are met, inability of Buyer to obtain or maintain market-based rate authority from FERC to operate any Facility (except to the extent such inability results from a Buyer-initiated change in Buyer's business from that contemplated as of the Original PUMA Agreement Date and/or the assets or operations of any entity considered by FERC to be affiliated with Buyer), a failure or interruption of performance due to an act of God, civil or military authority, war, civil disturbances, terrorist activities, fire, explosions, the external power delivery system (a/k/a the grid) being out of the required specifications or totally failing (a/k/a brownout or blackout), or electric grid curtailment. Notwithstanding the foregoing, Force Majeure Event does not include the lack of economic resources of a Party, Seller's failure to design and construct the Facilities so as to meet the respective warranties hereunder, or the supply of natural gas from any source other than an Approved LDC or any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier that results in a termination of the Equinix PPA based on a breach of Section 7.1(h)(i) of the Equinix PPA. If an event or circumstance gives rise to a Force Majeure Event as defined herein under this Agreement, but such event or circumstance does not also constitute a 'Force Majeure Event' as defined under the applicable PPA or Site License (depending on which Facilities are affected), then for the purposes of any rights and obligations of the parties under this Agreement that relate to corresponding rights or obligations under such PPA or Site License such event or circumstance will not constitute a Force Majeure Event under this Agreement.

"Fundamental Representation" means the representations provided in Section 8.1(b), Section 8.1(h), Section 8.1(k) and Section 8.1(o).

"GAAP" means United States generally accepted accounting principles consistently applied.

"Governmental Approvals" means (a) any authorizations, consents, approvals, licenses, rulings, permits, tariffs, rates, certifications, variances, orders, judgments, decrees by or with a relevant Governmental Authority and (b) any required notice to, any declaration of, or with, or any registration or filing by, or with, any relevant Governmental Authority.

"Governmental Authority" means any foreign, federal, state, local or other governmental, regulatory or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, court, tribunal, arbitrating body or other governmental authority.

"Guaranty Bank Determination Date" is defined in Section 4.12(f).

"Hazardous Material" means and includes those elements or compounds which are contained or regulated as a hazardous substance, toxic pollutant, pesticide, air pollutant, or as defined in any Environmental Law, order or decree of any Governmental Authority for the protection of human health, water, safety or the environment or is otherwise included in the definition of "Hazardous Materials," "Hazardous Substance" or a similar term in a PPA or a Site License.

"Home Depot PPA" has the meaning set forth in Annex D.

"Indemnifiable Loss" means any claim, demand, suit, loss, liability, damage (including any losses arising as a result of the loss or recapture of any ITC), obligation, payment, fine, cost or expense (including the cost and expense of any investigation, action, suit, proceeding, assessment, judgment, settlement or compromise relating thereto and reasonable attorneys' fees and reasonable disbursements in connection therewith).

"Indemnified Party" is defined in Section 13.4.

"Indemnifying Party" is defined in Section 13.4.

"Indexed PPA" is defined in Section 4.11.

"Indexed PPA Tolling Rate Guaranty" is defined in Section 4.12(a).

"Intellectual Property" shall mean any or all of the following and all rights therein, whether arising under the laws of the United States or any other jurisdiction (a) all patents and patent applications (and all reissues, divisions, re-examinations, renewals, extensions, provisionals, continuations and continuations-in-part thereof), patent disclosures and inventions (whether patentable or not); (b) all trade secrets, know-how and confidential and proprietary information; (c) all copyrights and copyrightable works (including computer programs) and registrations and applications therefor and any renewals, modifications and extensions thereof; (d) all moral and economic rights of authors and inventors, however denominated, throughout the world; (e) unregistered and registered design rights and any registrations and applications for registration thereof; (f) trademarks,

service marks, trade names, service names, brand names, trade dress, logos, slogans, corporate names, trade styles, domain names and other source or business identifiers, whether registered or not, together with all applications therefor and all extensions and renewals thereof and all goodwill associated therewith; (g) semiconductor chip "mask" works, and registrations and applications for registration thereof, (h) database rights; (i) all other forms of intellectual property, including waivable or assignable rights of publicity or moral rights; and (j) any similar, corresponding or equivalent rights to any of the foregoing anywhere in the world.

"Interconnection Agreement" means an agreement between the PPA Customer (or Buyer (as required)) and the applicable Transmitting Utility regarding interconnection of a Facility to the transmission or distribution system of such Transmitting Utility.

"Interconnection Point" means, with respect to each Facility, the point at which title and risk of loss with respect to the electricity produced by such Facility passes to the applicable PPA Customer.

"Investor" means Southern PowerSecure Holdings, Inc.

"Invoice Due Date" means the date specified on a Payment Notice duly delivered by Seller to Buyer for the Milestones achieved by certain Tranches and/or Facilities in a given calendar month.

"IP License" is defined in Section 11.1.

"IRS" means the Internal Revenue Service.

"ITC" means an investment tax credit pursuant to Code Sections 38(b)(1), 46 and 48(a).

"Knowledge" means (a) as to any Person other than a natural person, the actual knowledge (including any knowledge which would reasonably have been obtained after due inquiry) of such Person and its managers, directors officers and employees who have responsibility for the transactions contemplated by this Agreement, and (b) in respect of any Person who is a natural Person, the actual knowledge (including any knowledge which would reasonably have been obtained after due inquiry) of such Person.

"kW" means kilowatt.

"kWh" means kilowatt-hour.

"Legal Requirement" means any law, statute, act, decree, ordinance, rule, directive (to the extent having the force of law), tariff, order, treaty, code or regulation or any interpretation of any of the foregoing, as enacted, issued or promulgated by any Governmental Authority, NERC, any Person that NERC has delegated its authority to under the Federal Power Act or any Person that operates an interstate electric transmission system, including all amendments, modifications, extensions, replacements or re-enactments thereof, in each case applicable to or binding upon such Person or any of its properties or to which such Person or any of its property is subject.

"Liens" means any lien, security interest, mortgage, hypothecation, encumbrance or other restriction on title or property interest.

"Low-Pressure Gas Booster" means a component designed to increase the pressure of natural gas supplied to a Facility by the applicable local natural gas distribution company serving an applicable PPA Customer at the applicable Site to the level required for the ordinary operation of such Facility.

"LREC Contract(s)" means each of the South Windsor LREC Contract and the Middletown LREC Contract.

"Maintenance Specification Log" is defined in Section 6.1(a).

"Major Service Provider" is defined in Section 4.6.

"Managers" means Operations Manager and Buyer Manager.

"Manufacturer's Warranty Period" means, for each Facility, the period beginning on the date the applicable Facility achieves the requirements of subsections (a), (c) and (d) of the definition of "Commencement of Operations" and ending on the first (1st) anniversary of the date of Commencement of Operations of such Facility.

"Material Adverse Effect" means, for any Person or Facility, as applicable, any change, effect or occurrence that, individually or in the aggregate, is or could reasonably be expected to be materially adverse to (a) the business, earnings, assets, results of operations, property or condition (financial or otherwise) of such Person or Facility, as applicable, (b) the validity or enforceability of any Transaction Document, any applicable PPA, any applicable Site License or the transactions contemplated by this Agreement, or (c) any Person's (including any PPA Customer's) ability to perform its obligations under any Transaction Document, any applicable PPA, any applicable Site License (including any material adverse effect on any customer that has, or could reasonably be expected to have, a material adverse impact on such customer's ability to fully perform under any applicable PPA).

"Maximum Liability" means, with respect to each Party, One Million Dollars ($1,000,000).

"Middletown LREC Contract" means that certain Standard Contract for the Purchase and Sale of Connecticut Class I Renewable Credits from Low or Zero Emission Projects, dated as of July 26, 2017, by and between FedEx Ground Package System, Inc. and the Connecticut Light and Power Company dba Eversource Energy, as assigned to 2017 ESA Project Company, LLC pursuant to that certain Assignment and Assumption Agreement dated as of October 24, 2017 by and between FedEx Ground Package System, Inc. and 2017 ESA Project Company, and assigned from 2017 ESA Project Company to Buyer pursuant to that certain Assignment and Assumption Agreement executed by 2017 ESA Project Company and Buyer as of the "Effective Date" of Amendment No. 2 to 2nd A&R PUMA.

"Milestone(s)" means each of (a) the Deposit Milestone Requirements, (b) Shipment, and (c) Commencement of Operations.

"Minimum Efficiency Level" means an Efficiency quotient of 45%.

"Minimum kWh" means the product of (a) the number of hours in the applicable period minus the number of hours for each Facility, as of the last day of the applicable period following Commencement of Operations with respect to the applicable Facility when the operation of such Facility (i) (A) was subject to a Force Majeure Event, (B) was not delivering Energy, or was delivering Energy at a reduced level, because of a failure to perform by the applicable PPA Customer, except to the extent caused or contributed to by Seller or its employees, agents, subcontractors or representatives, (C) was required by a Legal Requirement (which for this purpose shall include any utility requirement) to be disconnected from the distribution or transmission facilities of the Transmitting Utility or otherwise required not to deliver Energy as the result of a Legal Requirement or action by or a directive from the applicable Transmitting Utility with respect to the applicable Facility (e.g., due to a grid event), or (D) was impacted by a failure of the Battery Solution to perform in accordance with any warranty(ies) provided by the Battery Solution Manufacturer (excluding any such failure of the Battery Solution that is attributable to a Bloom Component Defect), except, in each case, to the extent caused or contributed to by Seller or its employees, agents, subcontractors and representatives, or (ii) was not delivering Energy during any idle period specified in an Extension Agreement entered into pursuant to Section 4.1(c) hereof, and (b) the Minimum Power Product for the applicable period.

"Minimum Power Product" means (a) when this term is used for the Performance Warranty, the aggregate System Capacity of the Bloom Systems in the Portfolio in kW for the applicable Calendar Quarter multiplied by [***], and (b) when this term is used for the Performance Guaranty, the aggregate System Capacity of the Bloom Systems in the Portfolio in kW for the applicable calendar year multiplied by [***]. An example of a calculation of the Minimum Power Product is set forth in Annex A.

"Monthly Report" is defined in Section 6.1(a).

"MW" means megawatt.

"Nameplate Capacity" means the maximum electrical output of a generator as rated by the manufacturer determined at the normal operating conditions designated by the manufacturer.

"NERC" means the North American Electric Reliability Corporation or any successor.

"NYC HHC PPA" is defined in Annex D.

"Operations Manager" is defined in Section 4.8(a).

"Original PUMA" is defined in the recitals.

"Original PUMA Agreement Date" means October 24, 2016.

"Party" and "Parties" have the meanings set forth in the preamble.

"Payment Certificate" means Seller's Deposit Milestone Certificate or Seller's Certificate of Installation, as applicable.

"Payment Notice" means a notice delivered from Seller to Buyer pursuant to Section 2.4(c) in the form attached hereto as Exhibit D.

"Performance Guaranty" is defined in Section 5.2.

"Performance Guaranty Payment Cap" means the product of (x) Seven Hundred Twenty-Seven Dollars and Seventy-One Cents ($727.71) multiplied by (y) the System Capacity of all Bloom Systems in kW Purchased under this Agreement prior to the applicable date.

"Performance Guaranty Payment Rate" means $[***] per kWh.

"Performance Standards" is defined in Section 3.9.

"Performance Warranty" is defined in Section 5.4(a).

"Permits" means all Governmental Approvals that are necessary under applicable Legal Requirements or this Agreement to have been obtained at such time in light of the stage of development of the Portfolio to site, construct, test, operate, maintain, repair, lease, own or use each Facility as contemplated in this Agreement to sell electricity from the Portfolio or for a Party to enter into this Agreement or to consummate any transaction contemplated hereby, in each case in accordance with all applicable Legal Requirements.

"Permitted Liens" means any (a) Liens that are released or otherwise terminated at or prior to the Delivery Date of the encumbered assets; (b) obligations or duties to any Governmental Authority arising in the ordinary course of business (including under licenses and Permits held by Buyer and under all Legal Requirements); (c) obligations or duties under easements, leases or other property rights; and (d) any other Liens agreed to in writing by Seller and Buyer.

"Person" means any individual, partnership, limited liability company, joint venture, corporation, trust, unincorporated organization, or governmental entity or any department or agency thereof.

"Placed in Service" means, with respect to any Facility, the completion and performance of all of the following activities: (1) obtaining the necessary licenses and Permits for the operation of such Facility and the sale of power generated by the Facility in accordance with clause (4) of this definition, (2) satisfactory completion of critical tests necessary for the proper operation of such Facility in accordance with clause (4) of this definition, (3) synchronization of such Facility onto the electric distribution and transmission system of the applicable Transmitting Utility, and (4) the commencement of regular, continuous, daily operation of such Facility.

"Placed in Service Date" means, with respect to a Facility, the date upon which such Facility is Placed in Service.

"Portfolio" means, on an aggregate basis, all Bloom Systems owned by Buyer that are purchased pursuant to this Agreement and that have been incorporated into Facilities which have been Placed in Service and which have not thereafter been removed from the Portfolio and/or repurchased by Seller pursuant to the terms of this Agreement.

"Portfolio Warranty" is defined in Section 5.5(a).

"PPA" means each power purchase, energy server use, energy services agreement, or similar agreement with a PPA Customer listed on Annex D hereto, as the same may be updated from time to time by the mutual agreement of the Parties.

"PPA Customer" means each off-taker counter-party to a PPA.

"PPA Documentation" means all written invoices, receipts, billing statements, payment notices, wire receipt and payment notifications, bank statements and other similar written evidence of (i) amounts payable by Buyer to any Person and (ii) amounts received or receivable by Buyer from any Person.

"PPA Warranties" is defined in Section 5.8(a).

"PPA Warranty Reimbursement Payment" is defined in Section 5.8(a).

"Project Model" means the economic model, incorporating a number of factors including the availability and amount of tax credits and other incentives, to be delivered from Seller to Buyer from time to time pursuant to Section 2.8.

"Projected Revenues" is defined in Section 4.12(j)(ii).

"Projected Tolling Rate(s)" is defined in Section 4.12(a).

"Prudent Electrical Practices" means those practices, methods, equipment, specifications and standards of safety and performance, as the same may change from time to time, as are commonly used by a significant portion of the grid-tied fuel cell electrical generation industry operating in the United States and/or approved or recommended by the NERC as good, safe and prudent engineering practices in connection with the design, construction, operation, maintenance, repair and use of electrical and other equipment, facilities and improvements of electrical generating facilities, including any applicable practices, methods, acts, guidelines, standards and criteria of FERC and all applicable Legal Requirements.

"Purchase" is defined in Section 2.5.

"Purchase Date" is defined in Section 2.5.

"Purchase Order" means Buyer's purchase order for a Facility or Facilities to be purchased by Buyer in substantially the form of Exhibit E.

"Purchase Price" means a price for the design, installation and purchase of each Facility or Tranche, based on the aggregate System Capacity of the Bloom Systems comprising such Facility or Tranche, determined pursuant to Section 2.8, plus any Taxes for the account of Buyer under Section 2.3(c) in respect of such Facility; provided, however, that Taxes shall not be included in the calculation of the Purchase Price for invoices issued pursuant to Section 2.3(a)(i) or Section 2.3(a)(iii).

"Purchase Price Adder(s)" means an addition to the Purchase Price for certain Facilities based on the additional equipment included in such Facilities, calculated as follows:

(a) For Facilities including AOM(s), $[***] for each AOM;

(b) For Facilities including a Battery Solution pursuant to any PPA, a price determined according to the terms and conditions of the Battery Solution Supply Agreement;

(c) For Facilities including a Low-Pressure Gas Booster, $[***]/kW of the aggregate System Capacity of the Bloom Systems comprising such Facility; and

(d) For Facilities including UPM(s), $[***] for each UPM.

"Qualified Appraiser" means a nationally recognized third-party appraiser reasonably acceptable to Buyer and Seller which shall (a) be qualified to appraise power systems similar to the Bloom Systems, and experienced in such businesses in the general geographic region of the relevant Facility, and (b) not be associated with either Buyer or Seller or any Affiliate thereof. If the Parties cannot agree on a third-party appraiser within fifteen (15) days of a Party invoking the Appraisal Procedure, then Marshall & Stevens Incorporated shall act as the Qualified Appraiser.

"Refund Value" means, with respect to any Facility (including Underperforming Facilities), the greater of (a) the Fair Market Value of such Facility (as determined under the Appraisal Procedure if Buyer and Seller cannot agree as to that Fair Market Value within ten (10) days)), and (b) 100% of the Purchase Price for such Facility until the first anniversary of Commencement of Operations of the applicable Facility, [***] on each anniversary of such date thereafter (for example, on the fifth anniversary of Commencement of Operations, the Refund Value will be [***] of the Purchase Price), in each case as calculated as of the date that Seller becomes obligated to refund such amount to Buyer. For clarity, the Refund Value includes one hundred percent (100%) of the Taxes, if any, which were paid by or on behalf of Buyer pursuant to Section 2.3(c) for such Facility or one hundred percent (100%) of any Taxes, if any, which are required to be paid by or on behalf of Seller in connection with the return of such Facility.

"Representatives" of a Party means such Party's authorized representatives, including its professional and financial advisors.

"SCADA" means the supervisory control and data acquisition systems.

"Second A&R PUMA" is defined in the recitals.

"Seller" is defined in the preamble.

"Seller Default" is defined in Section 12.1.

"Seller Deliverables" means, with respect to each Facility, the items listed in Exhibit C.

"Seller Indemnitee" is defined in Section 13.2.

"Seller's Certificate of Installation" means a certificate, in the form attached hereto as Exhibit H, issued by Seller to Buyer pursuant to paragraph (e) of the definition of Commencement of Operations.

"Seller's Deposit Milestone Certificate" means a certificate, in the form attached hereto as Exhibit F, issued by Seller to Buyer pursuant to paragraph (c) of the definition of Deposit Milestone Requirements.

"Seller's Intellectual Property" is defined in Section 11.1.

"Service Fees" is defined in Section 4.3(a).

"Service Provider" means an operation and maintenance contractor appointed by Seller and approved by Buyer pursuant to Section 4.6.

"Service Technicians" is defined in Section 4.2(d).

"Sharing Payment(s)" is defined in Section 4.12(j)(iii).

"Shipment" means for each Bloom System, shipment of such Bloom System from Seller's manufacturing facility to the Site.

"Shipment Date" means for each Bloom System, the date of Shipment.

"Site" means the parcel of land licensed from a PPA Customer to Buyer under a Site License and all easements appurtenant, easements in gross, license agreements and other rights running in favor of Buyer which provide access to the applicable Facility.

"Site License" means each agreement between Buyer and a PPA Customer regarding the license or similar contractual arrangement providing Buyer with the right of access to a Site for the purposes of performing Buyer's obligations pursuant to the applicable PPA.

"Site Preparation Services" means preparing each Site for installation of a Facility, obtaining the required Permits to construct, operate and maintain the Facility, and providing for natural gas interconnection facilities, the Electrical Interconnection Facilities and any other ancillary facilities and equipment between the Bloom Systems and the

applicable Transmitting Utility and otherwise performing the tasks required to prepare each Site for the Facility at the Site to attain Commencement of Operations.

"Software" shall mean all computer software that is necessary for Buyer to own and operate the Facilities in compliance with the terms of this Agreement, the PPAs, and the Site Licenses.

"Software License" is defined in Section 11.2(a).

"South Windsor LREC Contract" means that certain Standard Contract for the Purchase and Sale of Connecticut Class I Renewable Credits from Low or Zero Emission Projects, dated as of July 28, 2016, by and between the Buyer and the Connecticut Light and Power Company dba Eversource Energy.

"Southern Company" means The Southern Company (NYSE: SO).

"Specifications" means the specifications for the Battery Solution and the Bloom Systems, as applicable, as set forth in Exhibit A.

"System Capacity" means, with respect to a Bloom System, the "System Capacity" set forth on the applicable specification sheet provided by the manufacturer of such Bloom System. The aggregate System Capacity of the Bloom Systems comprising each Facility shall be reflected in the Bill of Sale delivered by Seller to Buyer with respect to such Facility.

"Tax" (and, with correlative meaning, "Taxes" and "Taxable") means:

(a) any taxes, customs, duties, charges, fees, levies, penalties or other assessments imposed by any federal, state, local or foreign taxing authority, including, but not limited to, income, gross receipts, windfall profit, severance, property, production, sales, use, license, excise, franchise, net worth, employment, occupation, payroll, withholding, social security, alternative or add-on minimum, ad valorem, transfer, stamp, or environmental tax, or any other tax, custom, duty, fee, levy or other like assessment or charge of any kind whatsoever, together with any interest, penalty, addition to tax, or additional amount attributable thereto; and

(b) any liability for the payment of amounts with respect to payment of a type described in clause (a), including as a result of being a member of an affiliated, consolidated, combined or unitary group, as a result of succeeding to such liability as a result of merger, conversion or asset transfer or as a result of any obligation under any tax sharing arrangement or tax indemnity agreement.

"Term" means the period which (a) shall commence on the Original PUMA Agreement Date and (b) shall, unless terminated earlier under ARTICLE XII of this Agreement or unless extended by mutual agreement of the Parties, terminate on the date that is the last day of the Warranty Period for the last Facility subject to the Warranty Period.

"Third Party Claim" means any claim, action, or proceeding made or brought by any Person who is not (a) a Party to this Agreement, or (b) an Affiliate of a Party to this Agreement.

"Third Party Warranty" is defined in Section 3.7.

"Tolling Rate" means with respect to any period the specified rate used for the supply of electricity or for the conversion of natural gas into electricity in the calculation of the fees owed to Buyer by a PPA Customer pursuant to a PPA. Tolling Rates are set forth on a dollar-per-kWh ($/kWh) basis or a dollar-per-MMBtu ($/MMBtu) basis, as indicated in the applicable PPA.

"Training Materials" is defined in Section 4.7.

"Tranche" means an amount of Facilities, measured on the basis of the aggregate System Capacity of the Bloom Systems comprising such Facilities (in kW), for which Seller is invoicing Buyer pursuant to Section 2.3(a)(i).

"Tranche Notice" is defined in Section 2.2.

"Transaction Documents" means this Agreement and the Payment Certificates.

"Transmitting Utility" means, with respect to a Facility, the local electric utility company in whose territory the Facility is located.

"Underperforming Facility" means any Facility that fails to deliver, in any Calendar Quarter during which the Portfolio fails to satisfy the Performance Warranty, a number of kWh greater than or equal to the product of (a) such Facility's aggregate System Capacity multiplied by [***], and (b) the number of hours in such quarter minus the number of hours as of the last day of such quarter when such Facility (i) was subject to a Force Majeure Event, (ii) was not delivering Energy because of a failure to perform by the applicable PPA Customer, except to the extent caused or contributed to by Seller or its employees, agents, subcontractors or representatives, (iii) was required by a Legal Requirement (which for this purpose shall include any utility requirement) to be disconnected from the distribution or transmission facilities of the Transmitting Utility or otherwise required not to deliver Energy as the result of a Legal Requirement or action by or a directive from the applicable Transmitting Utility with respect to the applicable Facility (e.g., due to a grid event), or (iv) was impacted by a failure of the Battery Solution to perform in accordance with any warranty(ies) provided by the Battery Solution Manufacturer (excluding any such failure of the Battery Solution that is attributable to a Bloom Component Defect), except to the extent caused or contributed to by Seller or its employees, agents, subcontractors and representatives.

"UPM" means an uninterruptible power module, to be included in certain of the Facilities.

"Warranty Period" means, for each Facility, the Manufacturer's Warranty Period, as extended or renewed by Buyer pursuant to Section 4.1(b), in which case the Warranty Period shall mean the specified end date of the Warranty Period as so extended or renewed,

unless the applicable PPA expires or terminates prior to such date, in which case the Warranty Period shall end on the date on which such PPA expires or terminates. For the avoidance of doubt, the Warranty Period shall in all events end, with respect to each Facility, at the expiration of the Extended Warranty Period.

"Warranty Specifications" means the Performance Warranty, the Performance Guaranty and the Efficiency Warranty.

"2017 ESA Project Company" means 2017 ESA Project Company, LLC, a Delaware limited liability company.

"2017 Fuel Cell Operating Company" means 2017 Fuel Cell Operating Company I, LLC, a Delaware limited liability company.

Section 1.2 Other Definitional Provisions.

(a) As used in this Agreement and in any certificate or other documents made or delivered pursuant hereto or thereto, financial and accounting terms not defined in this Agreement or in any such certificate or other document, and financial and accounting terms partly defined in this Agreement or in any such certificate or other document to the extent not defined, will have the respective meanings given to them under GAAP. To the extent that the definitions of financial and accounting terms in this Agreement or in any such certificate or other document are inconsistent with the meanings of such terms under GAAP, the definitions contained in this Agreement or in any such certificate or other document will control.

(b) The words "hereof", "herein", "hereunder", and words of similar import when used in this Agreement will refer to this Agreement as a whole and not to any particular provision of this Agreement. Section references contained in this Agreement are references to Sections in this Agreement unless otherwise specified. The term "including" will mean "including without limitation".

(c) The definitions contained in this Agreement are applicable to the singular as well as the plural forms of such terms and to the masculine as well as to the feminine and neuter genders of such terms.

(d) Any agreement or instrument defined or referred to herein or in any instrument or certificate delivered in connection herewith means (unless otherwise indicated herein) such agreement or instrument as from time to time amended, amended and restated, modified or supplemented and includes (in the case of agreements or instruments) references to all attachments thereto and instruments incorporated therein.

(e) Any references to a Person are also to its permitted successors and assigns.

(f) References to any statute, code or statutory provision are to be construed as a reference to the same as it exists as of the Original PUMA Agreement Date, Purchase Date or date a Party performed or was required to perform an obligation hereunder (as applicable), and include references to all bylaws, instruments, orders and regulations for

the time being made thereunder or deriving validity therefrom unless the context otherwise requires; provided, however, that, subject to Section 2.8, the determination of whether a Facility is ITC eligible shall be as of the Placed in Service Date.

ARTICLE II.
PURCHASE AND SALE

Section 2.1 Appointment of Seller as Buyer's EPC Provider. Subject to Section 14.13, Buyer hereby appoints Seller to act as Buyer's provider of all design, engineering, procurement and construction services necessary in connection with the installation, connection, testing, start-up, delivery and commissioning operation of the Facilities to be installed pursuant to each PPA and related Site License, and Seller hereby accepts such appointment and agrees to provide all such services, labor, materials, supplies, equipment, and tests for design, engineering, and construction services provided by Seller, to or on Buyer's behalf and on the terms and conditions set forth in this Agreement, each PPA and related Site License (collectively, "EPC Services"). For clarity, Seller's entire consideration for performing all such required services with respect to a Facility through Commencement of Operations for such Facility shall be the Purchase Price for such Facility, and Seller shall bear the financial risk regarding any cost overruns, claims from subcontractors or other liabilities. Following Commencement of Operations with respect to a Facility, Seller shall be entitled to Services Fees in respect of Facility Services rendered with respect to such Facility as described in Section 4.3.

Section 2.2 Purchase Orders. In connection with the Original PUMA Agreement Date and thereafter not later than ten (10) Business Days prior the first date of each Calendar Quarter, Seller will provide to Buyer a tranche notice substantially in the form hereto attached as Exhibit G (each, a "Tranche Notice"), which shall contain the aggregate System Capacity of the Facilities which are to be installed in connection with the applicable PPAs set forth in Annex D hereof that Seller expects will be included in a Tranche and that Seller reasonably expects will satisfy the applicable Deposit Milestones in such Calendar Quarter. So long as no Seller Default has occurred and is continuing hereunder, Buyer will, within five (5) Business Days of such notice, submit to Seller a Purchase Order for such Facilities. So long as no Buyer Default has occurred and is continuing hereunder, Seller shall promptly accept each such Purchase Order by countersigning and returning it to Buyer; provided that the failure of Seller to countersign or return to Buyer a Purchase Order shall not invalidate such Purchase Order and Seller shall be obligated to deliver the Bloom Systems comprising such Facility under such Purchase Order as contemplated by this Agreement.

Section 2.3 Invoicing of Purchase Price.

(a) Seller shall invoice Buyer hereunder as follows:

(i) on the date that Seller has satisfied the Deposit Milestone Requirements for a Tranche, [***] per kW ($[***]/kW), calculated on the basis of the System Capacity of the Bloom Systems comprising the Facilities included in such Tranche (and, for clarity, Seller shall not invoice any amount in respect of any Purchase Price Adder(s) applicable to such Facilities;

(ii) on the Shipment Date for the last Bloom System(s) in each Facility,

(A) In the event that such Facility was previously included in a Tranche for which Buyer has made payment, [***] per kW ($[***]/kW) for such Facility calculated based on the System Capacity of the Bloom Systems comprising such Facility plus 100% of the Purchase Price Adder(s) applicable to such Facility, if any; and

(B) In the event that such Facility was not previously included in a Tranche for which Buyer has made payment, [***] per kW ($[***]/kW) for such Facility calculated based on the System Capacity of the Bloom Systems comprising such Facility plus one hundred percent (100%) of the Purchase Price Adder(s) applicable to such Facility, if any; and

(iii) upon Commencement of Operations for each Facility, the remainder of the Purchase Price, if any, not previously paid (calculated, and adjusted from time to time, in accordance with this Agreement), for such Facility, plus one hundred percent (100%) of the Taxes to be paid by Buyer pursuant to Section 2.3(c) for such Facility.

(b) Each invoice issued pursuant to Section 2.3(a)(ii) and Section 2.3(a)(iii) shall include the following information for each applicable Facility:

(i) Buyer's Purchase Order number;

(ii) the Tranche (indicated by the invoice date) in which such Facility is deemed to be included;

(iii) the Site on which such Facility is installed or will be installed;

(iv) the serial number and System Capacity of each Bloom System comprising such Facility, and purchase order number;

(v) whether or not any AOM(s), Battery Solution, Low-Pressure Gas Booster(s) and/or UPM(s) are to be installed in connection with such Facility;

(vi) the Purchase Price, including details of (A) all amounts previously paid towards or credited against the Purchase Price, and (B) all amounts remaining due and payable on the Purchase Price;

(vii) the Shipment Date or expected Shipment Date, as applicable;

(viii) the Purchase Date or expected Purchase Date, as applicable; and

(ix) such other information as Buyer may reasonably request.

(c) Buyer shall pay all state and local sales, use or other transfer Taxes required to be paid by Buyer and attributable to the transfer of the Facility to Buyer, except that Seller shall be responsible for and pay any Taxes arising as a result of any components of such Facility or any Facility being acquired from a source outside of the United States.

Section 2.4 Payment of Purchase Price.

(a) Buyer shall pay all outstanding Purchase Price invoices on a monthly basis in accordance with the terms of this Section 2.4.

(b) Not less than ten (10) Business Days prior to the Invoice Due Date for all invoices to be paid by Buyer for the applicable calendar month, Seller shall deliver to Buyer:

(i) A draft Payment Notice, setting forth the anticipated aggregate Purchase Price for all Tranches and/or Facilities to be paid in such month; and

(ii) Supporting documentation (i.e., Seller's Deposit Milestone Certificates, bills of lading and Seller's Certificates of Installation) evidencing the achievement of all applicable Milestones achieved by the applicable Tranches and/or Facilities prior to the date of such draft Payment Notice.

(c) Not less than three (3) Business Days prior to the applicable Invoice Due Date for all invoices to be paid by Buyer for such calendar month, Seller shall deliver to Buyer:

(i) an executed Payment Notice, setting forth the actual aggregate Purchase Price for all Tranches and/or Facilities to be paid by Buyer in such month, which amount shall in no event exceed the amount notified by Seller to Buyer in the applicable draft Payment Notice except to the extent of any adjustment to such amount resulting from Section 2.8;

(ii) Supporting documentation (i.e., Seller's Deposit Milestone Certificates, bills of lading and Seller's Certificates of Installation) evidencing the achievement of all applicable Milestones achieved as of such date for all Milestones achieved by the applicable Tranches and/or Facilities between the date on which the draft Payment Notice was delivered and the date on which the executed Payment Notice was delivered.

(d) Buyer shall, on the applicable Invoice Due Date indicated in the executed Payment Notice delivered by Seller pursuant to Section 2.4(c), make Purchase Price payments for each Tranche and/or Facility included in such Payment Notice for which Seller has delivered all applicable documentation evidencing the satisfaction of the applicable Milestone(s).

(e) If Buyer defaults in any payment when due for any Facility (other than with respect to amounts being disputed in good faith), Seller may, on not less than five (5) Business Days prior notice to Buyer, at its option and without prejudice to its other

remedies, (i) suspend performance of its obligations hereunder for such Facility, or defer delivery of such Facility to Buyer and (ii) require that (until all such outstanding payment defaults have been cured) the payment of the portion of the Purchase Price for future Facilities required under Section 2.3(a)(ii) and Section 2.3(a)(iii) above be made immediately prior to the Shipment of the applicable Bloom Systems, but Seller shall not be able to otherwise suspend performance of its obligations hereunder for other Facilities for which no such default exists.

(f) Seller shall promptly pay all subcontractors working on the Facilities delivered and installed under this Agreement (including, for clarification, subcontractors working off-Site), and shall, at the time of each payment made to any such subcontractor, obtain a partial or final lien waiver, as applicable, in a form approved by Buyer, and promptly provide Buyer with a copy of each such lien waiver. Seller shall discharge any Liens by such subcontractors within thirty (30) days of receiving notice thereof. Seller shall release all Liens in favor of Seller on each Facility upon final payment of the Purchase Price for such Facility. Upon the failure of Seller to discharge a Lien required to be discharged under this Section 2.3, or else promptly to provide a bond in an amount and from a surety acceptable to Buyer to protect against such Lien, in each case, within thirty (30) days after Seller is aware of the existence thereof, Buyer may, but shall not be obligated to, pay, discharge or obtain a bond or security for such Lien and, upon such payment, discharge or posting of security therefor, shall be entitled immediately to recover from Seller the amount thereof, together with all reasonable and necessary expenses actually incurred by Buyer in connection with such payment or discharge, or to set off all such amounts against any amounts owed by Buyer to Seller hereunder. After receipt of the portions of the Purchase Price for each Facility as provided in Section 2.3(a)(i) and Section 2.3(a)(ii), Seller will issue a statement of the balance of the Purchase Price for such Facility, being the amount which, once paid to Seller, will cause Seller to release its lien on the Facility. Seller hereby agrees that third parties may rely on each such statement.

(g) Notwithstanding the foregoing in this Section 2.3 or any other provision of this Agreement to the contrary, if Buyer (i) admits in writing its inability to pay its debts generally as they become due; (ii) files a petition or answer seeking reorganization or arrangement under the federal bankruptcy laws or any other Legal Requirements of the United States of America or any State, district or territory thereof; (iii) makes an assignment for the benefit of creditors; (iv) consents to the appointment of a receiver of the whole or any substantial part of its assets; (v) has a petition in bankruptcy filed against it, and such petition is not dismissed within ninety (90) days after the filing thereof; or if (vi) a court of competent jurisdiction enters an order, judgment, or decree appointing a receiver of the whole or any substantial part of Buyer's assets, and such order, judgment or decree is not vacated or set aside or stayed within ninety (90) days from the date of entry thereof; or (vii) under the provisions of any other law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of the whole or any substantial part of Buyer's assets and such custody or control is not terminated or stayed within ninety (90) days from the date of assumption of such custody or control, then Seller shall have no obligation to deliver any Facility hereunder, or if Shipment for the Bloom Systems comprising a Facility has already occurred, Seller

shall have the right to require immediate payment of any amount due under Section 2.3(a)(ii) and the right to require that the final payment of the Purchase Price for such Facility be made promptly (but no earlier than Commencement of Operations of such Facility).

(h) With respect to any payment due from one party to the other pursuant to this Agreement, unless being contested in good faith, interest shall accrue daily at the lesser of a monthly rate of one and five-tenths percent (1.5%) or the highest rate permissible by law on the unpaid balance.

Section 2.5 Purchase and Sale of Facilities. Upon the "Purchase Date" for a Facility, which date shall be the date on which Delivery of all Bloom Systems comprising such Facility occurs and the Facility Purchase Conditions for the Facility are and remain true and correct, (a) Seller shall have sold, assigned, conveyed, transferred and delivered to Buyer, and Buyer shall have purchased, assumed and acquired from Seller, all of Seller's right, title and interest in and to such Facility, (b) except as set forth in Section 3.3(b), the sale of such Facility shall occur, and (c) Seller shall provide Buyer with (i) a Bill of Sale evidencing the same, and (ii) lien waivers from each subcontractor performing BOF Work at the applicable Site, stating that such subcontractor has been paid all amounts owed to it as of the date of the lien waiver (the foregoing being "Purchase").

Section 2.6 PPA Termination and Re-Purchase of Facilities.

(a) If a PPA is terminated with respect to one or more Facilities prior to the date such Facilities have achieved Commencement of Operations, then (i) Seller shall repurchase the Facilities from Buyer on an AS IS basis by refunding to Buyer all payments of the Purchase Price paid as of such date, (ii) title to such Facilities, if held by Buyer, shall pass back to Seller upon payment of such refund amount and Buyer's delivery of a Bill of Sale to Seller evidencing such transfer of title, and (iii) the applicable Bloom Systems shall no longer constitute a portion of the Portfolio. If a Facility is repurchased by Seller pursuant to this Section 2.6(a) and any portion of such Facility is located at the Site, Seller shall at its sole cost and expense remove the applicable Bloom Systems and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations, in the manner required by all Legal Requirements and the applicable PPA or Site License. In the event that in connection with such termination Buyer is entitled to any reimbursement of costs from the applicable PPA Customer for removing such Bloom Systems and other ancillary equipment from the applicable Site or for restoring the Site to its condition before the installation, the Parties will cooperate in good faith in order to secure such reimbursement and Buyer will promptly remit to Seller any such amounts actually received from such PPA Customer in respect of removal or restoration work performed by Seller for the applicable Site, net of any Buyer out-of-pocket costs incurred to collect such reimbursement from the PPA Customer.

(b) Subject to Section 12.7(c), in the event that (i) a PPA Customer terminates a PPA with respect to a Facility prior to its expiration and (ii) the applicable PPA Customer pays Buyer the termination value due under the applicable PPA, then Buyer shall reimburse Seller for any costs or expenses incurred in connection with the removal of such Facility.

Section 2.7 [Reserved].

Section 2.8 Purchase Price Adjustment for Portfolio Price Changes.

(a) [Reserved].

(b) Not less than ten (10) Business Days prior to the end of each Calendar Quarter, Seller shall deliver to Buyer a revised Project Model, reflecting the Base Case Model updated solely to reflect (i) with respect to each Facility that has achieved Commencement of Operations, (A) the dates on which Buyer paid each portion of the Purchase Price for such Facility and the amount of such payments, and (B) the date on which such Facility achieved Commencement of Operations, (ii) with respect to each Facility that Seller reasonably expects to achieve Commencement of Operations following the delivery of such revised Project Model, (A) the dates on which Buyer has paid, or is expected to pay, each portion of the Purchase Price for such Facility and the amount of such payments, and (B) the date on which Seller reasonably expects such Facility to achieve Commencement of Operations, (iii) the inclusion or deletion, as applicable, of any Facilities that have been added or deleted from the PPAs during such Calendar Quarter, and (iv) changes in the availability and amount of tax credits and other incentives.

(c) The Parties will mutually agree on an adjusted Purchase Price for the Facilities within five (5) Business Days of Buyer's receipt of the revised Project Model under Section 2.8(b), which shall be used as (i) the final Purchase Price for all Tranches and Facilities invoiced and paid in the current Calendar Quarter, and (ii) the Purchase Price for purposes of all invoices delivered in the following Calendar Quarter (until the date of the next adjustment made pursuant to this Section 2.8). Within five (5) Business Days of the Parties' agreement on such adjusted Purchase Price, Buyer shall amend and reissue each invoice previously delivered by Seller to Buyer for the current Calendar Quarter to reflect the Purchase Price determined pursuant to this Section 2.8(c). For the avoidance of doubt, no adjustments shall be made hereunder with respect to any payments from Buyer to Seller made in any Calendar Quarter prior to the current Calendar Quarter. Without in any way limiting the provisions of Section 9.1(g), Seller makes no representation, warranty or guaranty regarding Buyer's expected rate of return as a result of the purchase of the Facilities hereunder.

(d) Following the reissuance of invoices as described in Section 2.8(c), if Buyer has made any over- or under-payments in respect of such invoices, Seller shall apply such over-payments as a credit against, or addition to, the amount owed by Buyer with respect to the invoices to be paid on the final Invoice Due Date of the current Calendar Quarter; provided, however, that if such adjustment results in Buyer owing no payments

to Seller with respect to such invoices but fails to fully compensate Buyer for prior over-payments, Seller shall remit the remaining balance of any over-payments to Buyer within thirty (30) days following the applicable Invoice Due Date.

ARTICLE III.
DELIVERY AND INSTALLATION OF BLOOM SYSTEMS AND BALANCE OF FACILITIES

Section 3.1 Access to Site. Seller shall be responsible for ascertainment of the suitability of the Sites, the environment around the Sites, the Sites' soil condition and other ground conditions for construction of the Facilities. As between Seller and Buyer, Seller shall be solely responsible for all Site Preparation Services at Seller's cost. Buyer shall provide Seller with access to the Sites in a manner consistent with the applicable PPAs and Site Licenses to permit Seller to deliver and install each Bloom System and the BOF to the applicable Sites and to connect the applicable Facility to the distribution and transmission facilities of the Transmitting Utility, as applicable. If a PPA Customer requires a change in the location of a Site from that specified in a Purchase Order or applicable Site License, whether temporary or permanent, (a) Buyer shall submit a written notice to Seller setting forth the details of such location change, (b) Seller shall administer and perform the Site Preparation Services as required for that changed location to the extent required and in accordance with the relevant PPA and Site License, and (c) to the extent that such PPA Customer pays to Buyer an amount under the applicable PPA or Site License in connection with such required change in the installation location of a Site, Buyer shall pay the same to Seller promptly upon receipt from such PPA Customer, except that Buyer shall retain the portion of such amount equaling any applicable amount to compensate Buyer for lost output, environmental attributes, and environmental incentives during the period the Facility is consequently not producing electricity.

Section 3.2 Delivery of Bloom Systems.

(a) Delivery of each Bloom System shall be DDP (Incoterms 2010) to its Site, in accordance with the Uniform Commercial Code then in effect. Title to each Bloom System shall pass to Buyer upon Buyer's Purchase of such Bloom System, and such title shall be good and marketable and free of all Liens, except for Permitted Liens. From and after Buyer's Purchase of each Bloom System all risk of loss or damage to such Bloom System shall be borne by Buyer. Seller shall manage its supply chain and place orders with suppliers with respect to Components and other materials, supplies, and equipment so as to support the Facilities sold to Buyer hereunder.

Section 3.3 Delivery of Balance of Facility; Installation of Bloom Systems.

(a) Seller shall be responsible for engineering, procuring, constructing, installing and commissioning the BOF, and Seller shall cause each Facility to achieve Commencement of Operations without any compensation or reimbursement by Buyer, other than the Purchase Price under this Agreement and payments pursuant to Section 3.1(c), if any, in accordance with the following (collectively, the "BOF Work"):

(i) Seller shall be solely responsible for the means, methods, techniques, sequences, and procedures employed for execution and completion of the BOF Work, and shall perform and complete all BOF Work in accordance and consistent with the Performance Standards;

(ii) Seller shall cause to be performed any and all studies, reports and applications (in the name of Buyer) that are necessary for interconnection to the distribution and transmission facilities of the Transmitting Utility;

(iii) Seller shall perform the BOF Work and act at all times as an independent contractor. Seller shall at all times maintain such supervision, direction and control over its employees, agents, subcontractors and representatives as is consistent with and necessary to preserve its independent contractor status. Subject to Section 4.6, Seller is permitted to enter into contracts or otherwise hire one or more subcontractors to perform any of Seller's work under this Agreement on its behalf. Each subcontractor must be a reputable, qualified firm with an established record of successful performance in its trade, and shall obtain and maintain such insurance coverages having such terms as set forth in Annex B to the extent applicable to the work to be performed by such subcontractor. Seller shall not be relieved from its obligation to provide any services hereunder if a subcontractor agrees to provide any or all of such services. No subcontractor is intended to be or will be deemed a third-party beneficiary of this Agreement. Nothing contained herein shall create any contractual relationship between any subcontractor and Buyer or obligate Buyer to pay or cause the payment of any amounts to any subcontractor, including any payment due to any third party. Seller shall not permit any subcontractor to assert any Lien against any Facility or Bloom System, or attach any Lien other than a Permitted Lien. None of Seller's employees, subcontractors or any such subcontractor's employees will be or will be considered to be employees of Buyer. Seller shall be fully responsible to Buyer for the acts and omissions of each such employee or subcontractor. To the extent that any PPA Customer has the right to request removal of any Seller or subcontractor personnel under a PPA or Site License, Seller shall cooperate with Buyer in complying with the terms and conditions of such PPA or Site License including by, upon written notification by Buyer that the performance, conduct or behavior of any Person employed by Seller or one of its subcontractors is unacceptable to the applicable PPA Customer, promptly stopping such Person from performing any obligations hereunder and/or removing such Person from the applicable Site. Additionally, Buyer may bring to Seller's attention any concerns regarding the performance, conduct or behavior of any Person employed by Seller or one of its subcontractors, which concerns Seller shall consider in good faith and thereafter take such action as Seller deems appropriate under the circumstances. Seller will be fully responsible for the payment of all wages, salaries, benefits and other compensation to its employees and for payment of any Taxes due because of the BOF Work;

(iv) Seller shall, and shall cause each of its subcontractors to, install the Bloom Systems and the BOF at each Site using items that are new, and undamaged at the time of such use or installation;

(v) Seller shall install, test, and cause the Commencement of Operations with respect to each Facility within ninety (90) days of the date of Seller's Deposit Milestone Certificate as provided in Section 3.4;

(vi) Seller shall pay all amounts owed to its subcontractors and vendors in connection with the performance of the BOF Work on a timely basis and shall hold Buyer harmless against any claims asserted by such subcontractors and vendors;

(vii) Seller shall obtain and maintain, or cause to be obtained and maintained (where required, in the name of Buyer or each PPA Customer, as the case may be), all Permits necessary to design, install, commission, construct, occupy, and operate each Facility at each Site;

(viii) Seller shall cause BOF Work to be completed in a good and workmanlike manner, free from defective materials, and in accordance with the Performance Standards, free and clear of all Liens other than Permitted Liens; and

(ix) If Seller, at any time during the Warranty Term, becomes aware of any potential material manufacturing or design defect in any Facility, including any Component thereof, it will notify Buyer of the defect within a reasonable time, not to exceed five (5) Business Days after Seller first becomes aware of such defect.

(b) Title and risk of loss to each component of such BOF Work for the Site which is not performed and provided on assets owned by a relevant PPA Customer or relevant Transmitting Utility shall pass to Buyer upon the later of the Delivery Date of the first Bloom System at the Site and the date such component is installed as part of the Facility at the Site. For the avoidance of doubt, the passage of title and risk of loss with respect to each Facility shall have passed to Buyer prior to such Facility being Placed in Service. From and after the Commencement of Operations of the Facility of which particular BOF Work is a part, all risk of loss or damage to such BOF Work which is owned by Buyer shall be borne by Buyer.

(c) Without in any way limiting Seller's obligations pursuant to this Section 3.3, Seller shall perform all design, permitting and installation work in accordance with the provisions of Schedule 3.3 attached hereto.

Section 3.4 Commissioning; Commencement of Operations.

(a) Upon the occurrence of the Delivery for a Bloom System, Seller shall promptly perform the following, at Seller's sole cost:

(i) Seller shall provide installation, inspection, commissioning and start-up for each Bloom System and the BOF at the applicable Site in accordance

with the installation manuals provided for such Bloom System and the applicable Site License, and in conformance with Prudent Electrical Practices. Without limitation of the foregoing, each Facility will be connected by Seller to the natural gas source, water source and SCADA at the applicable Site and to the applicable Facility's Electrical Interconnection Facilities;

(ii) Prior to Commencement of Operations of each Facility, Seller shall, perform an acceptance test not less stringent than the testing applied to its fuel cell power generating systems for any other major customer of Seller of each Bloom System incorporated into such Facility and the applicable BOF in the presence of Buyer (if Buyer elects to attend), and such Bloom Systems and applicable BOF shall have passed such test. Seller will, upon request by Buyer, inform Buyer of the date on which it expects to conduct the acceptance test of any Facility(ies) and cooperate with Buyer to provide Buyer with the opportunity to observe such testing to the extent practicable, provided, that in no event shall Seller be required to delay the performance of any acceptance test in order to allow Buyer to witness such test if all other pre-testing requirements have been satisfied;

(iii) Seller shall cause Commencement of Operations for such Facility to occur within ninety (90) days of the date of Seller's Deposit Milestone Certificate. Seller shall promptly certify in writing to Buyer when each Facility achieves Commencement of Operations;

(iv) Seller will provide to Buyer, prior to the Commencement of Operations, a single line diagram of the Facility installation, electronic system manuals, copies of all relevant design documents, and printed system manuals, in each case relating to such Facility (each in paper copy and native electronic format). Seller shall deliver to Buyer any other documentation necessary to establish placement in service for purposes of Section 48 of the Code;

(v) Until Commencement of Operations of the Facility, Seller shall be responsible for providing physical security of such Facility;

(vi) If requested by Buyer, Seller shall provide operator training and associated training materials to personnel and representatives of Buyer sufficient to instruct Buyer on operation of such Facility in conformance with Prudent Electrical Practices; and

(vii) Following Commencement of Operations of a Facility, Seller shall promptly remove all waste materials and rubbish from and around the Site as well as all of its tools, construction equipment, machinery, and surplus materials as reasonably necessary to restore each Site to a condition reasonably satisfactory to such PPA Customer or as otherwise required by the applicable Site License.

(b) Seller's services under Section 3.1 through Section 3.4 shall be fully comprehensive of all services, labor, and equipment necessary to complete installation of a fully commissioned and operating Facility in accordance with this Agreement, the

applicable PPA, the applicable Interconnection Agreement, and the applicable Site License.

(c) Seller shall be responsible, at its sole cost and expense, for maintaining and complying with all Permits required to perform its services under this Agreement and Buyer agrees to cooperate with and assist Seller in obtaining such Permits.

(d) To the extent any Facility has not achieved Commencement of Operations within the earlier of (i) one hundred eighty (180) days of the payment of the portion of Purchase Price set forth in Section 2.3(a)(ii) for such Facility and (ii) the Commencement of Operations Date Deadline, then Buyer shall have the ongoing right for the period from the end of that date until the earlier of (A) the date that such Facility has achieved Commencement of Operations and (B) ninety (90) days after such date, to elect that Seller repurchase and remove such Facility from the applicable Site, in which case (1) Seller shall repurchase the Facility from Buyer on an AS IS basis by refunding to Buyer all payments of the Purchase Price paid as of such date, (2) title to such Facilities shall pass back to Seller upon payment of such refund amount and Buyer's delivery of a Bill of Sale to Seller evidencing such transfer of title, and (3) the applicable Facility shall no longer constitute a portion of the Portfolio. If a Facility is repurchased by Seller pursuant to this Section 3.4(d), Seller shall at its sole cost and expense remove the applicable Bloom Systems and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing all Site penetrations, in the manner required by all Legal Requirements and the applicable PPA or Site License.

(e) Without in any way limiting Seller's obligations pursuant to this Section 3.4, Seller shall perform all commissioning work in accordance with the provisions of Schedule 3.4 attached hereto.

(f) Within ninety (90) days of a Facility achieving Commencement of Operations, Seller shall deliver to Buyer each of the Seller Deliverables indicated on Exhibit C as items to be delivered following Commencement of Operations.

Section 3.5 Insurance. Seller shall maintain the insurance described in Annex B.

Section 3.6 Disposal; Right of First Refusal.

(a) Except as set forth in Section 14.4, in the event that Buyer decides to scrap, abandon or otherwise dispose of any Bloom System, Buyer shall notify Seller and Seller shall have the right but not the obligation to obtain title to the Bloom System and remove the Bloom System at Seller's cost; provided, however, that Seller will not be responsible for remediation of the Site in which the Bloom System was located.

(b) Except as set forth in Section 2.4 or Section 14.4, in the event that Buyer or its Affiliates desire to sell or otherwise transfer title to any Bloom System to a transferee other than a PPA Customer or an Affiliate of Buyer, Buyer shall notify Seller and Seller

shall have the right of first refusal to purchase or acquire the Bloom System on the same terms and conditions of such sale. In the event that Seller exercises such right of first refusal, Seller shall, promptly following payment of the purchase price of such Bloom System, remove the Bloom System at Seller's cost, including the remediation of the Site in which the Bloom System was located in accordance with the terms of the applicable PPA and/or Site License.

Section 3.7 Third Party Warranties. If any express or implied warranties, indemnities, guaranties, remedies, covenants and other rights which any subcontractor or supplier has made to Seller with respect to any good, service, or other deliverable furnished under this Agreement in respect of a Facility (each a "Third Party Warranty") would provide an additional rights to Buyer beyond the warranties under ARTICLE V, then (a) such Third Party Warranty providing additional rights will be for the benefit of and passed through to Buyer to the fullest extent possible, (b) Seller transfers and assigns to Buyer all of Seller's right, title and interest under such Third Party Warranty to exercise such additional rights, and (c) Seller hereby appoints Buyer as attorney-in-fact coupled with an interest to exercise and enforce all such additional rights in the name of either Buyer or Seller. Nothing in this Section 3.7 will limit Seller's obligations to Buyer under ARTICLE V. Buyer agrees that it will not look to Seller for any claims covered by Third Party Warranties in respect of the Battery Solution; provided, however, that this shall not relieve Seller of any liability or obligation of Seller arising in connection with any failure of the Battery Solution that is attributable to a Bloom Component Defect.

Section 3.8 Access; Cooperation. Seller shall provide to Buyer such other information that is in the possession of Seller or its Affiliates or is reasonably available to Seller regarding the permitting, engineering, construction, or operations of Seller, its subcontractors or the Facilities, and other data concerning Seller, its subcontractors or the Facilities that Buyer may, from time to time, reasonably request in writing, subject to Seller's obligations of confidentiality to third parties with respect to such information. Seller shall not take any action or omit to take any action as would cause Buyer in any material respect to violate any Legal Requirements, and to the extent that Seller has knowledge of any such existing or prospective violation take, or cause to be taken, commercially reasonable actions, to redress or mitigate any such violation, which action shall be at Seller's sole expense if Seller is obligated to perform such action as part of the EPC Services or Facility Services, and otherwise shall be at Buyer's sole expense. Seller shall give to Buyer prompt written notice of any material disputes with Governmental Authorities. Seller shall furnish, or cause to be furnished, to Buyer copies of all material documents furnished to Seller by any Governmental Authority in respect of Buyer or any Facility.

Section 3.9 Performance Standards. For the purpose of this Agreement, Seller shall perform under this Agreement in accordance and consistent with each of the following (unless the context requires otherwise): (a) plans and specifications subject to Permits under Legal Requirements and applicable to each Facility; (b) the manufacturer's recommendations with respect to all equipment and all maintenance and operating manuals or service agreements, whenever furnished or entered into, including any subsequent amendments or replacements thereof, issued by the manufacturer, provided they are consistent with generally accepted practices in the fuel cell industry; (c) the requirements of all applicable insurance policies; (d) preserving all rights to any incentive payments, warranties, indemnities or other rights or remedies, and enforcing or assisting with the enforcement of the applicable warranties, making or assisting in making all

claims with respect to all insurance policies; (e) all Legal Requirements and Permits/Governmental Approvals; (f) any applicable provisions of the Site Licenses, including any landlord rules and regulations; (g) Prudent Electrical Practices; (h) the relevant provisions of each Interconnection Agreement; (i) each PPA; (j) the Seller Corporate Safety Plan provided in Exhibit J (as updated by Seller from time to time, with a copy provided promptly to Buyer); (k) the Seller Subcontractor Quality Plan provided in Exhibit K (as updated by Seller from time to time, with a copy provided promptly to Buyer); (l) all Environmental Requirements, and (m) the LREC Contract(s) (collectively, the "Performance Standards"); provided, however, that meeting the Performance Standards shall not relieve Seller of its other obligations under this Agreement.

ARTICLE IV.
FACILITY SERVICES

Section 4.1 In General.

(a) During the Warranty Period, in consideration of the Service Fees, Seller shall service each Facility constituting a portion of the Portfolio so that the Portfolio performs in accordance with the Warranty Specifications and so that the BOF will not cause the Portfolio to fail to perform in accordance with the Warranty Specifications, as more fully set forth in ARTICLE V. Without limiting the foregoing, Seller agrees to perform on behalf of Buyer all operations and maintenance obligations in respect of each Facility under the applicable PPA and Site License in a manner fully consistent with the terms and conditions of such documents. The services set forth in this Section 4.1, as more fully described in this ARTICLE IV, are collectively referred to herein as the "Facility Services." For clarity, Seller shall have no authority or responsibility with respect to the payment or receipt of monies to or from PPA Customers or with respect to serving or receiving formal notices to or from PPA Customers; provided, however, that Seller may informally communicate with PPA Customers regarding routine, day-to-day Facility Services matters. For so long as Seller is performing Facility Services in respect of a Facility, the Parties intend that Seller shall be responsible for all operational activities in respect of such Facility, including the performance of all obligations to PPA Customers that are required to be performed physically at the Site. If a Party has any uncertainty regarding which Party is responsible for particular obligations to PPA Customers, the Party's Manager shall discuss such matter with the other Party's Manager to implement the allocation of responsibility intended by this Agreement and the Parties thereafter shall, if necessary, amend this Agreement to clarify the Parties' agreement regarding such allocation of responsibility.

(b) Until the expiration of the Extended Warranty Term, upon the expiration of the Warranty Period with respect to any Facility(ies) Buyer may, at its option, elect to renew the Warranty Period with respect to such Facility(ies) for a period of one (1) additional year. The Warranty Period for each Facility shall be automatically renewed for a period of one (1) additional year at the termination of the existing Warranty Period if Buyer has not informed Seller in writing of its election to terminate the Warranty Period at the end of such existing Warranty Period at least thirty (30) days prior to the final date of such existing Warranty Period.

(c) Notwithstanding anything to the contrary herein, in the event that the "Term" of any Customer PPA(s) with respect to any Facility(ies) is extended pursuant to any provision therein providing for a day-for-day extension thereof, then, the Parties may agree in writing to extend the Warranty Period for such Facility(ies). Promptly following the Parties becoming aware of facts or circumstances resulting in a day-for-day extension the "Term" of any PPA, the Parties shall negotiate in good faith to mutually agree in writing (an "Extension Agreement") upon, among other things, any period during which the Parties agree that the Facility will be idled and the number of days the Warranty Period for such Facility will be extended. If the Parties enter into an Extension Agreement for any Facility, (i) Buyer will not owe any Service Fees during any days during the Facility idle period specified in the Extension Agreement, (ii) during such idle period Seller will be obligated to perform only such maintenance services for the Facility as are designed to facilitate a safe and reliable restart of the Facility following such idle period, and (iii) Buyer will owe Service Fees during the number of days the Warranty Period for such Facility is extended pursuant to the Extension Agreement.

Section 4.2 Operation and Maintenance Services. Without limiting, and in furtherance of, Section 4.1, Seller is hereby granted the right and authority (and, to the extent necessary to carry out its functions hereunder, a limited power of attorney) and agrees, for the benefit of Buyer, to operate safely and reliably each Facility and to maintain during the Warranty Period in accordance with the terms of this Agreement each such Facility in good condition and repair in accordance with the Warranty Specifications, Performance Standards and Prudent Electrical Practices. During the Warranty Period, the specific responsibilities of Seller under this Agreement shall include the following:

(a) Facility Operations. Seller shall ensure that all Facility components are operated and maintained safely and in a manner designed to meet the Warranty Specifications and Performance Standards and as otherwise required under this Agreement.

(b) Facility Maintenance. Seller shall perform, or cause to be performed, all scheduled and unscheduled maintenance required on the Facilities in order to perform in accordance with the Warranty Specifications and Performance Standards. In that regard, Seller's responsibilities hereunder shall include, without limitation, promptly correcting any Bloom System or BOF malfunctions, either by (x) recalibrating or resetting the malfunctioning Bloom System or BOF, or (y) subject to Section 5.7(b), repairing or replacing Bloom System or BOF components which are defective, damaged, worn or otherwise in need of repair or replacement. Seller agrees to respond in a timely manner to any Facility outage or other casualty that materially reduces power output or materially impairs the capability of the Battery Solution to load shift, peak shave or run (with the Bloom System) in islanded mode, by (i) promptly diagnosing the source of such issue and, (ii) if on-Site Facility Services are required, using its best efforts to (A) dispatch field service personnel to the Site within six (6) hours of Seller's Knowledge that such on-Site Facility Services are required, and (B) cause its field service personnel to arrive at the applicable Site in order to commence repair services at the applicable Facility no later than the next Business Day. Without in any way limiting

the foregoing, Seller shall in any event comply with any and all response time(s) and/or corrective activity(ies) required by the applicable PPA(s).

(c) Repair and Replacement of Power Modules. Buyer agrees that Seller may replace the power modules included in each Facility with power modules of a different model provided that such replacement model has been subjected to inspections and tests performed by Seller which indicate that such replacement power module model is reasonably expected to perform at least as well as the model it replaces; provided, however, that, upon Buyer's request, Seller agrees to promptly provide Buyer with copies of such inspection and test results. Notwithstanding the foregoing, Seller represents to Buyer that it reasonably expects that any repair or replacement of power modules to be made within five (5) years of the date the applicable Facility was Placed in Service will have an aggregate value of replaced parts that is less than eighty percent (80%) of the Facility's total value (the cost of the new parts plus the value of the remaining Facility originally Placed in Service).

(d) Personnel. Seller shall ensure that all operations and maintenance functions contemplated by this Section are performed by technically competent and qualified personnel (the "Service Technicians"). Seller shall ensure that all Service Technicians: (i) participate in a maintenance training program and receive confirmation of having achieved the requisite level of proficiency for the tasks they are assigned to perform, and (ii) attend periodic "refresher" training programs to the extent Seller deems necessary, in its reasonable judgment.

(e) Spare Parts. Seller shall establish and maintain an adequate inventory of spare Components in one or more locations to facilitate scheduled and unscheduled maintenance required on the Facilities.

(f) Programs and Procedures. Prior to the date of the Commencement of Operations of the first Facility, Seller shall have adopted and implemented programs and procedures, consistent with Prudent Electrical Practices, intended to ensure safe and reliable operation of the Facilities. Seller may update such programs and procedures from time-to-time during the Term as it may determine appropriate, in its reasonable judgment and in accordance with Prudent Electrical Practices. Buyer may, not more than once per calendar year and at Buyer's sole cost and expense, review such programs and procedures from time to time to confirm compliance with Prudent Electrical Practices. Buyer may from time to time provide comments on any such Seller programs and procedures and Seller agrees to consider any such comments in good faith; provided that Buyer's review and comment on any such program or procedure will not relieve Seller of any of its obligations under this Agreement.

(g) PPA Customer Complaints. Seller will promptly provide notice to Buyer if Seller has received any written communication from any PPA Customer suggesting that such PPA Customer is dissatisfied with the operational performance of any Facility or with the manner in which EPC Services or Facility Services have been provided by Buyer, Seller or any other Service Provider in respect of any Facility. If any PPA Customer misdirects any written notice to Seller that should have been delivered to

Buyer under the applicable PPA or Site License, Seller shall promptly deliver such written notice to Buyer.

(h) PPA Customer Invoicing and Reports. Until such time as Buyer is able to receive such data directly from the Facilities, Seller will promptly, and in any case within three (3) Business Days following request by Buyer, provide any operational data and other PPA Documentation necessary for Buyer to invoice any PPA Customer for the output of any Facility or any other amounts payable by the PPA Customer to Buyer under the applicable PPA. Seller will provide reasonable assistance to Buyer in the performance of all ordinary course reporting and other routine management responsibilities related to the operation of any Facility (including preparing or causing to be prepared reports, updated schedules and notices required to be prepared and delivered to a PPA Customer pursuant to a PPA).

(i) Operations and Maintenance Procedures. Without in any way limiting Seller's obligations pursuant to this Section 4.2, Seller shall perform all operations and maintenance work in accordance with the provisions of Schedule 4.2 attached hereto.

(j) LREC Contracts Administration. Seller will, (i) prepare and submit any and all filings, notices, communications or other documents that are required under each LREC Contract on behalf of Buyer, (ii) prepare and promptly pay on behalf of Buyer (and at no cost to Buyer), any amounts required to be paid by Buyer under each LREC Contract, and (iii) otherwise perform all routine administrative activities required of Buyer under each LREC Contract. Buyer agrees to cooperate with Seller as requested from time-to-time in connection with Seller's obligations pursuant to this Section 4.2(j) (at Seller's sole cost and expense) including promptly executing any documents required under each LREC Contract that must, by their nature, be executed by Buyer; provided, however, that Seller will be responsible for any liability resulting from such cooperation by Buyer.

(k) Equinix PPA Compliance. Seller will immediately provide notice to Buyer in the event that Seller knows or has reason to believe that a Compliance Law Violation (as defined in the Equinix PPA) or a breach of any of the representations, warranties or covenants in Section 7.1(h)(i) of the Equinix PPA has occurred or will occur in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier.

Section 4.3 Service Fees.

(a) Buyer shall compensate Seller for the Facility Services, on a calendar month basis, by paying Seller the "Service Fees" equal, for each Facility, to (i) (A) the rate (in $/kW) specified in Exhibit M hereto for such Facility for the applicable calendar month since the applicable Facility achieved Commencement of Operations, multiplied by (B) the aggregate System Capacity (in kW) of the Bloom Systems comprising the applicable Facility, for the applicable calendar month, plus (ii) any additional Services Fees for such Facility set forth on Exhibit M hereto based on the presence of a Low-Pressure Gas Booster in such Facility. If Facility Services are provided by Seller for a particular

Facility for only a portion of any calendar month, the Service Fees due with respect to such partial calendar month shall be pro-rated based on the number of days such Facility Services were provided in respect of such Facility during the calendar month.

(b) Commencing on the date each Facility achieves Commencement of Operations, with respect to each calendar month of such Facility's Warranty Period, the Service Fees shall be invoiced on a separate invoice (and not pursuant to a Payment Notice) not later than five (5) Business Days prior to the first day of such calendar month, and, subject to Section 3.4(d) and Section 5.4, shall be payable no later than the thirty (30) calendar days following such proper delivery of such invoice; provided, that the pro rata Services Fees for the calendar month in which a Facility achieves Commencement of Operations shall be invoiced and paid with the Services Fees for the subsequent calendar month. Interest shall accrue, unless being contested in good faith, daily on the Service Fees not paid when due, at the lesser of the monthly rate of (i) one and five-tenths percent (1.5%) and (ii) the highest rate permissible by law on such unpaid balance. Seller shall be under no obligation to provide or perform services hereunder for any Facility whose Service Fee, other than a Service Fee disputed in good faith, has not been paid in full (or offset pursuant to Section 3.4(d), Section 5.7 or Section 5.8) within thirty (30) days of invoice until such date upon which the Service Fee has been paid.

(c) If Buyer disputes any amount shown in an invoice issued by Seller in accordance with Section 4.3(a): (i) Buyer must pay the undisputed portion of the invoice amount within the time prescribed by Section 4.3(a), and (ii) liability for the disputed portion of that invoice will be determined in accordance with the dispute resolution procedure set out in Section 14.5.

(d) Any disputed portion of an invoiced amount which was not paid under Section 4.3(c) and is determined as being due to Seller in accordance with the dispute resolution procedure set out in Section 14.5 must be paid by Buyer within ten (10) days of the determination of the dispute in accordance with the procedure set out in Section 14.5 plus, if it is determined in accordance with the dispute resolution procedures that the disputed portion was not disputed in good faith, interest calculated in accordance with Section 4.3(b).

(e) Each Party shall have the sole and absolute right to set off any undisputed amounts to which it is entitled to under this Agreement, including under Section 3.4(d), Section 5.7 or Section 5.8, against any amounts owed by such Party to the other Party under this Agreement. The deduction of any such amounts shall operate for all purposes as a complete discharge (to the extent of such deduction) of the obligation of such Party to pay the amount from which such deduction was withheld and made. Neither the exercise of, nor the failure to exercise, such right of setoff will constitute an election of remedies or limit the applicable Party in any manner in the enforcement of any other remedies that may be available to it.

(f) Buyer will, promptly following receipt thereof, remit to Seller any and all payments received pursuant to the South Windsor LREC Contract. For the avoidance of

doubt, Buyer shall be entitled to retain for its own account any and all payments received under the Middletown LREC Contract, except that Buyer shall remit to Seller any amounts received as a return of performance assurance, contract security, or other similar amounts.

Section 4.4 Remote Monitoring; BloomConnect.

(a) For purposes of monitoring the operational performance and determining when repair services are necessary, Seller shall monitor and evaluate the information gathered through remote monitoring of each Facility as well as the maintenance and inspection Site visits. For so long as Seller is responsible for the Facility Services in respect of any Facility, Seller shall provide Buyer with "view only" access to any information gathered through remote monitoring of such Facility. Such access shall be provided in real-time or as close to real-time as practicable.

(b) Notwithstanding anything to the contrary set forth in Section 4.4(a), Seller shall provide Buyer with access to the Battery Solution data as may be mutually agreed by the Parties following the Original PUMA Agreement Date.

(c) To the extent a PPA Customer has a right to access BloomConnect or any successor software related to the management of its purchase of energy under an applicable PPA, Seller shall provide access to such PPA Customer for the same.

Section 4.5 Permits.

(a) Seller shall be responsible, at its sole cost and expense, for maintaining and complying with all Permits required to perform the Facility Services under this Agreement, and shall promptly notify Buyer of any material challenges to the status of a Permit for a Facility, or any other material issues or anticipated material issues relating to obtaining or maintaining a Permit for a Facility.

(b) Buyer agrees to cooperate with and assist Seller in obtaining all Permits.

(c) Seller agrees to assist with the preparation and submission of all filings and notices of any nature which are required to be made by Buyer under the terms of any Permit held by Buyer or any Legal Requirements applicable to the Facilities or to Buyer on account of the Facilities.

Section 4.6 Service Providers. Seller may appoint one or more unrelated third party(ies), who is appropriately qualified, licensed, and financially responsible, to perform EPC Services and/or Facility Services throughout the Term (each, a "Service Provider"). Seller shall submit such appointment of any Major Service Provider to Buyer for its prior written approval, which approval shall not be unreasonably withheld or delayed. No such appointment nor the approval thereof by Buyer, however, shall relieve Seller of any liability, obligation, or responsibility resulting from a breach of this Agreement. "Major Service Provider" means any Service Provider that Seller proposes to engage to perform any EPC Services and/or any Facility Services for which the aggregate compensation to such Service Provider in any calendar year is expected to be greater than [***] of the Services Fees paid to Seller in the applicable calendar year.

The Parties agree that each of the Major Service Providers set forth on Schedule 4.6 hereof are approved for all purposes by Buyer as of the Original PUMA Agreement Date and the Agreement Date.

Section 4.7 Rights to Deliverables. Buyer agrees that Seller shall, except as expressly set forth herein, retain all rights, title and interest, including Intellectual Property rights, in any Training Materials provided to Buyer in connection with the services performed hereunder. "Training Materials" means any and all materials, documentation, notebooks, forms, diagrams, manuals and other written materials and tangible objects, describing how to operate and maintain the Facilities, including any corrections, improvements and enhancements which are delivered by Seller to Buyer, but excluding any Documentation or other data and reports delivered to Buyer in respect of any Facilities.

Section 4.8 Coordination of Relationship.

(a) Seller's Operations Manager. Seller shall at all times retain an operations manager (the "Operations Manager") who shall be dedicated to the overall supervision and management of performance of Seller's Facility Services obligations under this Agreement. Seller's initial Operations Manager is set forth on Exhibit M attached hereto. Seller may, from time to time, designate another individual as a proposed replacement for the Operations Manager by notice to Buyer. Seller's suggested replacement Operations Manager shall be subject to Buyer's approval, which may not be unreasonably withheld or delayed in all instances. Where feasible, Buyer shall have the opportunity to meet the replacement Operations Manager in person or telephonically prior to assignment. Such meeting will take place telephonically except as otherwise agreed upon by the Parties. Nothing in this paragraph shall prevent Seller from assigning interim replacements on a temporary basis to enable it to continue to timely perform its obligations while assignment of a permanent replacement is pending. During the Warranty Term, Seller shall not assign the Operations Manager duties that are inconsistent or that conflict with the obligations of the Operations Manager in respect of his or her Facility Services duties.

(b) Buyer Manager. Buyer will appoint an individual to serve as its primary contact person with regard to this Agreement (the "Buyer Manager"). Buyer's initial Buyer Manager is set forth on Exhibit M attached hereto. Buyer may, from time to time, designate another individual as a proposed replacement for the Buyer Manager by notice to Seller.

(c) Manager Meetings. The Buyer Manager and the Operations Manager will serve as each Party's main contact to, and for, the other Party with regard to day-to-day matters affecting the Parties' relationship in relation to EPC Services and Facility Services. The Buyer Manager and the Operations Manager (or their designees) will meet, by phone or in person, as often as they feel necessary to monitor and manage such day-to-day activities. Such managers shall operate by consensus to the extent practicable but shall have no authority to amend or waive compliance with the terms and conditions of this Agreement, or to approve actions of the Parties that are

inconsistent with this Agreement. Any such waivers or amendments shall be implemented only as described in Section 14.1 or Section 14.2, as the case may be.

Section 4.9 Relocation or Removals of Equinix Power Modules. In the event that a PPA permits the applicable PPA Customer to require the relocation or removal of power modules, Buyer may, upon request made by such PPA Customer pursuant to the provisions of the applicable PPA, require Seller to relocate or remove power modules pursuant to this Section 4.9.

(a) In the event that one or more power modules are to be relocated pursuant to this Section 4.9, Seller shall promptly perform all actions necessary for the removal of such power modules from the original Site(s) and the transportation to, and reinstallation and resumption of operations of, such power modules at the relocation Site(s) determined in accordance with the applicable PPA. Seller shall bear all costs associated with such relocation unless the applicable PPA Customer is required to bear such costs pursuant to the terms of the applicable PPA, in which case (i) Seller and Buyer shall cooperate in good faith to prepare appropriate documentation of such costs, (ii) Buyer shall use all commercially reasonable efforts to obtain payment from the applicable PPA Customer as permitted under the applicable PPA, and (iii) Buyer will promptly remit to Seller all payments obtained from the applicable PPA Customer in respect of such costs associated with the relocation of the applicable power modules; and

(b) In the event that one or more power modules are to be removed pursuant to this Section 4.9, Seller will promptly remove such power modules from the applicable Facility(ies), and the Parties will cooperate in good faith to identify one or more Facilities in the Portfolio at which to redeploy such power modules, either as additional power modules installed in then-empty power module cabinets or to replace operating power modules nearing the end of their useful life. In identifying such Facilities, the Parties will consider (among other things) (i) the availability of empty power module cabinets, (ii) wiring or other equipment limitations, and (iii) any restrictions or limitations imposed by Legal Requirements, the PPAs, and the applicable Interconnection Agreements. Until a power module is redeployed pursuant to the terms of this Section 4.9(b), Seller shall be responsible for the handling, shipping and storage of such power module, and shall bear all risk of loss with respect thereto during such period. Seller shall bear all costs associated with the redeployment of power modules pursuant to the terms of this Section 4.9(b).

Section 4.10 Remarketing and Redeployment Assistance. The Parties acknowledge and agree that in certain circumstances, Buyer (or certain of Buyer's Affiliates) may be obligated to attempt to remarket and redeploy certain Facilities in connection with the termination of one or more PPAs with respect to such Facilities pursuant to the applicable PPA or an agreement between Buyer (or the applicable Buyer Affiliate or other predecessor-in-interest) and the applicable PPA Customer(s) ("Redeployment Agreement"). In such event, Seller agrees to assist Buyer in its efforts to resell or redeploy each such Facility, using at least that degree of effort as is required of Buyer (or the applicable Buyer Affiliate or other predecessor-in-interest) pursuant to the applicable Redeployment Agreement; without in any way limiting the foregoing, Seller assistance shall include, without limitation, taking the following actions for Buyer's benefit upon request: (a) on a nondiscriminatory basis with respect to other similar equipment of Seller, distributing to its sales

organization information on the availability, location and price of such Facility, and agreeing to provide to a prospective purchaser of such unit or the output thereof, as applicable, at no cost to such purchaser a certificate of maintainability with respect to such unit, (b) cause such Facility to be reinstalled at the applicable purchaser's site at Seller's then prevailing installation rates, including procuring and installing any necessary BOF equipment related thereto, (c) cause such Facility to be refurbished or reconfigured as necessary or appropriate to facilitate such resale or redeployment, and (d) enter into an operations and maintenance agreement for all necessary operations and maintenance services necessary to operate such Facility following resale or redeployment at Seller's then prevailing maintenance rates for similar equipment and including a scope of work, performance guaranties, and indemnification provisions similar in all material respects to the Customer PPA pursuant to which the applicable Facility was originally installed. All of Seller's reasonable costs and expenses (including a reasonable allocation of personnel hours) incurred in connection with the actions described in this Section 4.10 shall be reimbursed by Buyer, and Seller will reasonably cooperate with Buyer to provide Buyer with any documentation that is required pursuant to the applicable Customer PPA or Redeployment Agreement to support such costs and expenses.

Section 4.11 Calculation of Indexed PPA Tolling Rates. In the event that a PPA provides for the calculation of the Tolling Rate for any System(s) as of any time based on external factors such as the prevailing price of electricity, electricity transmission and delivery, natural gas prices, or other factors (each, an "Indexed PPA"), Seller shall perform all required calculations of the Tolling Rate(s) on behalf of Buyer in accordance with the requirements of the applicable Indexed PPA, and Buyer hereby authorizes Seller to act as Buyer's agent for the limited purpose of performing such calculations and interacting with the applicable PPA Customer(s) to finalize such Tolling Rate(s) from time to time in accordance with the provisions of the applicable Indexed PPA; provided, however, that, in the event of any dispute between Seller and the applicable PPA Customer(s) regarding the calculations of the Tolling Rate(s), Seller shall provide prompt notice to Buyer of such dispute and thereafter Buyer shall have right to participate in and control all negotiations and to resolve such dispute with the applicable PPA Customer(s) regarding the calculations of such Tolling Rate(s). Seller shall deliver to Buyer the results of Seller's calculations of the Tolling Rate(s) under each applicable Indexed PPA at least five (5) Business Days prior to the date such calculations are to be delivered to the applicable PPA Customer so that Buyer may confirm Seller's calculations, and shall not provide any such calculation to the applicable PPA Customer until Buyer has confirmed Seller's calculations. In the event that Buyer believes Seller has made any calculation errors, the Parties shall cooperate in good faith to resolve any discrepancies between Seller's calculations and Buyer's calculations prior to the date on which such calculations must be delivered to the applicable PPA Customer pursuant to the terms of the applicable Indexed PPA, and as between Buyer and Seller any discrepancies that remain unresolved after a period of three (3) Business Days of discussions shall be resolved in favor of Buyer.

Section 4.12 Indexed PPA Tolling Rate Guaranty.

(a) Seller hereby guarantees that the Tolling Rates pursuant to each Indexed PPA will equal or exceed the applicable "Projected Tolling Rates" for each of the applicable periods set forth on Exhibit L (each such period and the last day of each such period, a "Calculation Period" and a "Calculation Date," respectively) during the first

twenty years of the term (including any extensions) of such Indexed PPA, and shall compensate Buyer for any shortfall in revenues pursuant to the Indexed PPAs in the event the aggregate revenues realized using actual Tolling Rates under the Indexed PPAs do not equal or exceed the aggregate revenues that would have been realized using Projected Tolling Rates, calculated on a weighted-average, net present value basis (the "Indexed PPA Tolling Rate Guaranty"). The Indexed PPA Tolling Rate Guaranty shall be calculated and paid as set forth in this Section 4.12.

(b) Seller shall determine, within ten (10) Business Days following each Calculation Date under each Indexed PPA, whether the Actual Revenues for each Facility installed under such Indexed PPA equaled or exceeded the Projected Revenues for such Facility in the immediately-preceding Calculation Period.

(c) If such calculation indicates that the Actual Revenues for a Facility for the applicable Calculation Period were greater than the Projected Revenues for the applicable Calculation Period, then the excess (in dollars) of Actual Revenues over Projected Revenues shall be recorded as a positive balance in the Indexed PPA Tolling Rate Guaranty Bank, after discounting such amount to reflect the net present value of such amount on the basis of a [***] cost of capital from Commencement of Operations of the applicable Facility through the Calculation Date.

(d) If such calculation indicates that the Actual Revenues for a Facility for the applicable Calculation Period were less than the Projected Revenues for the applicable Calculation Period, then the excess (in dollars) of Projected Revenues over Actual Revenues shall be recorded as a negative balance in the Indexed PPA Tolling Rate Guaranty Bank, after discounting such amount to reflect the net present value of such amount on the basis of a [***] cost of capital from Commencement of Operations of the applicable Facility through the Calculation Date.

(e) Seller shall report the balance of the Indexed PPA Tolling Rate Guaranty Bank to Buyer within thirty (30) days of each calculation made pursuant to Section 4.12(c) and Section 4.12(d), including details regarding the calculation of any adjustments of such Indexed PPA Tolling Rate Guaranty Bank made pursuant to Section 4.12(c) and Section 4.12(d) not previously reported by Seller.

(f) The sum of all of the amounts recorded from time to time in the Indexed PPA Tolling Rate Guaranty Bank as of a particular date for a particular Facility pursuant to Section 4.12(c) and Section 4.12(d) are referred to herein as the "Facility Recorded Adjustments." For purposes of determining the Indexed PPA Tolling Rate Guaranty Bank as of a given date (each, a "Guaranty Bank Determination Date") for each Facility with Facility Recorded Adjustments, the Facility Recorded Adjustments amount shall be increased on the basis of a [***] cost of capital from Commencement of Operations of the applicable Facility through the Guaranty Bank Determination Date (the "Adjusted Facility Recorded Adjustments"). The aggregate of the Adjusted Facility Recorded Adjustments for all Facilities with Facility Recorded Adjustments as of the Guaranty Bank Determination Date is equal to the Indexed PPA Tolling Rate Guaranty Bank balance as of such date.

(g) Seller shall determine, within ten (10) Business Days following the fifth (5th), tenth (10th), fifteenth (15th), and, if Projected Tolling Rates are set forth on Exhibit L for a twenty (20) year term (including any extensions), twentieth (20th) anniversary of the Commencement of Operations Date of the final Facility installed pursuant to an Indexed PPA, as described in Section 4.12(f), the Indexed PPA Tolling Rate Guaranty Bank balance using the date of such anniversary as the applicable Guaranty Bank Determination Date. Seller shall report the balance of the Indexed PPA Tolling Rate Guaranty Bank to Buyer within ten (10) days of each such determination made pursuant to the immediately preceding sentence, including details regarding the calculation thereof, and, if the Indexed PPA Tolling Rate Guaranty Bank as of such anniversary has a negative balance, then Seller shall make a payment to Buyer within fifteen (15) days of receipt of such claim equal to the absolute value of the balance of the Indexed PPA Tolling Rate Guaranty Bank. Upon payment of such amount, the Indexed PPA Tolling Rate Guaranty Bank and all Facility Recorded Adjustments for all Facilities with Facility Recorded Adjustments as of such Guaranty Bank Determination Date shall be reset to zero as of such Guaranty Bank Determination Date.

(h) If Seller fails to perform any calculations of Facility Recorded Adjustments or any calculation of the Indexed PPA Tolling Rate Guaranty Bank balance within the periods required by this Section 4.12, Buyer may perform its own calculations and inform Seller of the results of such calculations, which shall be binding on the Parties unless Seller notifies Buyer of any calculation errors within fifteen (15) Business Days of Seller's receipt of Buyer's calculations.

(i) If a Party disagrees with any calculations of the other Party, that Party shall notify such other Party of such disagreement within fifteen (15) Business Days of receipt of such other Party's calculations. Following any notice of dispute under this Section 4.12(f), the Parties shall handle such dispute under Section 14.5.

(j) For purposes of the Indexed PPA Tolling Rate Guaranty, the following terms shall have the following meanings:

(i) "Actual Revenues" means, for a Facility, the product (A) of (x) the Actual kWh delivered by such Facility in the applicable period, multiplied by (y) the actual Tolling Rate for such Facility in the applicable period, less (B) a ratable portion of any Sharing Payments owed by Buyer to the applicable PPA Customer for such period (calculated on the basis of the applicable Facility's pro rata portion of the aggregate System Capacity of all Facilities installed pursuant to the applicable Indexed PPA that have achieved Commencement of Operations).

(ii) "Projected Revenues" means, for a Facility, the product of (A) the Actual kWh delivered by such Facility in the applicable period, multiplied by (B) the Projected Tolling Rate for such Facility in the applicable period.

(iii) "Sharing Payments" means, for each Indexed PPA, any payments owed by Buyer to the applicable PPA Customer (including offsets against amounts

owed by such PPA Customer to Buyer) that are calculated on the basis of the escalation of the Tolling Rate(s).

ARTICLE V.
WARRANTIES

Section 5.1 Facility Services Warranty. Without limiting Seller's obligations under ARTICLE IV, during the Warranty Period, Seller shall perform, or cause to be performed, all such Facility Services in respect of the Bloom Systems and the BOF necessary for the Portfolio to perform in accordance with the Warranty Specifications (the "Facility Services Warranty").

Section 5.2 Performance Guaranty.

(a) During the Warranty Period, Seller shall determine within ten (10) Business Days after the end of each calendar year, whether the Portfolio has delivered to the applicable Interconnection Points the Minimum kWh for purposes of the Performance Guaranty during such calendar year ("Performance Guaranty").

(b) If such calculation indicates that the Actual kWh delivered by the Portfolio was greater than the Minimum kWh during such calendar year, then the difference (in kWh) between Actual kWh less Minimum kWh shall be recorded as a positive balance in the Performance Guaranty Bank.

(c) If such calculation indicates that the Actual kWh delivered by the Portfolio was less than the Minimum kWh during such calendar year, then the difference (in kWh) between Minimum kWh less Actual kWh shall be recorded as a negative balance in the Performance Guaranty Bank.

(d) Seller shall report the balance of the Performance Guaranty Bank to Buyer within thirty (30) days of the end of each calendar year. If Seller fails to perform any Performance Guaranty calculation within the periods required by this Section 5.2, Buyer may perform its own calculations and may make a claim under Section 5.7. An example of a Performance Guaranty calculation is attached as Annex C.

Section 5.3 Efficiency Warranty. During the Warranty Period, Seller shall determine for each full calendar month within five (5) Business Days after the end of such month whether each Facility that has achieved Commencement of Operations has performed at the Minimum Efficiency Level (the "Efficiency Warranty"). If the Minimum Efficiency Level has not been met during such month, then Seller shall so notify Buyer in writing of the basis of its determination and Buyer may make a claim under Section 5.7. If Seller fails to perform any Efficiency Warranty calculation within the periods required by this Section 5.3, Buyer may perform its own calculations and may make a claim under Section 5.7.

Section 5.4 Performance Warranty.

(a) During the Warranty Period, Seller shall determine within ten (10) Business Days after the end of each Calendar Quarter, whether the Portfolio has delivered to the

applicable Interconnection Points the Minimum kWh for purposes of the Performance Warranty during such Calendar Quarter ("Performance Warranty").

(b) If such calculation indicates that the Actual kWh delivered by the Portfolio was greater than the Minimum kWh during such Calendar Quarter, then the difference (in kWh) between Actual kWh less Minimum kWh shall be recorded as a positive balance in the Performance Warranty Bank.

(c) If such calculation indicates that the Actual kWh delivered by the Portfolio was less than the Minimum kWh during such Calendar Quarter, then the difference (in kWh) between Minimum kWh less Actual kWh shall be recorded as a negative balance in the Performance Warranty Bank.

(d) Seller shall report the balance of the Performance Warranty Bank to Buyer within thirty (30) days of the end of each Calendar Quarter. At any time the Performance Warranty Bank has a negative balance, Buyer may make a claim under Section 5.7. If Seller fails to perform any Performance Warranty calculation within the periods required by this Section 5.4, Buyer may perform its own calculations and may make a claim under Section 5.7. An example of a Performance Warranty calculation is attached as Annex C.

Section 5.5 Portfolio Warranty.

(a) Subject to Section 13.5(a), Seller warrants to Buyer that (i) each Bloom System upon Commencement of Operations will conform to the Bloom System Specifications, (ii) each Facility will be free from defects in design, materials and workmanship until the first anniversary of the Commencement of Operations for such Facility, and (ii) the Portfolio and each Facility will comply with the Warranty Specifications applicable to the Portfolio or such Facility, as the case may be, during the Warranty Period (collectively, the "Portfolio Warranty").

(b) Seller agrees to correct, at Seller's sole expense, all Bloom Systems or BOF provided, or BOF Work performed, by it or its subcontractors under this Agreement which proves to be defective in design, materials, or workmanship during the Manufacturer's Warranty Period for each Facility. WITHOUT IN ANY WAY LIMITING (I) SELLER'S OBLIGATION TO INDEMNIFY BUYER PURSUANT TO (A) SECTION 5.8, (B) SECTION 13.3(A)(II) IN RESPECT OF A BREACH OF A PPA OR SITE LICENSE ATTRIBUTABLE TO A DEFECTIVE FACILITY AS STATED ABOVE OR A BREACH OF SECTION 8.1(M), AND/OR (C) WITH RESPECT TO THIRD PARTY CLAIMS PURSUANT TO SECTION 13.3(A), OR (II) ANY OTHER EXPRESS REMEDY SET FORTH HEREIN THAT MAY BE AVAILABLE IN CONNECTION WITH A SELLER FAILURE TO TIMELY CORRECT DEFECTIVE BLOOM SYSTEMS, BOF, OR BOF WORK (INCLUDING, WITHOUT LIMITATION, A SELLER OBLIGATION TO REMOVE OR REPURCHASE A DEFECTIVE BLOOM SYSTEM), BUYER'S SOLE REMEDY FOR A BREACH OF THE WARRANTY SET FORTH IN SECTION 5.5(A)(II) SHALL BE THE CORRECTION OF DEFECTIVE FACILITY AS STATED ABOVE.

(c) The Portfolio Warranty is not transferable to any third person, including any Person who buys a Facility from Buyer, without Seller's prior written consent (which shall not unreasonably be withheld).

(d) Any period of time in which the Warranty Specifications are not met shall not extend the Warranty Period.

Section 5.6 Exclusions. The Portfolio Warranty shall not cover any obligations on the part of Seller to the extent caused by or arising from (a) the Bloom Systems or BOF being affected by vandalism or other third-party's actions or omissions occurring after Commencement of Operations (other than to the extent that Seller, Seller Affiliate, the Service Provider or a Seller subcontractor fails to properly protect the Bloom Systems and was required to do so under the Transaction Documents); (b) any failure relating to a PPA Customer's failure to supply natural gas as required under the applicable PPA; (c) Buyer's (as opposed to Seller, Seller Affiliate, the Service Provider or a subcontractor thereof) or a PPA Customer's removal of any safety devices; (d) any conditions caused by unforeseeable movement in the environment in which the Bloom Systems are installed (provided that normal soil settlement, shifting, subsidence or cracking will not constitute 'unforeseeable movement'); (e) accidents, abuse, improper third party testing (unless caused by Seller, Seller Affiliate, the Service Provider or a subcontractor thereof) or Force Majeure Events, (f) installation, operation, repair or modification of the Bloom Systems or BOF by anyone other than Seller or Seller's authorized agents; or (g) a failure of any Battery Solution to perform in accordance with any warranty(ies) provided by the Battery Solution Manufacturer (excluding any such failure of the Battery Solution that is attributable to a Bloom Component Defect). SELLER SHALL HAVE NO OBLIGATION UNDER THE PORTFOLIO WARRANTY AND MAKES NO REPRESENTATION AS TO BLOOM SYSTEMS OR BOF WHICH HAVE BEEN OPENED OR MODIFIED BY ANYONE OTHER THAN SELLER, SELLER'S AFFILIATE, A SERVICE PROVIDER OR SUBCONTRACTOR, OR ANY OF SUCH PERSON'S REPRESENTATIVES, IN EACH CASE TO THE EXTENT OF ANY DAMAGE OR OTHER NEGATIVE CONSEQUENCE OF SUCH OPENING OR MODIFICATION.

Section 5.7 Portfolio Warranty Claims.

(a) Subject to the provisions of Section 13.5(a), if Buyer desires to make a Portfolio Warranty claim during the Warranty Period, Buyer must notify Seller of the defect or other basis for the claim in writing.

(b) If, after the annual adjustment to the Performance Guaranty Bank, such Performance Guaranty Bank has a negative balance, then Buyer may make a claim under the Performance Guaranty. Upon verification of such claim Seller shall make a payment to Buyer within ten (10) days of receipt of such claim equal to (i) the absolute value of the balance of the Performance Guaranty Bank, multiplied by (ii) the Performance Guaranty Payment Rate. Upon payment of such amount, the Performance Guaranty Bank shall be reset to zero. Notwithstanding anything to the contrary set forth in this Agreement, Seller's cumulative aggregate liability for all claims related to the Performance Guaranty shall not exceed the Performance Guaranty Payment Cap.

(c) In the case of a claim relating to the Efficiency Warranty, upon receipt of such claim and verification by Seller that such Efficiency Warranty is applicable, Seller or its designated subcontractor will promptly, and in all cases within ninety (90) days, repair or replace, at Seller's sole option and discretion, any Bloom System(s) or any portion of the BOF whose repair or replacement is required in order for the applicable Facility to perform consistent with the Efficiency Warranty. If Seller is obligated to repair or replace any Facility pursuant to this Section 5.7(c) and such repair or replacement is not feasible (as determined at Seller's sole option and discretion) and Seller notifies Buyer to such effect, Seller will refund to Buyer the Refund Value of such Facility (calculated as of the date of such refund), in which case Seller shall be deemed to have taken title to such Facility, and such Facility shall be deemed to no longer constitute a portion of the Portfolio. Seller shall make such determination as to the feasibility of repair or replacement as promptly as practicable, but in any event within ninety (90) days after Seller's receipt of notice of the claim unless the specific nature of the problem requires a longer period in which to make such determination (in which case Seller must make a determination within a reasonable time) provided that such longer period for a determination does not cause any breach of a PPA. In the event that Seller has not completed the repair or replacement of any Facility within ninety (90) days of the date on which Seller received notice of a claim (or within one hundred twenty (120) days if the specific nature of the problem required a period longer than ninety (90) days in which to determine the feasibility of repair or replacement), or repurchased the Facility in the time period in this Section 5.7(c) then Buyer has the right to require Seller (in which case Seller agrees) to procure return of the Facility in question to Seller (at Seller's cost) and Seller will refund to Buyer the Refund Value of such Facility, in which case Seller shall be deemed to have taken title to such Facility upon payment of the Refund Value, and such Facility shall be deemed to no longer constitute a portion of the Portfolio and shall be removed as described in the previous sentence. The rights and obligations of the Parties under this this Section 5.7(c) are in addition to and separate from any other rights of Buyer under this ARTICLE V.

(d) In the event of a claim relating to the Performance Warranty, upon receipt of such notice and verification by Seller that such Performance Warranty is applicable, Seller or its designated subcontractor will promptly, and in all cases prior to the final day of the immediately following Calendar Quarter, repair or replace, at Seller's sole option and discretion, a sufficient number of Underperforming Facilities in order for the Portfolio to perform consistent with the Performance Warranty at the end of such Calendar Quarter. If Seller is obligated to repair or replace any Facilities pursuant to this Section 5.7(d) and such repair or replacement is not feasible (as determined at Seller's sole option and discretion) and Seller notifies Buyer to such effect, Seller will refund to Buyer the Refund Value of such number of Underperforming Facilities (calculated as of the date of such refund) as will cause the remaining Portfolio to comply with the Performance Warranty calculated through the final day of the applicable Calendar Quarter, in which case Seller shall be deemed to have taken title to such Underperforming Facilities, and such Underperforming Facilities shall be deemed to no longer constitute a portion of the Portfolio. Seller shall make such determination as to the feasibility of repair or replacement as promptly as practicable, but in any event within ninety (90) days after Seller's receipt of notice of the claim unless the specific

nature of the problem requires a longer period in which to make such determination (in which case Seller must make a determination within a reasonable time) provided that such longer period for a determination does not cause any breach of a PPA. In the event that Seller has not completed the repair or replacement of such sufficient number of Underperforming Facilities within ninety (90) days of the date on which Seller received notice of a claim, or repurchased such sufficient number of Underperforming Facilities in the time period in this Section 5.7(d), then Buyer has the right to require Seller (in which case Seller agrees) to procure return of such number of Underperforming Facilities (calculated as of the date of such refund) as will cause the remaining Portfolio to comply with the Performance Warranty calculated through the final day of the applicable Calendar Quarter) and Seller will refund to Buyer the Refund Value of such Underperforming Facilities, in which case Seller shall be deemed to have taken title to such Underperforming Facilities upon payment of the Refund Value, and such Facilities shall be deemed to no longer constitute a portion of the Portfolio and shall be removed as described in the previous sentence. In the event that Seller is obligated to repurchase any Underperforming Facilities pursuant to this Section 5.7(d) in connection with a Performance Warranty claim, the first Underperforming Facility repurchased shall be the Facility with the lowest output as a factor of its System Capacity in the prior Calendar Quarter, followed by the next lowest, and so on until Seller's repurchase obligations are satisfied.

(e) Buyer is hereby notified that refurbished parts may be used in repair or replacement activities, provided that (i) any such refurbished parts will have passed the same inspections and tests performed by Seller on its new parts of the same type before such refurbished parts are used in any repair or replacement, and (ii) Seller shall within thirty (30) days of a written request therefor by Buyer, provide a report for any or all Bloom Systems purchased hereunder that lists all components that have been replaced in any individual Bloom System. If it is determined that a Facility will be removed pursuant to Section 5.7(c) or Section 5.7(d), Seller shall at its sole cost and expense remove the Facility and all ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations in the manner required by all Legal Requirements and the applicable PPA or Site License.

(f) WITHOUT IN ANY WAY LIMITING (I) SELLER'S OBLIGATION TO INDEMNIFY BUYER PURSUANT TO SECTION 13.3(A)(II) IN RESPECT OF A BREACH OF SECTION 8.1(M), EXCEPT AS EXPLICITLY SET FORTH IN SECTION 5.8, THE REMEDIES SET FORTH IN THIS SECTION 5.7 ARE BUYER'S SOLE AND EXCLUSIVE REMEDY, AND SELLER'S SOLE AND EXCLUSIVE LIABILITY, ARISING OUT OF A FAILURE OF ANY FACILITY OR THE PORTFOLIO, AS APPLICABLE, TO PERFORM IN ACCORDANCE WITH THE WARRANTY SPECIFICATIONS.

Section 5.8 Indemnification Regarding Performance Under PPAs.

(a) Without in anyway limiting and in addition to Buyer's remedies pursuant to Section 5.2 to Section 5.7, inclusive, in the event that Buyer incurs any liability to a PPA Customer with respect to any performance guarantee, any power performance shortfall, any efficiency warranty or any cost excess, including payments made or to be made by Buyer to a PPA Customer to reimburse such PPA Customer for any deficiency in the benefits received by such PPA Customer under the applicable state incentive programs for any PPA (collectively the "PPA Warranties"), Seller shall indemnify and hold Buyer harmless for any such liability, costs and expenses incurred by Buyer pursuant to such PPA Warranties ("PPA Warranty Reimbursement Payment") except to the extent such liability results from a failure (not attributable to a Bloom Component Defect) of the Battery Solution to perform in accordance with any warranty(ies) provided by the Battery Solution Manufacturer. Without in any way limiting and in addition to the foregoing, in the event that the failure of any Bloom System(s) to comply with any PPA Warranty causes the termination of a PPA (in whole or in part), then (i) Buyer may return the applicable Bloom System(s) to Seller and Seller will refund to Buyer the Refund Value of such Bloom Systems, in which case Seller shall be deemed to have taken title to such Bloom Systems, and such Bloom System shall be deemed to no longer constitute a portion of the Portfolio, and (ii) Seller shall indemnify and hold Buyer harmless for any amount Buyer is liable to a PPA Customer in connection with such termination. If it is determined that a Bloom System will be removed pursuant to this Section 5.8(a), Seller shall at its sole cost and expense remove the Bloom System and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations in the manner required by all Legal Requirements and the applicable PPA or Site License. For the avoidance of doubt, claims, credits, reimbursements and any other payments made under this Section 5.8(a) are not subject to the cap set forth in Section 5.7(b) with respect to claims relating to the Performance Guaranty and shall not count against such cap.

(b) PPA Warranty Reimbursement Payments owed pursuant to Section 5.8(a) shall be calculated by Seller on the first Business Day following the end of each Calendar Quarter and paid no later than the fifth Business Day of the Calendar Quarter immediately following the Calendar Quarter with respect to which such PPA Warranty Reimbursement Payment arose.

(c) Notwithstanding anything to the contrary set forth herein, Seller shall have no liability to Buyer under this Section 5.8 to the extent that Seller's liability under any PPA Warranty is increased due to such PPA Warranty having been modified, amended, or otherwise changed in any way from the terms of such PPA Warranty as set forth in the applicable PPA as of the Original PUMA Agreement Date (or, for PPAs added after the Original PUMA Agreement Date, as set forth in the applicable PPA as of such date) unless Seller has consented in writing to such modification, amendment, or change.

Section 5.9 Disclaimers. EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES SET FORTH IN ARTICLE VIII, THIS ARTICLE V AND THE OTHER TRANSACTION DOCUMENTS, THE FACILITIES ARE TRANSFERRED "AS IS, WHERE IS", AND SELLER EXPRESSLY DISCLAIMS ANY REPRESENTATIONS OR WARRANTIES OF ANY KIND OR NATURE, EXPRESS OR IMPLIED, AS TO LIABILITIES, OPERATIONS OF THE FACILITIES, VALUE OR QUALITY OF THE FACILITIES OR THE PROSPECTS (FINANCIAL AND OTHERWISE), RISKS AND OTHER INCIDENTS OF THE FACILITIES. EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES SET FORTH IN ARTICLE VIII, THIS ARTICLE V AND THE OTHER TRANSACTION DOCUMENTS, SELLER SPECIFICALLY DISCLAIMS ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, USAGE, SUITABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE WITH RESPECT TO THE FACILITIES, OR ANY PART THEREOF. NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTY OR REPRESENTATION CONCERNING THE PERFORMANCE OF THE FACILITIES.

Section 5.10 Title. Title to all replacement items, parts, materials and equipment supplied under or pursuant to this Agreement to Buyer shall transfer to Buyer upon installation or inclusion in a Facility. Upon replacement of an item or part as part of the Facility Services provided hereunder, Seller shall be obligated to remove such item or part and shall have the right to dispose of such replaced property in any manner that it chooses in its sole discretion.

ARTICLE VI.
RECORDS AND AUDITS

Section 6.1 Record-Keeping Documentation; Audit Rights.

(a) Seller shall ensure that records concerning Seller's EPC Services and Facility Services activities hereunder are properly created and maintained at all times in accordance with all Legal Requirements, including FERC requirements regarding record retention for Holding Companies in 18 C.F.R. Part 368 and any successor regulations to the extent applicable to Seller. Such records shall include, but not be limited to, the following:

(i) records and documentation in respect of each Facility's satisfaction of each Milestone, including records and documentation regarding the shipment of Bloom Systems and BOF, the completion of BOF Work, the achievement of Commencement of Operations, and the fact and date(s) such Facility has achieved each of the four separate criteria set forth the definition of "Placed in Service";

(ii) a separate "Maintenance Specification Log" for each Facility in a paper or electronic format (with entries made for each inspection, including any discrepancies found during such inspection), a copy of which shall be submitted, in paper or electronic format, to Buyer along with the corresponding Quarterly Reports;

(iii) a Site service report completed in respect of each inspection, repair, replacement, service or other activity or observation made by or on behalf of Seller

in connection with its responsibilities hereunder, detailing the nature of the problems with a Facility detected, if any, and the specifics of the problem resolution and submitted to Buyer within ten (10) Business Days of the date when such problem is resolved or within ten (10) Business Days of a routine inspection or service that did not identify any issues;

(iv) a monthly report submitted to Buyer within fifteen (15) days after the end of each month ("Monthly Report") detailing and documenting, on a monthly basis, the (A) Efficiency and total output (in kWh) of each Facility comprising the Portfolio, and (B) total output (in kWh) of the Portfolio, in each case for the preceding month;

(v) records and documentation in respect of each Facility or the Portfolio, as applicable, regarding the compliance of such Facility or the Portfolio, as applicable, with the Warranty Specifications and any applicable PPA Warranties during the Warranty Period;

(vi) any other records, reports, or other documentation related to the production and sale of energy from the Facilities or that Buyer is required to maintain in respect of any Facility under any applicable PPA;

(vii) until the Commencement of Operations Date of the final Facility to achieve such milestone, a "Construction Report" delivered in connection with the Payment Notice corresponding to each invoice delivered pursuant to Section 2.3(a)(iii), specifying (A) the forecasted commencement of construction date, shipment date and Commencement of Operations Date of each Facility projected to be included in the Portfolio, (B) the actual commencement of construction date, shipment date and Commencement of Operations Date of each Facility included in the Portfolio as of the date of such Construction Report, and (C) a summary narrative regarding the source of any delays in the achievement of any of the foregoing milestones as compared to the dates forecasted in the immediately prior Construction Report; and

(viii) any other records, reports, or other documentation reasonably requested by Buyer, including as necessary to support any ITC eligibility determination with respect to a Facility. Seller agrees to use commercially reasonable efforts to promptly provide such documentation to Buyer, and shall provide a reasonable explanation for any inability to provide such documentation.

(b) All such records required to be created and maintained pursuant to Section 6.1(a) shall (i) be kept available at Seller's office and made available for Buyer's inspection upon request at all reasonable times, and (ii) be retained for the relevant retention period provided in 18 C.F.R. § 368.3 or any successor regulation as amended from time, to the extent applicable to Seller, or any longer period required under any PPA. Any documentation prepared by Seller during the Term for the purposes of this Agreement shall be directly prepared for Buyer's benefit and immediately become Buyer's property. Any such documentation shall be stored by Seller on behalf of Buyer

until its final delivery to Buyer. Seller may retain a copy of all records related to each Facility for future analysis.

(c) Buyer shall have the right no more than once during any calendar year and going back no more than two (2) calendar years preceding the calendar year in which an audit takes place, upon reasonable prior written notice, including using an independent public accounting firm reasonably acceptable to Seller, to examine such records during regular business hours in the location(s) where such records are maintained by Seller for the purposes of verifying Buyer's compliance with its obligations hereunder, including the accuracy of Monthly Reports and Seller's calculations in respect of Warranty Specifications and applicable PPA Warranties; provided, however, that such records may be audited only once under this Section 6.1(c). Buyer shall pay the cost of the audit unless the results of the audit reveal that the Minimum kWh or Actual kWh reported by Buyer in respect of the Portfolio or any Facility during any calendar year that is audited exceeds by five percent (5%) or more the true Minimum kWh or Actual kWh, as the case may be, in which case Seller shall pay the audit costs.

Section 6.2 Reports; Invoicing Information; Other Information. Without in any way limiting Seller's other reporting, notification, and other similar obligations under this Agreement, during the Warranty Period, Seller shall furnish to Buyer the following reports, notices, and other information regarding the Bloom Systems (which may be effected by e-mail communication to the Buyer Manager or other appropriate Buyer representative):

(a) Promptly upon Seller's knowledge of any event or circumstance which could materially delay or prevent its performance of any of Seller's obligations under any PPA, notice of such event or circumstance in reasonable detail;

(b) Promptly upon Seller's knowledge of the occurrence of any damage to any Facility or Site, notice of such damage in reasonable detail;

(c) Promptly (and in any case within three (3) Business Days) following Seller's final determination of the applicability thereof, notice that the operation of a Facility has experienced any of the circumstances described in clauses (i) through (iv) of the definition of "Minimum kWh" herein;

(d) Promptly upon Seller's knowledge, notice that any Facility was or is not in compliance with any PPA Warranty during any period;

(e) Any information Buyer may reasonably request in connection with any claim filed by Buyer under any insurance maintained with respect to the Facilities, and any information such insurance providers may reasonably request in connection with such claim; and

(f) Seller shall, upon Buyer's reasonable request, make available to Buyer appropriate members of Seller's senior technical personnel to discuss any performance issues relating to (i) any Facility that experienced a reduction in average output in any calendar month as compared to the immediately preceding calendar month exceeding five percent (5%), or (ii) any component of the Battery Solution.

ARTICLE VII.
DATA ACCESS

Section 7.1 Access to Data and Meters. Throughout the Term, and thereafter to the extent relevant to calculations necessary for periods prior to the end of the Term and subject to any confidentiality obligation owed to any third party, any limitations under Legal Requirements as determined by Buyer in its reasonable discretion, and/or any restrictions on the disclosure of information which may be subject to intellectual property rights restricting disclosure, at the sole cost of Seller:

(a) Buyer shall grant Seller access to all data relating to the electricity production of each Facility, it being understood that it is Seller's responsibility to determine the performance of the Facility, and any other calculations as required under this Agreement, and that it is Buyer's responsibility to handle all accounting and invoicing activities;

(b) Buyer shall allow Seller access to all data from all Facility Meters; and

(c) Seller shall be entitled to use the foregoing data for its internal business purposes and make such data available to third parties for analysis, in all cases unless and to the extent such uses of or disclosures by Seller are restricted under the applicable PPA or Legal Requirements, including those related to privacy.

ARTICLE VIII.
REPRESENTATIONS AND WARRANTIES OF SELLER

Section 8.1 Representations and Warranties of Seller. Seller represents and warrants to Buyer as of the Original PUMA Agreement Date and as of each Purchase Date as follows:

(a) Incorporation; Qualification. Seller is a corporation duly incorporated, validly existing and in good standing under the laws of the State of Delaware and has all requisite corporate power and authority to own, lease, and operate its business as currently conducted. Seller is duly qualified to do business as a foreign corporation and is in good standing under the laws of each jurisdiction that its business, as currently being conducted, shall require it to be so qualified, except where the failure to be so qualified would not have a material adverse effect on the Bloom Systems being sold under this Agreement.

(b) Authority. Seller has full corporate power and authority to execute and deliver the Transaction Documents to which it is a party and to consummate the transactions contemplated hereby and thereby. The execution and delivery by Seller of the Transaction Documents to which it is a party and the consummation by Seller of the transactions contemplated hereby and thereby have been duly and validly authorized by all necessary corporate action required on the part of Seller and the Transaction Documents to which Seller is a party have been duly and validly executed and delivered by Seller. Each of the Transaction Documents to which Seller is a party constitutes the legal, valid and binding agreement of Seller, enforceable against Seller in accordance with its terms, except as enforcement may be limited by applicable bankruptcy,

insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally and by general principles of equity (regardless of whether considered in a proceeding in equity or at law).

(c) Consents and Approvals; No Violation. Neither the execution, delivery and performance of the Transaction Documents to which Seller is a party nor the consummation by Seller of the transactions contemplated hereby and thereby will (i) conflict with or result in any breach of any provision of the certificate of incorporation or bylaws of Seller, (ii) with or without the giving of notice or lapse of time or both, conflict with, result in any violation or breach of, constitute a default under, result in any right to accelerate, result in the creation of any Lien on Seller's assets, or create any right of termination under the conditions or provisions of any note, bond, mortgage, indenture, material agreement or other instrument or obligation to which Seller is a party or by which it, or any material part of its assets may be bound, in each case that would individually or in the aggregate result in a material adverse effect on Seller or its ability to perform its obligations hereunder or (iii) constitute violations of any law, regulation, order, judgment or decree applicable to Seller, which violations, individually or in the aggregate, would result in a material adverse effect on Seller or its ability to perform its obligations hereunder.

(d) Legal Proceedings. There are no pending or, to Seller's Knowledge, threatened claims, disputes, governmental investigations, suits, actions (including non-judicial real or personal property foreclosure actions), arbitrations, legal, administrative or other proceedings of any nature, domestic or foreign, criminal or civil, at law or in equity, by or against Seller that challenge the enforceability of the Transaction Documents to which Seller is a party or the ability of Seller to consummate the transactions contemplated hereby or thereby, in each case, that could reasonably be expected to result in a material adverse effect on Seller or its ability to perform its obligations hereunder.

(e) U.S. Person. Seller is not a "foreign person" within the meaning of Section 1445(b)(2) of the Code and has provided a Certificate of Non-Foreign Status in the form and substance required by Section 1445 of the Code and the regulations thereunder.

(f) Purchase Price of Facility. The Purchase Price paid for each Facility is an amount that is equal to the Fair Market Value of each Facility, as determined on an arms-length basis.

(g) Title; Liens. As of each date title is required to pass to Buyer hereunder with respect to any assets comprising a Facility, Seller has and will convey good and marketable title to such assets to be sold to Buyer on such date and all such assets are free and clear of all Liens other than Permitted Liens. Neither Seller nor any of its subcontractors have placed any Liens on the Sites or the Facilities other than Permitted Liens. To the extent that Seller has actual knowledge that any of its subcontractors has placed any Lien on a Facility or Site, then Seller shall cause such Liens to be discharged, or shall provide a bond in an amount and from a surety acceptable to Buyer to protect

against such Lien, in each case, within thirty (30) days after Seller is aware of the existence thereof. Seller shall indemnify Buyer against any such lien claim, provided that if the applicable Site License requires additional or more stringent action, Seller shall also indemnify Buyer for the costs and expenses of such actions.

(h) Intellectual Property. To Seller's Knowledge, no Bloom System and no other product or service marketed or sold (or proposed to be marketed or sold) by Seller hereunder violates or will violate any license or infringes or will infringe any intellectual property rights of any other Person; provided, however, that, except with respect to parts and components supplied by Seller or any of its Affiliates to the Battery Solution Manufacturer that are used to manufacture any Battery Solution, Seller makes no representations or warranties under this Section 8.1(h) regarding the Battery Solution. Seller has received no written communications alleging that such Seller has violated, or by conducting its business, would violate any of the patents, trademarks, service marks, tradenames, copyrights, trade secrets, mask works or other proprietary rights or processes of any other Person.

(i) Consents and Approvals. Seller has received all material third party consents which are required as of such date for the consummation and performance of the transactions contemplated hereunder.

(j) Real Property. The real property referred to in each PPA and each Site License is all the real property that is necessary for the construction, installation, operation and maintenance of the Facilities other than those real property interests that can be reasonably expected to be available on commercially reasonable terms as and to the extent required. Each Site has been licensed to Buyer pursuant to the terms of the applicable Site License. For clarity, no Site has been leased to Buyer.

(k) Tax Representations.

(i) Each Facility is a fuel cell power plant that has a Nameplate Capacity of at least 0.5 kilowatts of electricity using an electrochemical process and has an electricity-only generation efficiency greater than 30 percent. Each Facility will function independently of each other Facility in the Portfolio to generate electricity for transmission and sale to a PPA Customer and is an integrated system comprised of a fuel cell stack assembly and associated balance of plant components that has all the necessary components to convert a fuel into electricity using electrochemical means.

(ii) As of Purchase Date for each Facility, no federal, state, or local Tax credit (including the ITC) has been claimed with respect to any property that is part of such Facility.

(iii) No application has been submitted for a grant provided under Section 1603 of the American Recovery and Reinvestment Tax Act of 2009, as amended by the Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010, with respect to any property that is part of any Facility.

(iv) No private letter ruling has been obtained for the transactions contemplated hereunder from the IRS.

(v) As of the Purchase Date of each Facility, such Facility was not originally Placed in Service and, specifically, clauses (3) and (4) of the definition of the term "Placed in Service" have not been met with respect to such Facility.

(vi) No Facility is comprised of any property that (A) is "used predominately outside of the United States" within the meaning of Code Section 168(g), (B) is imported property of the kind described in Code Section 168(g)(6), (C) is "tax-exempt use property" within the meaning of Code Section 168(h), or (D) is property described in Code Section 50(b).

(vii) Other than de minimis property, material or parts, each Facility consists of property, materials or parts not used by any Person prior to having been first placed in a state of readiness and availability for their specific design function as part of the Facility.

(viii) No portion of the basis of the Facility is attributable to "qualified rehabilitation expenditures" within the meaning of Section 47(c)(2)(A) of the Code.

(ix) No grants (for purposes of this paragraph, "grants" shall not include any credits, benefits, emissions reductions, offsets or allowances, howsoever entitled, attributable to the generation from the Facilities, and its respective avoided emission of pollutants) have been provided by the United States, a state, a political subdivision of a state, or any other Governmental Authority for use in constructing or financing any Facility or with respect to which Seller is the beneficiary. No proceeds of any issue of state or local government obligations have been used to provide financing for any Facility the interest on which is exempt from tax under Code Section 103. No subsidized energy financing (within the meaning of Code Section 45(b)(3)) has been provided, directly or indirectly, under a federal, state, or local program provided in connection with any Facility.

(x) Seller is not related to any PPA Customer within the meaning of Code Section 267 or Code Section 707.

(l) Bankruptcy. No event of Bankruptcy has occurred with respect to Seller.

(m) Bloom System Performance. Assuming that Seller maintains each of the Facilities consistent with the Preventative Maintenance Schedule, Seller is not aware of any circumstances which could reasonably be expected to prevent the Portfolio from performing in accordance with the Warranty Specifications and the PPA Warranties for the Warranty Period.

(n) Material Adverse Effect.

(i) As of the Original PUMA Agreement Date, no Material Adverse Effect has occurred with respect to Seller or, to the Knowledge of Seller, any PPA Customer.

(ii) As of each Purchase Date, no Material Adverse Effect has occurred between the Original PUMA Agreement Date and the applicable Purchase Date (A) with respect to Seller or, (B) to the Knowledge of Seller, with respect to the applicable PPA Customer(s) relating to any of the Facilities purchased and sold on such date.

(o) Governmental Approvals. Seller, as applicable on behalf of Buyer, has obtained all Governmental Approvals required as of Delivery Date to construct any Facility in compliance with Applicable Law. Seller will assist Buyer in applying for a grant of market-based rate authority from FERC sufficient to operate each Facility with an effective date prior to any Facility being Placed in Service. As of each of the dates each Facility is Placed in Service and achieves Commencement of Operations, Seller, as applicable on behalf of Buyer, has obtained all Governmental Approvals required for such operation of such Facility and each of the Governmental Approvals obtained as of such date is validly issued, final and in full force and effect and is not subject to any current legal proceeding or to any unsatisfied condition. On each of such dates, Seller, as applicable on behalf of Buyer, is in compliance in all material respects with all applicable Governmental Approvals and has not received any notice from a Governmental Authority of an actual or potential violation of any such Governmental Approval.

(p) Compliance. Seller has performed in all respects all obligations, and complied in all material respects with the agreements and covenants, required to be performed by or complied with by Seller hereunder; provided that, for clarity, Seller has complied, and will comply, in all respects with the obligations set forth in Section 7.1(h)(i) of the Equinix PPA in its capacity as "Bloom" thereunder and as if Seller were a "Party" thereto.

(q) No Breaches. As of the Original PUMA Agreement Date, each PPA is a legal, valid, binding and enforceable obligation of Buyer and, to Seller's Knowledge, of each other party thereto, and each PPA is in full force and effect. To Seller's Knowledge, neither Buyer nor any other Person party thereto is in material breach or violation of any PPA, and no event has occurred, is pending or is threatened, which, after the giving of notice, with lapse of time, or otherwise, would constitute any such breach or default by Buyer or any other party thereto.

(r) Insurance. Seller has obtained the insurance described in Annex B with respect to each Facility in the Portfolio and with respect to each other Facility not yet in the Portfolio for which Buyer has paid any portion of the applicable Purchase Price, all such policies remain in full force and effect, and all insurance premiums that are due and payable have been paid in full with no premium overdue.

(s) Data Privacy. Seller has used all data that Seller has collected regarding a PPA Customer's electricity consumption at such Site consistent with and subject to Applicable Law with respect to privacy.

ARTICLE IX.
REPRESENTATIONS AND WARRANTIES OF BUYER

Section 9.1 Representations and Warranties of Buyer. Buyer represents and warrants to Seller as of the Original PUMA Agreement Date and as of each Purchase Date, as follows.

(a) Organization. Buyer is a limited liability company duly formed, validly existing and in good standing under the laws of the State of Delaware and has all requisite limited liability company power and authority to own, lease, and operate its business as currently conducted.

(b) Authority. Buyer has full limited liability company power and authority to execute and deliver the Transaction Documents to which it is a party and to consummate the transactions contemplated hereby and thereby. The execution and delivery by Buyer of the Transaction Documents to which it is a party and the consummation by Buyer of the transactions contemplated hereby and thereby have been duly and validly authorized by all necessary corporate action required on the part of Buyer and the Transaction Documents to which Buyer is a party have been duly and validly executed and delivered by Buyer. Each of the Transaction Documents to which Buyer is a party constitutes the legal, valid and binding agreement of Buyer, enforceable against Buyer in accordance with its terms, except as enforcement may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally and by general principles of equity (regardless of whether considered in a proceeding in equity or at law).

(c) Consents and Approvals; No Violation. Neither the execution, delivery and performance of the Transaction Documents to which Buyer is a party nor the consummation by Buyer of the transactions contemplated hereby and thereby will (i) conflict with or result in any breach of any provision of the articles of formation of Buyer nor Buyer's limited liability company agreement, (ii) with or without the giving of notice or lapse of time or both, conflict with, result in any violation or breach of, constitute a default under, result in any right to accelerate, result in the creation of any Lien on Buyer's assets, or create any right of termination under the conditions or provisions of any note, bond, mortgage, indenture, material agreement or other instrument or obligation to which Buyer is a party or by which it, or any material part of its assets may be bound, in each case that would individually or in the aggregate result in a material adverse effect on Buyer or its ability to perform its obligations hereunder or (iii) constitute violations of any law, regulation, order, judgment or decree applicable to Buyer, which violations, individually or in the aggregate, would result in a material adverse effect on Buyer or its ability to perform its obligations hereunder.

(d) Legal Proceedings. There are no pending or, to Buyer's Knowledge, threatened claims, disputes, governmental investigations, suits, actions (including non-

judicial real or personal property foreclosure actions), arbitrations, legal, administrative or other proceedings of any nature, domestic or foreign, criminal or civil, at law or in equity, by or against Buyer that challenge the enforceability of the Transaction Documents to which Buyer is a party or the ability of Buyer to consummate the transactions contemplated hereby or thereby, in each case, that could reasonably be expected to result in a material adverse effect on Buyer or its ability to perform its obligations hereunder.

(e) Consents and Approvals. Buyer has received all material third party consents which are required as of such date for the consummation and performance of the transactions contemplated hereunder.

(f) Bankruptcy. No event of Bankruptcy has occurred with respect to Buyer.

(g) No Other Representations. Buyer is not relying on any representations or warranties whatsoever, express, implied, at common law, statutory or otherwise, except for the representations or warranties expressly set out in the Transaction Documents and the Assignment Agreements.

ARTICLE X.
CONFIDENTIALITY

Section 10.1 Confidential Information. Subject to the other terms of this ARTICLE X each Party shall, and shall cause its Affiliates and its respective stockholders, members, subsidiaries and Representatives to, hold confidential the terms of this Agreement and all information it has obtained or obtains from the other Party in connection with this Agreement concerning Seller and Buyer and their respective assets, business, operations or prospects (the "Confidential Information"), including all materials and information furnished by Seller in performance of this Agreement, regardless of form conveyed or whether financial or technical in nature, including any trade secrets and proprietary know how and Software whether such information bears a marking indicating that they are proprietary or confidential or not; provided, however, that Confidential Information shall not include (a) the fact that the Parties have entered into this Agreement, (b) the nature of the transactions contemplated by this Agreement or (c) the Buyer's capital expenditures or financing plans related to the transactions contemplated by this Agreement, or (d) information that (i) is or becomes generally available to the public other than as a result of any fault, act or omission by a Party or any of its Representatives, (ii) is or becomes available to a Party or any of its Representatives on a non-confidential basis from a source other than the other Party or its Representatives, provided that such source was not and is not bound by any contractual, legal or fiduciary obligation of confidentiality with respect to such information or (iii) was or is independently developed or conceived by a Party or its Representatives without use of or reliance upon the Confidential Information of the other Party, as evidenced by sufficient written record.

Section 10.2 Restricted Access.

(a) Buyer agrees that the Bloom Systems themselves contain Seller's valuable trade secrets. Buyer agrees (i) to restrict the use of such information to matters relating

to the Facilities, and such other purposes, if any, expressly provided herein, and (ii) to restrict access to such information as provided in Section 10.3(b).

(b) Seller's Confidential Information will not be reproduced without Seller's prior written consent, and following termination of this Agreement all copies of such written information will be returned to Seller upon written request (not to be made while materials are still of use to the operation of a Facility and no Buyer Default has occurred and is continuing) or shall be certified by Buyer as having been destroyed, unless otherwise agreed by the Parties. Buyer's Confidential Information will not be reproduced by Seller without Buyer's prior written consent, and following termination of this Agreement all copies of such written information will be returned to Buyer upon written request or shall be certified by Seller as having been destroyed. Notwithstanding the foregoing, each Party and its Representatives may each retain archival copies of any Confidential Information to the extent required by law, regulation or professional standards or copies of Confidential Information created pursuant to the automatic backing-up of electronic files where the delivery or destruction of such files would cause undue hardship to the receiving Party, so long as any such archival or electronic file back-up copies are accessible only to legal or information technology personnel, provided that such Confidential Information will continue to be subject to the terms of this Agreement.

(c) Subject to ARTICLE XI and Section 10.2(a) and (b) hereof, the Facilities are offered for sale and are sold by Seller subject to the condition that such sale does not convey any license, expressly or by implication, to manufacture, reverse engineer, duplicate or otherwise copy or reproduce any part of the Facilities, documentation or Software without Seller's express advance written permission. Subject to ARTICLE XI hereof, Buyer agrees not to remove the covering of any Bloom System, not to access the interior or to reverse engineer, or cause or knowingly allow any third party to open, access the interior or reverse engineer any Facility or Software provided by Seller. Subject to ARTICLE XI hereof, and anything contemplated pursuant to this Agreement, only Seller or its authorized representatives may open or access the interior of a Facility. Notwithstanding the foregoing or anything else herein to the contrary, and without limitation of the rights set forth in ARTICLE XI hereof, if any Facility is no longer covered by this Agreement or another agreement between Buyer and Seller (or any Affiliate of Seller) regarding the operation and maintenance of such Facility as a result of the termination of this Agreement with respect to such Facility (A) in connection with a Seller Default or (B) in connection with the expiration of the Extended Warranty Period, Buyer shall be entitled to maintain, or cause a third party to maintain, such Facility, including replacing Components as needed or desired; provided that:

(i) No less than thirty (30) calendar days prior to the event of such termination pursuant to subsection (B) above, to the extent Buyer requires any maintenance services for such Facility following such termination, Buyer shall notify Seller of such requirements in writing. If Seller desires to perform such maintenance services, Seller shall provide within five (5) Business Days to Buyer the material terms and conditions (including, without limitation, the scope of services offered, the price(s) quoted for such services, and the terms of any

performance warranties to be provided in connection with such services) pursuant to which it is willing to provide such maintenance services for such Facility, which shall be no less favorable to Buyer than Seller's standard rates, terms and warranties as of such date. If Buyer declines to engage Seller to perform such services, or the Parties are unable to execute appropriate documentation to reflect such services, Buyer may (subject to clause (ii), below) seek to engage a third party to perform such services, provided that, prior to engaging any such third party to maintain a Facility, Buyer shall provide written notice to Seller of the material terms and conditions on which such third party has offered to provide such service (including, without limitation, (X) the scope of services offered, (Y) the price(s) quoted for such services, and (Z) the terms of any performance warranties to be provided in connection with such services). Seller shall have ten (10) Business Days to notify Buyer if Seller will agree to perform the applicable services for a price not to exceed the quoted amount and otherwise on terms no less favorable to Buyer than those included in the notice required hereunder. If Seller agrees to provide such services, the Parties will negotiate in good faith regarding appropriate documentation to reflect such services. If Seller declines to provide such services, Buyer may engage the applicable third party on terms no more favorable to such third party than those provided in the notice to Seller.

(ii) Without in any way limiting the provisions of the foregoing clause (i), Buyer shall in all events use commercially reasonable efforts to engage a third party to provide such maintenance that is not a competitor of Seller or its Affiliates and is not in litigation or other material dispute with Seller.

Section 10.3 Permitted Disclosures.

(a) Legally Compelled Disclosure. Confidential Information may be disclosed (i) as required or requested to be disclosed by a Party or any of its Affiliates or their respective stockholders, members, subsidiaries or Representatives as a result of any applicable Legal Requirement or rule or regulation of any stock exchange, the Financial Industry Regulatory Authority, Inc. or other regulatory authority or self-regulatory authority having jurisdiction over such Party, (ii) as required or requested by the IRS, the Department of Justice or the Office of the Inspector General in connection with a Facility, cash grant, or tax credits relating thereto, including in connection with a request for any private letter ruling, any determination letter or any audit or (iii) as required under any Interconnection Agreement. If a Party becomes compelled by legal or administrative process to disclose any Confidential Information, such Party shall, to the extent permitted by Legal Requirements, provide the other Party with prompt notice so that the other Party may seek a protective order or other appropriate remedy or waive compliance with the non-disclosure provisions of this Section 10.3 with respect to the information required to be disclosed. If such protective order or other remedy is not obtained, or such other Party waives compliance with the non-disclosure provisions of this Section 10.3 with respect to the information required to be disclosed, the first Party shall furnish only that portion of such information that it is advised by counsel is legally required to be furnished and shall exercise reasonable efforts, at the expense of the Party whose Confidential Information is being disclosed, to obtain reliable assurance that

confidential treatment will be accorded such information, including, in the case of disclosures to the IRS described in clause (ii) above, to obtain reliable assurance that, to the maximum extent permitted by applicable Legal Requirements, such information will not be made available for public inspection pursuant to Section 6110 of the Code.

(b) Disclosure to Representatives. Notwithstanding the foregoing, and subject always to the restrictions in Section 10.2, a Party may disclose Confidential Information received by it to its and its Affiliates' actual or potential investors or financing parties and its and their employees, consultants, legal counsel or agents who have a need to know such information; provided that such Party informs each such Person who has access to the Confidential Information of the confidential nature of such Confidential Information, the terms of this Agreement, and that such terms apply to them. The Parties shall use commercially reasonable efforts to ensure that each such Person complies with the terms of this Agreement and that any Confidential Information received by such Person is kept confidential.

(c) Securities Filings. A Party may file this Agreement as an exhibit to any relevant filing with the Securities Exchange Commission (or equivalent foreign agency) in accordance with Legal Requirements only after complying with the procedure set forth in this Section 10.3(c). In such event, the Party seeking such disclosure shall prepare a draft confidential treatment request and proposed redacted version of this Agreement to request confidential treatment for this Agreement, and the other Party agrees to promptly (and in any event, no less than fourteen (14) days after receipt of such confidential treatment request and proposed redactions) give its input in a reasonable manner in order to allow the Party seeking disclosure to file its request within the time lines prescribed by Legal Requirements. The Party seeking such disclosure shall exercise commercially reasonable efforts to obtain confidential treatment of the Agreement from the Securities Exchange Commission (or equivalent foreign agency) as represented by the redacted version reviewed by the other Party. Each Party shall bear its own costs in connection with such efforts.

(d) Other Permitted Disclosures. Nothing herein shall be construed as prohibiting a Party hereunder from using such Confidential Information in connection with (i) any claim against the other Party, (ii) any exercise by a Party hereunder of any of its rights hereunder, (iii) a financing or proposed financing by Seller or Buyer or their respective Affiliates, (iv) a disposition or proposed disposition by any direct or indirect Affiliate of Buyer of all or a portion of such Person's equity interests in Buyer, (v) a disposition or proposed disposition by Buyer of any Bloom System or Facility, or (vi) any disclosure required to be made to a PPA Customer (or otherwise) under a PPA or a Site License, provided that, in the case of items (iii), (iv) and (v), the potential financing party or purchaser has entered into a confidentiality agreement with respect to Confidential Information on customary terms used in confidentiality agreements in connection with corporate financings or acquisitions before any such information may be disclosed and a copy of such confidentiality agreement has been provided to the non-disclosing party for informational purposes, which copy of such confidentiality agreement may contain redactions of confidential information relating to the potential financing or purchaser. No disclosures of Confidential Information shall be made by

Buyer in exercise of its rights under this Section 10.3(d) until Seller has first had the opportunity to exercise its right to take or purchase the Bloom System in question, if applicable.

ARTICLE XI.
LICENSE AND OWNERSHIP; SOFTWARE

Section 11.1 IP License to Use. Subject to Section 11.2, Seller grants to Buyer a limited (as described herein), non-exclusive, royalty-free, irrevocable (except as described in ARTICLE XII hereof), non-transferable (except as described herein) license to use the Intellectual Property, including Seller's proprietary Software, contained in the Documentation, the Components and the Facilities purchased hereunder (collectively, "Seller's Intellectual Property") in conjunction with the purchase, use, operation, maintenance, repair and, subject to Section 3.6(b), sale of the Bloom Systems and in conjunction with each Facility in accordance with the terms hereof and each PPA and Interconnection Agreement (the "IP License"); provided that (a) such license may be transferred or sub-licensed upon a transfer of a Bloom System to any Person who acquires such Bloom System, subject to Buyer's compliance with Section 3.6(b), (b) such license may be transferred or sub-licensed by Buyer to any third party Buyer is entitled to engage to maintain any Facility pursuant to Section 10.2(c), (c) such license may be transferred by Buyer to any successor or assign of Buyer permitted pursuant to Section 14.4, and (d) in the event of a voluntary or involuntary Bankruptcy of Buyer, Seller hereby expressly consents to the assumption and assignment of the IP License by Buyer as necessary to allow Buyer's continued use of each Bloom System and/or Facility in accordance with the terms hereof and, as applicable, each PPA and Interconnection Agreement. Seller shall retain all right, title and ownership of any and all Intellectual Property licensed by Seller hereunder. No right, title or interest in any such Intellectual Property is granted, transferred or otherwise conveyed to Buyer under this Agreement except as otherwise expressly set forth herein. Buyer shall not, except as otherwise provided herein, modify, network, rent, lease, loan, sell, distribute or create derivative works based upon Seller's Intellectual Property in whole or part, or cause or knowingly allow any third party to do so.

Section 11.2 Grant of Third Party Software License.

(a) Seller grants to Buyer a limited (as described herein), non-exclusive, royalty-free, irrevocable (except as described in ARTICLE XII hereof), non-transferable (except as described herein) license to use the third party Software (the "Software License"); provided that (i) such license may be transferred or sub-licensed upon a transfer of a Bloom System to any Person who acquires such Bloom System, (ii) such license may be transferred or sub-licensed by Buyer to any third party Buyer is entitled to engage to maintain any Facility pursuant to Section 10.2(c), and (iii) such license may be transferred by Buyer to any successor or assign of Buyer permitted pursuant to Section 14.4. No right, title or interest in any Software provided to Buyer (including all copyrights, patents, trade secrets or other intellectual or intangible property rights of any kind contained therein) is granted, transferred, or otherwise conveyed to Buyer under this Agreement except as expressly set forth herein. Buyer agrees not to reverse engineer or decompile the Software or otherwise use the Software for any purpose other than in connection with the use of the Facilities. Further, Buyer shall not modify, network, rent, lease, loan, sell, distribute or create derivative works

based upon the Software in whole or part, or cause or knowingly allow any third party to do so.

(b) All data collected on the Facilities by Seller using the Software and data collected on the Facilities using Seller's internal proprietary Software are the sole property of Seller to be used by Seller in accordance with Legal Requirements, and Seller hereby grants to Buyer a limited, non-exclusive, irrevocable (except as set forth in ARTICLE XII hereof), royalty-free license to use the data collected on the Facilities using such Software or Seller's internal proprietary software only for purposes of using such Facilities and administering the Transaction Documents or as required pursuant to the terms of any PPA, Site License or Interconnection Agreement, provided the provisions of ARTICLE X on confidentiality are maintained.

Section 11.3 Effect on Licenses. All rights and licenses granted under or pursuant to this Agreement by Seller are, and shall otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code and of any similar provisions of applicable laws under any other jurisdiction (collectively, the "Bankruptcy Laws"), licenses of rights to "intellectual property" as defined under the Bankruptcy Laws. If a case is commenced by or against Seller under the Bankruptcy Laws (excluding a reorganization proceeding under Chapter 11 of the U.S. Bankruptcy Code if Seller is continuing to perform all of its obligations under this Agreement), Seller (in any capacity, including debtor-in-possession) and its successors and assigns (including a trustee under the Bankruptcy Laws) shall, as Buyer may elect in a written request, immediately upon such request:

(a) perform all of the obligations provided in this Agreement to be performed by Seller including, where applicable, providing to Buyer portions of such intellectual property (including embodiments thereof) held by Seller and such successors and assigns or otherwise available to them and to which Buyer is entitled to have access under this Agreement; and

(b) not interfere with the rights of Buyer under this Agreement, or the Transaction Documents, to such intellectual property (including such embodiments), including any right to obtain such intellectual property (or such embodiments) from another entity, to the extent provided in the Bankruptcy Laws.

Section 11.4 No Software Warranty. Buyer acknowledges and agrees that the use of the Software is at Buyer's sole risk. The Software and related documentation are provided "AS IS" and without any warranty of any kind and Seller EXPRESSLY DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Section 11.5 IP Related Covenants. If Seller grants, bargains, sells, conveys, mortgages, assigns, pledges, warrants or transfers any Intellectual Property or Software that is required (a) for Seller or its Affiliates to perform their respective obligations under the Transaction Documents or (b) for the continued maintenance and operation of the Facilities without a material decrease in

performance of the Facilities, Seller shall cause such act or transaction to be subject to the grant of the IP License and Software License under this Agreement.

Section 11.6 Representations and Warranties. Seller represents and warrants to Buyer as of the Original PUMA Agreement Date and as of each Purchase Date as follows with respect to all Intellectual Property that is required (i) for Seller or its Affiliates to perform their respective obligations under the Transaction Documents, and (ii) for the continued operation of the Facilities in accordance with the Transaction Documents, the PPAs and the Interconnection Agreements without a material decrease in performance of the Facilities:

(a) Seller owns or has the right to use and to authorize Buyer to use all such Intellectual Property and Software; and

(b) Seller and its Affiliates are not infringing on any Intellectual Property of any third party with respect to the actions described in subsection (i) and (ii) of Section 11.6 and the Facilities do not infringe on any Intellectual Property of any third party.

Notwithstanding the foregoing, Seller makes no representations or warranties regarding any Intellectual Property rights relating to the Battery Solution other than in respect of the parts or components supplied by Seller or any of its Affiliates to the Battery Solution Manufacturer that are used to manufacture the Battery Solution.

ARTICLE XII.
EVENTS OF DEFAULT AND TERMINATION

Section 12.1 Seller Default. The occurrence at any time of any of the following events shall constitute a "Seller Default":

(a) Failure to Pay. The failure of Seller to pay any undisputed amounts owing to Buyer on or before the day following the date on which such amounts are due and payable under the terms of this Agreement and Seller's failure to cure each such failure within ten (10) Business Days after Seller receives written notice from Buyer of each such failure;

(b) Failure to Perform Other Obligations. Unless due to a Force Majeure Event, the failure of Seller to perform or cause to be performed any other material obligation required to be performed by Seller under this Agreement, or the failure of any representation and warranty set forth herein to be true and correct as and when made; provided, however, that if such failure by its nature can be cured, then Seller shall have a period of thirty (30) days after receipt of written notice of such failure to cure the same and a Seller Default shall not be deemed to exist during such period; provided, further, that if Seller commences to cure such failure during such period and is diligently and in good faith attempting to effect such cure, said period shall be extended for sixty (60) additional days; notwithstanding the foregoing, the cure period set forth above will in no event exceed (and will be deemed modified as necessary to match) the cure period applicable to any particular failure or breach pursuant to a PPA.

(c) Termination Related to Equinix PPA. The termination of (i) this Agreement with respect to any Facilities under the Equinix PPA pursuant to Section 12.7(b) or (ii) the Equinix PPA, in each case relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier that results in a breach of Section 7.1(h)(i) of the Equinix PPA.

(d) Failure to Remedy Injunction. The failure of Seller to remedy any injunction that prohibits Buyer's use of any Facility as contemplated by Section 13.1 within sixty (60) days of Seller's receipt of written notice of Buyer being enjoined therefrom; or

(e) Bankruptcy. If Seller (i) admits in writing its inability to pay its debts generally as they become due; (ii) files a petition or answer seeking reorganization or arrangement under the federal bankruptcy laws or any other Legal Requirements of the United States of America or any State, district or territory thereof; (iii) makes an assignment for the benefit of creditors; (iv) consents to the appointment of a receiver of the whole or any substantial part of its assets; (v) has a petition in bankruptcy filed against it, and such petition is not dismissed within sixty (60) days after the filing thereof; or if (vi) a court of competent jurisdiction enters an order, judgment, or decree appointing a receiver of the whole or any substantial part of Seller's assets, and such order, judgment or decree is not vacated or set aside or stayed within sixty (60) days from the date of entry thereof; or (vii) under the provisions of any other law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of the whole or any substantial part of Seller's assets and such custody or control is not terminated or stayed within sixty (60) days from the date of assumption of such custody or control.

Section 12.2 Buyer Default. The occurrence at any time of the following events with respect to Buyer shall constitute a "Buyer Default":

(a) Failure to Pay. The failure of Buyer to pay any undisputed amounts owing to Seller on or before the day following the date on which such amounts are due and payable under the terms of this Agreement and Buyer's failure to cure each such failure within ten (10) Business Days after Buyer receives written notice of each such failure; or

(b) Failure to Perform Other Obligations. Unless due to a Force Majeure Event, the failure of Buyer to perform or cause to be performed any material obligation required to be performed by Buyer under this Agreement or the failure of any representation and warranty set forth herein to be true and correct as and when made; provided, however, that if such failure by its nature can be cured, then Buyer shall have a period of thirty (30) days after receipt of written notice of such failure to cure the same and a Buyer Default shall not be deemed to exist during such period; provided, further, that if Buyer commences to cure such failure during such period and is diligently and in good faith attempting to effect such cure, said period shall be extended for sixty (60) additional days.

(c) Bankruptcy. If Buyer (i) admits in writing its inability to pay its debts generally as they become due; (ii) files a petition or answer seeking reorganization or arrangement under the federal bankruptcy laws or any other Legal Requirements of the United States of America or any State, district or territory thereof; (iii) makes an assignment for the benefit of creditors; (iv) consents to the appointment of a receiver of the whole or any substantial part of its assets; (v) has a petition in bankruptcy filed against it, and such petition is not dismissed within sixty (60) days after the filing thereof; or if (vi) a court of competent jurisdiction enters an order, judgment, or decree appointing a receiver of the whole or any substantial part of Buyer's assets, and such order, judgment or decree is not vacated or set aside or stayed within sixty (60) days from the date of entry thereof; or (vii) under the provisions of any other law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of the whole or any substantial part of Buyer's assets and such custody or control is not terminated or stayed within sixty (60) days from the date of assumption of such custody or control.

Section 12.3 Buyer's Remedies Upon Occurrence of a Seller Default. If a Seller Default has occurred under Section 12.1(e), Buyer may terminate this Agreement by written notice, and assert all rights and remedies available to Buyer under Legal Requirements subject to the limitations of liability set forth in Section 13.5. If a Seller Default has occurred under Section 12.1(c), Buyer may, (a) at its option, (i) terminate this Agreement by written notice, and assert all rights and remedies available to Buyer under Legal Requirements subject to the limitations of liability set forth in Section 13.5, or (ii) terminate this Agreement with respect to any or all of the Facilities installed pursuant to the Equinix PPA and assert all rights and remedies available to Buyer under Legal Requirements subject to the limitations of liability set forth in Section 13.5, and (b) require Seller, at Buyer's option, to repurchase pursuant to Section 12.7(c) the relevant Facilities in respect of which this Agreement is being terminated. If a Seller Default has occurred under Section 12.1(a), Section 12.1(b) or Section 12.1(d), Buyer may terminate this Agreement only with respect to those Facilities for which such Seller Default has occurred by written notice, and (x) assert all rights and remedies available to Buyer under Legal Requirements subject to the limitations of liability set forth in Section 13.5, or (y) require Seller and, if so required, Seller shall repurchase the relevant Facility in respect of which this Agreement is being terminated from Buyer on an AS IS basis by paying the Refund Value of any such Facility, calculated as of the date of such refund, in which case Seller shall take title to such Facility upon paying the Refund Value, and such Facility shall no longer constitute a portion of the Portfolio; provided, however, that if a Seller Default has occurred under Section 12.1(a) or Section 12.1(b) and remains uncured with respect to ten (10) or more Facilities, then Buyer may terminate this Agreement by written notice with respect to all Facilities. If a Facility will be removed pursuant to this Section 12.3, Seller shall at its sole cost and expense remove the Facility and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations in the manner required by all Legal Requirements and the applicable PPA or Site License.

Section 12.4 Seller's Remedies Upon Occurrence of a Buyer Default. If a Buyer Default has occurred under Section 12.2(c), Seller may terminate this Agreement by written notice, and

assert all rights and remedies available to Seller under Legal Requirements subject to the limitations of liability set forth in Section 13.5. If a Buyer Default has occurred Seller may terminate this Agreement only with respect to those Facilities for which a Buyer Default has occurred and remains uncured; provided that, if such Buyer Default is a Buyer Default under Section 12.2(a) and has occurred and remains uncured with respect to ten (10) or more Facilities, then Seller may terminate this Agreement with respect to all Facilities not yet paid in full by Buyer by written notice and assert all rights and remedies available to Seller under Legal Requirements with respect to those Facilities for which a Buyer Default has occurred, subject to the limitations of liability set forth in Section 13.5, including without limitation retaining any prior payments with respect to such Facilities and selling such Facilities to another buyer.

Section 12.5 Preservation of Rights. Termination of this Agreement shall not affect any rights or obligations as between the Parties which may have accrued prior to such termination or which expressly or by implication are intended to survive termination whether resulting from the event giving rise to termination or otherwise, including, without limitation, ARTICLE X, ARTICLE XI, and ARTICLE XIII.

Section 12.6 Force Majeure. If either Party is rendered wholly or partially unable to perform any of its obligations under this Agreement by reason of a Force Majeure Event, that Party (the "Claiming Party") will be excused from whatever performance is affected by the Force Majeure Event to the extent so affected; provided, however, that (a) the Claiming Party, within a reasonable time after the occurrence of such Force Majeure Event gives the other Party notice describing the particulars of the occurrence; (b) the suspension of performance shall be of no greater scope and of no longer duration than is reasonably required by the Force Majeure Event; (c) no liability of either Party for an event that arose before the occurrence of the Force Majeure Event shall be excused as a result of the Force Majeure Event; (d) the Claiming Party shall exercise commercially reasonable efforts to correct or cure the event or condition excusing performance and resume performance of all its obligations; and (e) when the Claiming Party is able to resume performance of its obligations under this Agreement, the Claiming Party shall promptly give the other Party notice to that effect and shall promptly resume performance.

Section 12.7 Termination of Facilities Subject to PPAs.

(a) In the event that a PPA is terminated with respect to a Facility, this Agreement shall be deemed terminated with respect to that Facility and Buyer shall owe Seller no further Services Fees in respect of such Facility for any period from and after the date of termination. For clarity, nothing in this Section 12.7(a) shall limit in any manner any other remedies that may be available to Buyer under this Agreement.

(b) In the event of a Compliance Law Violation (as defined in the Equinix PPA), the Parties will cooperate in good faith to cure such Compliance Law Violation in accordance with the terms of Section 7.1(h)(i) of the Equinix PPA including, without limitation, by ensuring that any individual(s), Seller Affiliate, Service Provider and/or Seller or Seller Affiliate agent, representative or subcontractor at any tier directly involved in the Compliance Law Violation are no longer in any way performing under the Equinix PPA. In the event that, notwithstanding such efforts, such Compliance Law Violation either (i) can only be cured by the termination of Seller's performance in

connection with the Equinix PPA, or (ii) results in the termination of the Equinix PPA, then, in either case, Buyer may terminate this Agreement with respect to any or all Facilities installed pursuant to the Equinix PPA and Buyer shall owe Seller no further Service Fees in respect of such Facility(ies) for any period from and after the date of termination. For clarity, nothing in this Section 12.7(b) shall limit in any manner any other remedies that may be available to Buyer under this Agreement.

(c) In the event that the termination of this Agreement with respect to any Facilities under Section 12.7(a) or Section 12.7(b) results from the default of Seller under this Agreement, including, for clarity, in connection with a breach of Section 7.1(h)(i) of the Equinix PPA, Seller shall, at Buyer's option, repurchase the relevant Facilities in respect of which this Agreement is being terminated from Buyer on an AS IS basis by paying the Refund Value of any such Facilities, calculated as of the date of such refund, in which case Seller shall take title to such Facilities upon paying the Refund Value, and the applicable Bloom Systems shall no longer constitute a portion of the Portfolio. If a Facility will be removed pursuant to this Section 12.7(c), Seller shall at its sole cost and expense remove (or cause the removal of) the Facility and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations in the manner required by all Legal Requirements and the applicable PPA or Site License.

(d) In the event that this Agreement is terminated with respect to any Facilities under Section 12.7(a) for any reason other than as set forth in Section 12.7(b) or Section 12.7(c), Seller shall, at Buyer's option, remove (or cause the removal of) the Facility and any other ancillary equipment (including the concrete pad and any other improvements to the applicable Site to the extent required under the applicable PPA or Site License) from the applicable Site, restoring the Site to its condition before the installation, including closing all utility connections and properly sealing any Site penetrations, all in the manner required by all Legal Requirements and the applicable PPA or Site License. If a Facility is removed by Seller pursuant to this Section 12.7(d), Buyer shall reimburse Seller, within thirty (30) days following receipt of Seller's invoice therefor, for all reasonable and documented costs and expenses incurred by Seller in connection with such removal, including (i) payment for Seller's employees' services in accordance with Seller's then-applicable hourly rates charged to other Seller customers for similar work, and (ii) reimbursement of any costs incurred to third party vendors or service providers on a pass-thru basis without mark-up.

ARTICLE XIII.
INDEMNIFICATION

Section 13.1 IP Indemnity.

(a) Except as expressly limited below, Seller agrees to indemnify, defend and hold Buyer, its members, and their Affiliates and their respective managers, officers, directors, employees and agents harmless from and against any and all Third Party

Claims and Indemnifiable Losses (including in connection with obtaining any Intellectual Property necessary for continuation of completion, operation and maintenance of Bloom Systems purchased by Buyer from Seller), arising from or in connection with any alleged infringement, conflict, violation or misuse of any patents, copyrights, trade secrets or other third party Intellectual Property rights by Bloom Systems purchased by Buyer from Seller (or the use, operation or maintenance thereof) or the exercise of the IP License or the Software License granted pursuant to Section 11.1 and Section 11.2 hereunder. Buyer shall give Seller prompt notice of any such claims. Seller shall be entitled to participate in, and, unless in the opinion of counsel for Seller a conflict of interest between the Parties may exist with respect to such claim, assume control of the defense of such claim with counsel reasonably acceptable to Buyer. Buyer authorizes Seller to settle or defend such claims in its sole discretion on Buyer's behalf, without imposing any monetary or other obligation or liability on Buyer and subject to Buyer's participation rights set forth in this Section 13.1. Buyer shall assist Seller upon reasonable request by Seller and, at Seller's reasonable expense, in defending any such claim. If Seller does not assume the defense of such claim, or if a conflict precludes Seller from assuming the defense, then Seller shall reimburse Buyer on a monthly basis for Buyer's reasonable defense expenses of such claim through separate counsel of Buyer's choice reasonably acceptable to Seller. Even if Seller assumes the defense of such claim, Buyer may, at its sole option, participate in the defense, at Buyer's expense, without relieving Seller of any of its obligations hereunder. Should Buyer be enjoined from selling or using any Bloom System as a result of such claim, Seller will, at its sole option and discretion, either (i) procure or otherwise obtain for Buyer the right to use or sell the Bloom System; (ii) modify the Bloom System so that it becomes non-infringing but still substantially meets the original functional specifications of the Bloom System (in which event, for the avoidance of doubt, all warranties hereunder shall continue to apply unmodified); (iii) upon return of the Bloom System to Seller, as directed by Seller, provide to Buyer a non-infringing Bloom System meeting the functional specifications of the Bloom System; or (iv) when and if none of the first three options is reasonably available to Seller, authorize the return of the Bloom System to Seller and, upon receipt thereof, return to Buyer all monies paid by Buyer to Seller for the cost of the Bloom Systems and BOF, net of any monies paid by Seller to Buyer for any performance guaranties or other warranty claims; provided that Seller shall not elect the option in the preceding clause (i) without Buyer's written consent if such election could reasonably be expected to materially decrease Buyer's revenues or materially increase Buyer's operating expenses.

(b) THIS INDEMNITY SHALL NOT COVER ANY CLAIM:

(i) for Intellectual Property infringement, conflict, violation or misuse arising from or in connection with any combination made by Buyer of any Bloom System with any other product or products or modifications made by or on behalf of Buyer to any part of the Bloom System, unless (A) such combination or modification is in accordance with Seller's specifications for the Bloom System, (B) such combination or modification is made by or on behalf of or at the written request of Seller where Seller has requested the specific combination or modification giving rise to the claim by Buyer, or (C) such other product or

products would not infringe the Intellectual Property rights of a third party but for the combination with any part of the Bloom System;

(ii) for infringement of any Intellectual Property rights arising in whole or in part from any aspect of the Bloom System which was designed by or requested by Buyer on a custom basis. For the avoidance of doubt, the integration of the Battery Solution into any Facility shall not constitute an alteration designed by or requested by Buyer on a custom basis; or

(iii) for infringement of any Intellectual Property rights arising in whole or in part from any aspect of the Battery Solution (unless such infringement arises in whole or in part from any aspect of the parts or components supplied by Seller or any of its Affiliates to the Battery Solution Manufacturer that are used to manufacture the Battery Solution).

Section 13.2 Indemnification of Seller by Buyer. Buyer shall indemnify, defend and hold harmless Seller, its officers, directors, employees, shareholders, Affiliates and agents (each, a "Seller Indemnitee") from and against any and all Indemnifiable Losses asserted against or suffered by any Seller Indemnitee arising out of a claim by a third party (other than a claim for Seller Indemnitee's breach of any contract to which a Seller Indemnitee is a party) and in any way relating to, resulting from or arising out of or in connection with any Third Party Claims against a Seller Indemnitee to the extent arising out of or in connection with (a) the negligent or intentional acts or omissions of Buyer or its subcontractors, agents or employees or others under Buyer's control (excluding Seller and any Seller Affiliate) or breach by Buyer of its representations, warranties or obligations under any Transaction Document, or (b) operation of Bloom Systems by any party other than Seller or an Affiliate or subcontractor of Seller after such Bloom Systems have been purchased by Buyer pursuant to this Agreement (but subject to Seller's warranties, covenants and indemnities under this Agreement and any other Transaction Document to which Seller is a party); provided that Buyer shall have no obligation to indemnify Seller to the extent caused by or arising out of (i) any negligence, fraud or willful misconduct of any Seller Indemnitee or the breach by Seller or any Seller Indemnitee of its covenants, representations and warranties under this Agreement or in any Payment Certificate, or (ii) any operation of Bloom Systems by a party outside of Buyer's control or direction or by a party taking such action despite Buyer's reasonable efforts to prevent the same.

Section 13.3 Indemnification of Buyer by Seller.

(a) Seller shall indemnify, defend and hold harmless Buyer, its members, managers, officers, directors, employees, Affiliates and agents (each, a "Buyer Indemnitee") from and against any and all Indemnifiable Losses asserted against or suffered by any Buyer Indemnitee arising out of (i) a claim by a third party (other than a claim for Buyer Indemnitee's breach of contract (other than any breach by a Buyer Indemnitee of any PPA or Site License based on any breach by Seller of its obligations under this Agreement to perform obligations under such PPA or Site License on behalf of Buyer)) and in any way relating to, resulting from or arising out of or in connection with any Third Party Claims against a Buyer Indemnitee to the extent arising out of or in connection with the negligent or intentional acts or omissions of Seller or its

subcontractors, agents or employees or others under Seller's control (other than matters addressed separately in Section 13.1, which shall be governed by the terms thereof), (ii) a breach by Seller of its representations, warranties or obligations under any Transaction Document or in any Payment Certificate, including any breach of a PPA or Site License relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier in respect of EPC Services or Facility Services that Seller is obligated to perform on behalf of Buyer in fulfillment of such obligations under the PPA or Site License including, for clarity, a breach of Section 7.1(h)(i) of the Equinix PPA relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier, or (iii) any injury, death, or damage to property caused by a defect in a Facility; provided that Seller shall have no obligation to indemnify Buyer to the extent caused by or arising out of any negligence, fraud or willful misconduct of a Buyer Indemnitee, the breach by Buyer or any Buyer Indemnitee of its covenants, representations and warranties under this Agreement or the inability of Buyer to ultimately utilize any tax benefits. For the avoidance of doubt, the Parties acknowledge and agree that in the event that a Seller failure to remove a Facility in accordance with the requirements of the applicable PPA or Site License results in Buyer's loss of such Facility, Buyer's "Indemnifiable Loss" arising out of such Seller failure shall be deemed to include the Fair Market Value of such Facility as of such date, unless (x) Seller had no actual knowledge regarding the requirement to remove the Facility and Buyer failed to provide notice to Seller regarding the requirement to remove the Facility on or prior to the date that is five (5) Business Days before the deadline for such removal under the applicable PPA or Site License, or (y) Seller is not afforded access to the applicable Site consistent with the requirements of the applicable PPA or Site License to perform such removal.

(b) Except as otherwise set forth in this Agreement, in the event that Buyer incurs any liability, cost, loss or expense to a PPA Customer (including relating to a breach of a PPA or Site License) in relation to the repurchase by or return to Seller of any Bloom System under this Agreement, Seller shall indemnify and hold Buyer harmless for any such liability, cost, loss or expense incurred by Buyer.

(c) Seller acknowledges and agrees that each PPA Customer is an intended third party beneficiary of Seller's indemnification obligations in favor of the Buyer Indemnitees and that Buyer may, at its sole option, elect to assign to a PPA Customer the right to seek indemnification directly from Seller in the event that Buyer owes to such PPA Customer any indemnification obligations arising out of any actions or inactions of Seller under this Agreement that give rise to an indemnification obligation of Seller in favor of any Buyer Indemnitee.

Section 13.4 Indemnity Claims Procedure. Except as otherwise provided in Section 13.1, if any indemnifiable claim is brought against a Party (the "Indemnified Party"), then the other Party (the "Indemnifying Party") shall be entitled to participate in, and, unless in the reasonable opinion of counsel for the Indemnifying Party a conflict of interest between the Parties may exist with respect to such claim, assume the defense of such claim, with counsel reasonably acceptable

to the Indemnifying Party. If the Indemnifying Party does not assume the defense of the Indemnified Party or if a conflict precludes the Indemnifying Party from assuming the defense, then the Indemnifying Party shall reimburse the Indemnified Party on a monthly basis for the Indemnified Party's reasonable defense expenses through separate counsel of the Indemnified Party's choice. Even if the Indemnifying Party assumes the defense of the Indemnified Party with acceptable counsel, the Indemnifying Party, at its sole option, may participate in the defense, at its own expense, with counsel of its own choice without relieving the Indemnifying Party of any of its obligations hereunder.

Section 13.5 Limitation of Liability.

(a) Notwithstanding anything to the contrary in this Agreement, in no event shall a Party be liable to the other Party for an amount in excess of the Maximum Liability unless and to the extent such liability is the result of (A) fraud, willful default, willful misconduct, or gross negligence of a Party or that Party's employees, agents, subcontractors (except that for the purposes of this provision, Seller and its employees, agents and subcontractors will not be deemed to be employees, agents or subcontractors of Buyer), (B) a Third Party Claim, (C) a claim of Seller against Buyer for Buyer's failure to pay the Service Fees or Purchase Price for any Facility (which amounts shall not be included in calculating Buyer's Maximum Liability), (D) a claim with respect to injury to or death of any individual, (E) Seller's abandonment to the extent constituting a repudiation of this Agreement in respect of all or any part of the Facilities, (F) events or circumstances in respect of which insurance proceeds are available or that would have been available but for a failure by Seller to maintain, or comply with the terms of, insurance that it is required to obtain and maintain under this Agreement, and any amounts so received will not be included when calculating Seller's Maximum Liability, (G) a claim of Buyer against Seller for Seller's breach of a Fundamental Representation, (H) any purchase price adjustment pursuant to Section 2.8, (I) any Indemnifiable Losses asserted against or suffered by Buyer in connection with the LREC Contracts, or (J) any Indemnifiable Losses asserted against or suffered by Buyer in connection with a breach of Section 7.1(h)(i) of the Equinix PPA relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier. Subject always to the Maximum Liability limitations set forth in the preceding sentence, except for damages or amounts specifically provided for in this Agreement or in connection with the indemnification for damages awarded to a third party under a Third Party Claim, damages hereunder are limited to direct damages, and in no event shall a Party be liable to the other Party, and the Parties hereby waive claims, for indirect, punitive, special or consequential damages or loss of profits; provided, however, that the loss of profits language set forth in this Section 13.5(a) shall not be interpreted to exclude from Indemnifiable Losses any losses arising as a result of (i) the loss or recapture of any ITC, or (ii) in connection with a breach of Section 7.1(h)(i) of the Equinix PPA relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier. Notwithstanding anything to the contrary set forth herein, in no event shall the limitation of liability set forth above as it pertains to Seller limit Seller's obligations to Buyer for any payments owed by Seller to Buyer regarding (i) the

Refund Value of any Facility(ies), (ii) Performance Guaranty payments or Indexed PPA Tolling Rate Guaranty payments, (iii) liability for any PPA Warranties that Seller has incurred pursuant to Section 5.8, (iv) Indemnifiable Losses arising from the loss or recapture of any ITC, and/or any Indemnifiable Losses asserted against or suffered by Buyer in connection with the LREC Contracts or in connection with a breach of Section 7.1(h)(i) of the Equinix PPA relating to, resulting from or arising out of or in connection with any act or omission by Seller, Seller Affiliate, the Service Provider or a Seller or Seller Affiliate agent, representative or subcontractor at any tier. Any amounts paid or payable by Seller to Buyer as described in clauses (i) through (v) of the preceding sentence will not be included when calculating Seller's Maximum Liability.

(b) Each Party hereby waives any claim under this ARTICLE XIII irrespective of the legal theory under which it is brought to the extent such claim is covered by the insurance of the claiming Party.

Section 13.6 Liquidated Damages; Estoppel. The Parties acknowledge and agree that it would be impracticable or impossible to determine with precision the amount of damages that would or may be incurred by Buyer as a result of the Portfolio's failure to satisfy any Capacity Warranty. It is therefore understood and agreed by the Parties that: (a) Buyer may be damaged by Seller's failure to satisfy either Capacity Warranty; (b) it would be impractical or impossible to fix the actual damages to Buyer resulting therefrom; and (c) any cash payments in respect of a claim under the Performance Guaranty and any Refund Values payable to Buyer under Section 5.7 for failure to meet such obligations are in the nature of liquidated damages, and not a penalty, and are fair and reasonable estimate of compensation for the losses that Buyer may reasonably be anticipated to incur by such failure. Seller hereby (i) waives any argument that its failure to comply with its obligations set forth in Section 5.7 would not cause Buyer irreparable harm, (ii) agrees that it shall be estopped from arguing the invalidity, or otherwise questioning the reasonableness, of the liquidated damages provided for herein, and (iii) agrees that it will consent to the entry of judgment ordering payment of such liquidated damages in any court of competent jurisdiction. Seller and Buyer each agree that Buyer shall be under no obligation to submit any dispute regarding the payment of any Refund Value when due to the dispute resolution mechanism set forth in Section 14.5, but may rather immediately pursue whatever rights it has available under this Agreement, at law or in equity in accordance with Section 14.6 herein.

Section 13.7 Survival. The Parties' respective rights and obligations under this ARTICLE XIII shall survive any total or partial termination of this Agreement.

ARTICLE XIV.
MISCELLANEOUS PROVISIONS

Section 14.1 Amendment and Modification. This Agreement may be amended, modified or supplemented only by written agreement of Buyer and Seller.

Section 14.2 Waiver of Compliance; Consents. Except as otherwise provided in this Agreement, any failure of any of the Parties to comply with any obligation, covenant, agreement or condition herein may be waived by the Party entitled to the benefits thereof only by a written instrument signed by the Party granting such waiver, but any such waiver of such obligation,

covenant, agreement or condition shall not operate as a waiver of, or estoppel with respect to, any subsequent failure to comply therewith.

Section 14.3 Notices. All notices, provisions of Documentation, reports, certifications, or other documentation, and other communications hereunder shall be in writing and shall be deemed given when received if delivered personally or by facsimile transmission with completed transmission acknowledgment or by electronic mail, or when delivered if mailed by overnight delivery via a nationally recognized courier or registered or certified first class mail (return receipt requested), postage prepaid, to the recipient Party at its below address (or at such other address or facsimile number for a Party as shall be specified by like notice; provided, however, that notices of a change of address shall be effective only upon receipt thereof and that any notice provided by electronic mail will be followed promptly by another form of notice consistent with this Section 14.3 and will be effective when such follow-up notice is deemed effective):

To Seller:

Bloom Energy Corporation
1299 Orleans Drive
Sunnyvale, CA 94089-1137
Attention: [***]
Telephone: [***]
Fax: [***]
Email: [***]

To Buyer:

2016 ESA Project Company, LLC
c/o Southern PowerSecure Holdings, Inc.
c/o PowerSecure, Inc.
1609 Heritage Commerce Ct.
Wake Forest NC 27587
Attention: President and Chief Executive Officer
Email: [***][***]

and to:

Southern Company Services, Inc.
30 Ivan Allen Jr. Blvd., NW
Bin SC 1203
Atlanta, GA 30308
Attention: General Counsel
Email: [***]

with a copy to:
Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P.
150 Fayetteville Street, Suite 2300
Raleigh, NC 27601
Attention: [***]
Telephone: [***]
Email: [***]

Section 14.4 Assignment; Subcontractors.

(a) This Agreement and all of the provisions hereof shall be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns (including by operation of law), but neither this Agreement nor any of the rights, interests or obligations hereunder shall be assigned by any Party without the prior written consent of the other Party (to be granted in the other Party's sole discretion), provided that (i) Buyer may assign its indemnification rights to PPA Customers as set forth in Section 13.3 upon notice to Seller, (ii) Buyer may assign all of its right, title and interest in and to this Agreement to an Affiliate wholly owned (directly or indirectly) by The Southern Company without the prior consent of Seller (provided that such assignee Affiliate shall assign this Agreement back to the Buyer at any future date that such assignee is no longer an Affiliate of the Buyer), (iii) Buyer may make such an assignment without Seller's consent to a successor to substantially all of Buyer's business, whether in a merger, sale of stock, sale of assets or other transaction (other than a transaction with an entity that is a competitor of Seller or its Affiliates, unless consented to under the provisions of paragraph (b)), and (iv) Seller shall be entitled to subcontract any of its obligations under this Agreement without consent (except as set forth in Section 4.6) or to assign its obligations under this Agreement to an Affiliate under common ownership with Seller, provided, further, that (i) such assignment or subcontracting shall not excuse Seller from the obligation to competently perform any subcontracted or assigned obligations or any of its other obligations under the Agreement and (ii) nothing in this Agreement shall be deemed to require the consent of any party with respect to any change in control, merger or sale of all or substantially all of the assets of The Southern Company or Seller. Any purported assignment or delegation in violation of this Section shall be null and void.

(b) In the event of an assignment by Buyer or other transaction described in paragraph (a)(iii), Buyer shall notify Seller of the identity of the proposed assignee or successor in writing, and Seller shall have the right to consent to such assignment or transaction in the event that Seller reasonably believes such proposed assignee to be a competitor of Seller. Seller shall notify Buyer of its determination within ten (10) Business Days of receipt of notice from Buyer hereunder. If Seller notifies Buyer that it has determined that the proposed assignee is a competitor of Seller and that Seller is electing to withhold consent, then Buyer shall be prohibited from consummating the proposed transaction unless it has been finally determined that such proposed assignee is not a competitor of Seller.

(c) Any disputes regarding Seller's determination of a proposed assignee as a competitor to Seller shall be resolved as follows:

(i) Buyer will promptly provide written notification of the dispute to Seller within five (5) Business Days after notice by Seller that it has determined the proposed assignee to be a competitor and that it is withholding its consent. Thereafter, a meeting shall be held promptly between the Parties, attended by Seller's Chief Financial Officer and Buyer's Chief Financial Officer, to attempt in good faith to negotiate a resolution of the dispute, provided that either Party may

elect to escalate the dispute to the Parties' respective Chief Executive Officer at any time.

(ii) If the Parties are not successful in resolving a dispute within ten (10) Business Days of the meeting called for above, the dispute shall be submitted, within ten (10) Business Days thereafter, to a mediator with energy industry experience. The Parties shall cooperate with and provide such documents, information and other assistance as is requested by the mediator to assist in efforts to resolve the dispute. The costs of the mediator shall be borne equally by the Parties.

(iii) If efforts to mediate are not successful within thirty (30) days of submitting the dispute to the mediator, both Parties will retain all legal remedies available to them.

Section 14.5 Dispute Resolution; Service of Process.

(a) Except as provided in Section 13.6 and Section 14.4(c), in the event a dispute, controversy or claim arises hereunder, including any claim whether in contract, tort (including negligence), strict product liability or otherwise, the aggrieved Party will promptly provide written notification of the dispute to the other Party within ten (10) days after such dispute arises. Thereafter, a meeting shall be held promptly between the Parties, attended by representatives of the Parties with decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute. If the Parties are not successful in resolving a dispute within twenty-one (21) days of such meeting, then, subject to the limitations on remedies set forth in Section 12.3 and Section 12.4 and ARTICLE XIII, either Party may pursue whatever rights it has available under this Agreement, at law or in equity in accordance with Section 14.6 herein.

(b) In the event of any dispute arising out of or relating to this Agreement, each Party hereby consents to service of process made to the addressees set forth in Section 14.3 herein either by overnight delivery by a nationally recognized courier or by certified first class mail, return receipt requested, and hereby acknowledges that service by such means shall constitute valid and lawful service of process against the Party being served.

Section 14.6 Governing Law, Jurisdiction, Venue. THIS AGREEMENT SHALL BE GOVERNED BY AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK, WITHOUT GIVING EFFECT TO ANY CONFLICTS OF LAW OR OTHER PRINCIPLES THEREOF THAT WOULD RESULT IN THE APPLICATION OF THE LAWS OF ANOTHER JURISDICTION (OTHER THAN SECTION 5-1401 OF THE NEW YORK GENERAL OBLIGATIONS LAW). THE PARTIES HEREBY IRREVOCABLY SUBMIT TO THE NON-EXCLUSIVE JURISDICTION OF THE COURTS OF THE STATE OF NEW YORK AND OF THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK WITH RESPECT TO ANY DISPUTE ARISING OUT OF OR RELATING TO THIS AGREEMENT. EACH PARTY IRREVOCABLY AND

UNCONDITIONALLY WAIVES TRIAL BY JURY IN ANY ACTION, SUIT OR PROCEEDING RELATING TO ANY SUCH DISPUTE AND FOR ANY COUNTERCLAIM WITH RESPECT THERETO.

Section 14.7 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Signatures delivered by facsimile, portable document format or other electronic means (including, without limitation, services such as DocuSign) will be considered original signatures, and each Party shall thereafter promptly deliver original signatures to the other Party.

Section 14.8 Interpretation. The article, section and schedule headings contained in this Agreement are solely for the purpose of reference, are not part of the agreement of the Parties and shall not in any way affect the meaning or interpretation of this Agreement.

Section 14.9 Entire Agreement. The Transaction Documents and the exhibits, schedules, documents, certificates and instruments referred to therein, embody the entire agreement and understanding of the Parties in respect of the transactions contemplated by this Agreement. Each Party acknowledges that, in agreeing to enter into this Agreement, it has not relied on any representation, warranty, collateral contract or other assurance (except those repeated in this Agreement and any other agreement entered into on the date of this Agreement between the Parties) made by or on behalf of any other Party at any time before the signature of this Agreement. Each Party waives all rights and remedies which, but for the immediately preceding sentence, might otherwise be available to it in respect of any such representation, warranty, collateral contract or other assurance.

Section 14.10 Construction of Agreement. The terms and provisions of this Agreement represent the results of negotiations between Buyer and Seller, each of which has been represented by counsel of its own choosing, and neither of which has acted under duress or compulsion, whether legal, economic or otherwise. Accordingly, the terms and provisions of this Agreement shall be interpreted and construed in accordance with their usual and customary meanings, and Buyer and Seller hereby waive the application in connection with the interpretation and construction of this Agreement of any rule of law to the effect that ambiguous or conflicting terms or provisions contained in this Agreement shall be interpreted or construed against the Party whose attorney prepared the executed draft or any earlier draft of this Agreement.

Section 14.11 Severability. If any term or other provision of this Agreement is invalid, illegal or incapable of being enforced by any rule of law or public policy, all other conditions and provisions of this Agreement shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereby is not affected in any manner materially adverse to any Party.

Section 14.12 Further Assurances. Each Party agrees to execute and deliver such additional documents and instruments and to perform such additional acts as may be necessary or appropriate to effectuate, carry out and perform all of the terms, provisions, and conditions of this Agreement and the transactions contemplated by this Agreement.

Section 14.13 Independent Contractors. The Parties acknowledge that, save as expressly set out in this Agreement to the contrary, each Party is entering into this Agreement as an independent contractor and nothing in this Agreement shall be interpreted or applied so as to make the relationship of any of the Parties that of partners, joint ventures or anything other than independent contractors. For clarity, notwithstanding anything to the contrary herein, including Seller's obligation to perform on behalf of Buyer certain of Buyer's obligations under PPAs and Site Licenses, neither Seller nor any of its employees, agents, subcontractors or representatives shall be considered an employee, agent, subcontractor or representative of, nor under the control of, Buyer under this Agreement.

Section 14.14 Limitation on Export. Buyer agrees that it will not export, re-export, resell, ship or divert directly or indirectly any Facility or any part thereof in any form or technical data or Software furnished hereunder to any country prohibited by the United States Government or any other Governmental Authority, or for which an export license or other Governmental Approval is required, without first obtaining such license or approval.

Section 14.15 Time of Essence. Time is of the essence with respect to all matters contained in this Agreement.

Section 14.16 No Rights in Third Parties. Except as otherwise specified herein, (a) nothing in this Agreement nor any action taken hereunder shall be construed to create any duty, liability or standard of care to any Person that is not a Party, (b) no Person that is not a Party shall have any rights or interest, direct or indirect, in this Agreement or the services to be provided hereunder and (c) this Agreement is intended solely for the benefit of the Parties, and the Parties expressly disclaim any intent to create any rights in any third party as a third-party beneficiary to this Agreement or the services to be provided hereunder.

Section 14.17 Amendment and Restatement of Second A&R PUMA. By their execution and delivery of this Agreement, the Parties hereby amend and restate in its entirety the Second A&R PUMA. From and after the date hereof, (a) the Parties' mutual understanding of each of the matters set forth herein shall be governed by the terms of this Agreement, and (b) any reference to the Second A&R PUMA in any other agreement(s) shall be understood to refer to this Agreement.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, Buyer and Seller have caused this Third Amended and Restated Purchase, Use and Maintenance Agreement to be signed by their respective duly authorized officers as of the Agreement Date.

BUYER:	**SELLER:**
2016 ESA PROJECT COMPANY, LLC a Delaware limited liability company	**BLOOM ENERGY CORPORATION** a Delaware corporation
By: _____ Name: Title:	By: _____ Name: Title:

Annex A

Minimum Power Product Example Calculation

Sample Performance Warranty Example Calculation

Assumptions		
Number of Facilities in Portfolio	46	
System Capacity (per Facility)	200	kW
Performance Warranty	86%	
Minimum Power Product Analysis		
Minimum Power Product	7,912	kW

Sample Performance Guaranty Example Calculation

Assumptions		
Number of Facilities in Portfolio	46	
System Capacity	200	kW
Performance Guaranty	[***]	
Year Minimum Power Product Analysis		
Minimum Power Product	[***]	kW

Annex B

Insurance

Insurance. At all times during the Term, without cost to Buyer, Seller shall maintain in force and effect the following insurance, which insurance shall not be subject to cancellation, termination or other material adverse changes unless the insurer delivers to Buyer written notice of the cancellation, termination or change at least thirty (30) days in advance of the effective date of the cancellation, termination or material adverse change or if notice from the insurer to Buyer of material adverse change is not available on commercially reasonable terms then Seller shall provide Buyer with such notice as soon as reasonably possible after becoming aware of such change; provided, that following the Commencement of Operations Date with respect to a Facility, the insurance required hereunder shall only pertain to Seller's Facility Services (including, for clarity, any removal or restoration services provided by Seller):

(a) Worker's Compensation Insurance as required by the laws of the state in which Seller's employees are performing EPC Services or Facility Services;

(b) Employer's liability insurance with limits at policy inception not less than One Million Dollars ($1,000,000.00) per occurrence;

(c) Commercial General Liability Insurance, including bodily injury and property damage liability (arising from premises, operations, contractual liability endorsements, products liability, or completed operations) with limits not less than One Million Dollars ($1,000,000.00) per occurrence and Two Million Dollars ($2,000,000.00) annual aggregate limit at policy inception;

(d) If there is exposure, automobile liability insurance in accordance with prudent industry practice with a limit of not less than One Million Dollars ($1,000,000.00), combined single limit per occurrence;

(e) Umbrella liability insurance acting in excess of underlying employer's liability, commercial general liability and automobile liability policies with limits not less than Fifteen Million Dollars ($15,000,000.00) per occurrence, except that any subcontractors shall be required to maintain such insurance with limits of not less than Three Million Dollars ($3,000,000.00);

(f) Professional errors and omission insurance with a limit of not less than One Million Dollars ($1,000,000.00) per occurrence;

(g) Environmental/pollution liability insurance with a limit of not less than One Million Dollars ($1,000,000.00) per claim;

(h) Builder's Risk/Installation Coverage for each Facility, with replacement costs and a delay in startup component (for avoidance of doubt, this requirement is only applicable, with respect to each Facility, until such Facility's Commencement of Operations Date); and

(i) Marine Cargo - Transit coverage (including air, land and ocean cargo, as applicable) on an "all-risk" basis and a "warehouse to warehouse" basis with a per occurrence limit equal to not less than 110% of the value including transit and insurance of such shipment

involving the Facility at all times for which the Seller bears or has accepted risk of loss or has responsibility for providing insurance. Coverage shall include loading, unloading and temporary storage (as applicable). Coverage shall be maintained in accordance with prudent industry practice in all regards with per occurrence deductibles of not more than $50,000 for physical damage and other terms and conditions acceptable to the Buyer. For avoidance of doubt, (i) this requirement is only applicable during installation and is not required to be maintained with respect to any Facility after such Facility's Commencement of Operations Date, and (ii) this requirement shall not apply to any subcontractor except those engaged to transport materials owned by Seller during such transit.

Seller shall cause Buyer to be included as additional insured to all insurance policies required in accordance with the provisions of this Agreement except for worker's compensation. The required insurance must be written as a primary policy not contributing to or in excess of any policies carried by Buyer, and each must contain a waiver of subrogation, in form and substance reasonably satisfactory to Buyer, in favor of Buyer.

Additionally, Seller shall procure, on behalf of Buyer, any insurance coverages with respect to commercial general liability and excess liability required to be carried by Buyer pursuant to the NYC HHC PPA pursuant to policies that comply with all requirements set forth in such NYC HHC PPA.

The insurances contemplated in this clause are primary. The Parties acknowledge that, if a claim is made under any of the insurances contemplated in this Agreement, it is their intention that the insurer cannot require the Party first to exhaust indemnities referred to in this Agreement before the insurer's obligation to perform is mature, subject to the insurer's later pursuing subrogation, in which event any recovery will be credited by such insurer pro tanto in favor of the policyholder. The general liability and umbrella liability insurances required by this agreement shall provide blanket contractual coverage to the full policy limit. Where applicable, each of these insurances will:

(a) be effected with an insurer reasonably acceptable to Buyer;

(b) contain a waiver of subrogation in favor of Buyer;

(c) contain deductibles in accordance with prudent industry practice and approved by Buyer acting reasonably; and

(d) include a provision that such insurance is primary insurance with respect to the interests of Buyer and Seller and that any other insurance maintained by Buyer is excess and not contributory insurance with the insurances required under this Agreement.

Seller shall provide Buyer with evidence of compliance with these insurance requirements when requested by Buyer from time to time on a reasonable basis.

Annex C

Capacity Warranty Claim Example Calculation and Amounts Payable

Quarterly Performance Warranty Claim Example Calculation

Assumptions

Number of Systems	46	
System Capacity	200	kW
Hours/Day	24	Hours
Measurement Period	90	Days
Force Majeure Outage in Period(1)	5	Hours
PPA Customer Outage in Period(1)	0	Hours
Legal/Grid Outage in Period(1)	0	Hours
Battery Solution Outage in Period(1)	0	Hours
Starting Performance Warranty Bank Balance	3,985,900	kWh

Quarterly Performance Warranty Analysis

Minimum kWh(2)	[***]	kWh
Actual kWh	15,500,160	kWh
Underperformance (kWh)	[***]	kWh

Performance Warranty Bank Adjustment

Starting Balance	3,985,900	kWh
Debit	[***]	kWh
Ending Balance	[***]	kWh

Quarterly Performance Warranty Claim? **NO**

(1) As defined by "Minimum kWh."

(2) Minimum kWh = ((Measurement Period Days * 24 Hours/Day) - Force Majeure Hours - PPA Customer Outage Hours - Legal/Grid Outage Hours – Battery Solution Outage Hours) * Minimum Power Product(3)

(3) As calculated per Annex A.

Annual Performance Guaranty Claim Example Calculation

Assumptions

Number of Systems	46	
System Capacity	200	kW
Hours/Day	24	Hours
Measurement Period	365	Days
Force Majeure Outage in Period (1)	5	Hours
PPA Customer Outage in Period(1)	0	Hours
Legal/Grid Outage in Period(1)	0	Hours
Battery Solution Outage in Period(1)	0	Hours
Performance Guaranty Payment Rate	$[***]	/kWh
Starting Performance Guaranty Bank Balance	2,508,000	kWh

Annual Performance Guaranty Analysis

Minimum kWh(2)	76,518,700	kWh
Actual kWh	[***]	kWh
Underperformance (kWh)	[***]	kWh

Performance Guaranty Bank Adjustment

Starting Balance	2,508,000	kWh
Debit	[***]	kWh
Ending Balance	[***]	kWh

Performance Guaranty Payment(4) **$[***]**

Notes:

(1) As defined by "Minimum kWh."

(2) Minimum kWh = ((Measurement Period Days * 24 Hours/Day) – Force Majeure Hours – PPA Customer Outage Hours – Legal/Grid Outage Hours - Battery Solution Outage Hours) * Minimum Power Product(3)

(3) As calculated per Annex A.

(4) Performance Guaranty Payment = (absolute value of Performance Guaranty Bank ending balance) * (Performance Guaranty Payment Rate). Following such payment, the Performance Guaranty Bank balance is increased to zero.

Annex D

List of PPAs

Updated as of: September 26, 2018

1. That certain Amended and Restated Energy Server Use and License Agreement, dated as of October 27, 2016, by and between Home Depot U.S.A., Inc. and Buyer, as amended by (a) that certain First Amendment to Amended and Restated Energy Server Use and License Agreement dated March 28, 2017, (b) that certain Second Amendment to Amended and Restated Energy Server Use and License Agreement dated January 29, 2018, and (c) that certain Third Amendment to Amended and Restated Energy Server Use and License Agreement dated September 26, 2018 (the "Home Depot PPA").

2. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17012, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

3. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17013, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

4. That certain Energy Server Use Agreement, dated as of September 27, 2016, by and between FedEx Ground Package System, Inc. and Buyer (the "FedEx PPA").

5. That certain Energy Server Use and License Agreement, dated as of September 30, 2016, by and between Hoag Memorial Hospital Presbyterian and Buyer.

6. That certain Energy Server Use and License Agreement, dated as of February 15, 2017, by and between Home Depot U.S.A., Inc. and Buyer.

7. That certain Energy Server Use and License Agreement, dated as of March 14, 2017, by and between San Diego Community College District and Buyer.

8. That certain Energy System Use Agreement, dated as of March 24, 2017, by and between AT&T Corp. and Buyer (the "AT&T PPA").

9. That certain Energy Server Use and License Agreement, dated as of May 31, 2017, by and between Equinix, Inc. and Buyer, together with the Equinix Indemnity Agreement and the Equinix Landlord Consents (collectively, the "Equinix PPA").

10. That certain Energy Server Use and License Agreement, dated as of August 30, 2017, by and between Intel Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 11, 2017, by and between 2017 ESA Project Company, LLC and Buyer.

11. That certain Energy Server Use and License Agreement, dated as of December 28, 2017, by and between Intel Corporation and Buyer.

12. That certain Energy Services Agreement, dated as of September 29, 2017, by and between The State University of New York and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of April 26, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

13. That certain Energy Server Use Agreement, dated as of November 15, 2017, by and between FedEx Ground Package System, Inc. and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

14. That certain Energy Services Agreement, dated as of November 30, 2017, by and between Long Island University and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

15. That certain Energy Server Use and License Agreement, dated as of November 30, 2017, by and between New York City Health and Hospitals Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer (the "NYC HHC PPA").

16. That certain Energy Services Agreement, dated as of June 29, 2018, by and between New York State Office of Mental Health and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 30, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

17. That certain Energy Services Agreement, dated as of November 10, 2017, by and between Agilent Technologies, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

18. That certain Energy Services Agreement, dated as of December 8, 2017, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as amended by that certain First Amendment to Energy Services Agreement, dated as of September 14, 2018, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

19. That certain Energy Services Agreement, dated as of March 29, 2018, by and between II-VI Incorporated and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

20. That certain Energy Services Agreement, dated as of September 18, 2018, by and between CoreSite Real Estate 1656 McCarthy, L.P. and Buyer (the "CoreSite PPA").

Exhibit A

Specifications

For the Battery Solution:

Energy storage [***]**:** [***] of beginning of life capacity. A typical Home Depot installation might use [***] for [***] of beginning of life capacity in order to achieve contract targets of [***].

Power discharge [***]**:** [***] per [***]; [***] per [***]. A typical Home Depot installation will have a [***] discharge capability.

Power charge [***]**:** [***] per [***]; [***] per [***]. A typical Home Depot installation will have a [***] charge capability.

Cabinet dimensions: The team will work to find the most space efficient solution. A cabinet which holds [***] of storage and associated power electronics and air handling would have approximate dimension of: [***]" in depth; [***]" in width and [***]" in height.

Cabinet environmental rating: Outdoor rated; [***] C to [***] C.

For the Bloom Systems

System Capacity: Configuration-dependent. Each Facility will be composed of an appropriate number of Bloom Systems in order to achieve the desired System Capacity.
Electrical Connection: 480 V, 3-phase, 60 Hz

Fuels: Natural Gas, Directed Biogas
Input Fuel Pressure: 10-18 psig (15 psig nominal)
Water: None during normal operation

NOx: < 0.01 lbs/MWh
Sox: Negligible
CO: <0.05 lbs/MWh
VOCs: < 0.02 lbs/MWh

Weight: 14.3 tons
Dimensions (variable layouts): 14'9" x 8'9" x 7' or 29'6" x 4'5" x 7'5"

Temperature Range: -20° to 45° C
Humidity: 0% to 100%

Location: Outdoor
Noise: < 70 dBA @ 6 feet

Exhibit B

Form of Bill of Sale

BILL OF SALE

This BILL OF SALE, dated as of _____ __, 201_ is made by BLOOM ENERGY CORPORATION, a Delaware corporation ("Seller"), to 2016 ESA PROJECT COMPANY, LLC, a Delaware limited liability company ("Buyer"), and is delivered pursuant to the Purchase, Use and Maintenance Agreement, dated as of October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the "PUMA"), between Seller and Buyer, in connection with the transfer of the assets described on Exhibit A attached hereto (the "Purchased System").

Seller hereby assigns, conveys, sells, delivers, sets over and transfers to Buyer, for the consideration, and on the terms and conditions, set forth in the PUMA, all of Seller's rights, title and interest in, under and to the Purchased System, and Buyer hereby accepts such assignment .

This Bill of Sale shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

This Bill of Sale shall be governed by, and construed in accordance with, the laws of the State of California.

[Signature Page Follows]

[Note to Draft: To be revised as appropriate when used in connection with return of Facilities to Bloom]

IN WITNESS WHEREOF, the parties hereto have caused this Bill of Sale to be signed by their respective duly authorized officers as of the date first written above.

SELLER:

BLOOM ENERGY CORPORATION

By: _____
Name:
Title:

BUYER:

2016 ESA PROJECT COMPANY, LLC

By: _____
Name:
Title:

Attachment A to Bill of Sale

Purchased System

Exhibit C

Seller Deliverables

Seller shall develop a comprehensive design package consisting of drawings generated in AutoCAD. Design package to accompany appropriate information necessary to support the design and equipment specifications. The drawing package shall consist of the following, as applicable to the scope of work.

Seller shall submit the items listed below prior to or at the Commencement of Operations:

1. "Issued for Construction Drawing Set" (each of the below delivered, as appropriate and necessary given site design):
    a. Cover sheet
    b. Work site plan (work site and general arrangement drawings)
    c. Grading and drainage plan
    d. Soil erosion and sediment control
    e. Foundation plans and details
    f. Structural plans, details and elevation
    g. [***]
    h. Single-line electrical diagrams
    i. Electrical schematic diagrams
    j. [***]
    k. Network Architecture Drawings
    l. Power and control wiring
    m. Grounding plans
    n. Lightning and surge protection drawings
    o. Wiring Diagrams
    p. Bloom Equipment Specifications
    q. Electrical schematic diagrams
    r. [***]
    s. I/O list
2. Example screenshot to be delivered by Seller, with details on sample shown below:

[***]

Seller shall submit the items listed below on or before ninety (90) days following the Commencement of Operations:

1. Third party vendor drawings ([***] battery specifications and drawings to be provided by PowerSecure if applicable)
2. Safety Documentation for Bloom Personnel and Subcontractors
3. Final OSHA/Cal-OSHA 300Log (not required to be organized by Site)
4. Final Incident Reports (to include First Aid logs, Final Root Cause Analysis Reports, and Final Near Miss Reports)
5. Quality Documentation for Construction activities (if applicable)
6. As-built drawings
7. Permitting documentation

Seller will prepare in individually organized volumes of the Seller Deliverables and deliver to Buyer for Buyer's approval two sets of such required manuals. Seller will prepare and deliver to Buyer two (2) electronic copies on CDs or USB flash drive, at least one of such copy will be in native format (if available to Seller) to allow Buyer subsequently to modify or update the same. Seller shall transfer Seller Deliverables to Buyer and they shall become the sole property of Buyer.

Exhibit D

Form of Payment Notice

To: **2016 ESA PROJECT COMPANY, LLC (Buyer)**

This Payment Notice, dated _____, 201_, is given pursuant to Section 2.4(c) of the Purchase, Use and Maintenance Agreement between the BLOOM ENERGY CORPORATION (**Seller**) and Buyer dated October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the **PUMA**). Terms defined in the PUMA have the same meaning where used in this Payment Notice.

Seller hereby notifies Buyer that, in connection with the Invoice Due Date occurring on _____, 201__, Buyer shall be obligated to make Purchase Price payments to Bloom in the aggregate amount of $_____.

The Purchase Price to be paid by Buyer on the above-mentioned Invoice Due Date is comprised of the following amounts:

1) $_____ of Purchase Price payments for a Tranche composed of Facilities with aggregate System Capacity __kW, which amount equals [***] per kW ($[***]/kW) of System Capacity of the Facilities included in such Tranche.

2) $_____ of Purchase Price payments in connection with the Shipment of the final Bloom System to be installed in Facilities with aggregate System Capacity of __kW, which amount represents [***] per kW ($[***]/kW) of System Capacity of Facilities that have Shipped and were included in a Tranche for which Buyer has previously made a Purchase Price payment, plus 100% of the Purchase Price Adder(s) applicable to such Facilities, if any.

3) $_____ of Purchase Price payments in connection with the Shipment of the final Bloom System to be installed in Facilities with aggregate System Capacity of __kW, which amount represents [***] per kW ($[***]/kW) f System Capacity of Facilities that have Shipped and were not included in a Tranche for which Buyer has previously made a Purchase Price payment, plus 100% of the Purchase Price Adder(s) applicable to such Facilities, if any.

4) $_____ of Purchase Price payments in connection with the Commencement of Operations of Facilities with aggregate System Capacity of ___kW, which amount represents, the remaining unpaid Purchase Price for such Facilities, plus one hundred percent (100%) of the Taxes to be paid by Buyer pursuant to Section 2.3(c) for such Facilities.

Included with this Payment Notice is supporting documentation (i.e., Seller's Deposit Milestone Certificates, bills of lading and Seller's Certificates of Installation) evidencing the achievement of all applicable Milestones achieved by the Tranche and/or Facilities referenced above.

Seller hereby certifies that each of the representations and warranties of Seller in the PUMA is true and correct in all respects as of the date of this Payment Notice.

This Payment Notice may be relied upon by Buyer.

Signed for and on behalf of BLOOM ENERGY CORPORATION

By: _____

Name: _____

Title: _____

Exhibit E

Form of Purchase Order

http://vsaestiva.ps.local/CGI-Bin/htmlos.exe/00118.8.54310867891...

Create Form

Options Help

Select

Purchase Order

Email Invoices to: pcop@powersource.com

PO# Auto

Show this purchase order number on all correspondence, invoices, shipping papers and packaging

Tax Add	Date:	Requisitioned by:
Select	10/20/2016	dcall
	Ship To: Add Select	

Add NS Number Select

Delivery Date	FOB Point	Terms	Ship Via	Department
		Select	Ground	Accounts Payable

Item No	Description	Qty.	Category	Unit Price	Ext Price	T?
?	Facilities with aggregate System Capacity of [insert Tranche System Capacity] kW reflected in Bloom Tranche Notice dated [insert date].		Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	
?			Select		0.00	

Add lines

Special Instructions

Subtotal $ 0.00

Tax Rate: % Tax $ 0.00

Total $ 0.00

Order is to be shipped in accordance with price, delivery, and specifications shown above. Notify us immediately if you are unable to ship as specified.

Place staff-only comments below.

Attachment Size

No Attachments Found

Browse... No files selected. Upload

All Items Received? No

Release to Pay? Upon Receipt (If not Upon Receipt, please explain)

Receiving Register

Shipment	Item No	Description	Received Date	Qty	Login Name

Receive Notes:

Goods Received:	0.00
Goods Unreceived:	0.00
Value of Services Received:	0.00
Value of Services Unreceived:	0.00
Value of Goods & Services Received:	0.00
Value of Goods & Services Unreceived:	0.00

Invoice Register

Invoice #	Invoice Date	Amount

Total Invoiced:	0.00
Balance:	0.00

Save Draft as Template Save As Draft

Submit

1 of 1

10/20/2016 2:19 PM

Exhibit F

Form of Seller's Deposit Milestone Certificate

To: **2016 ESA PROJECT COMPANY, LLC (Buyer)**

This Deposit Milestone Certificate, dated _____, 201_, is given pursuant to paragraph (c) of the definition of Deposit Milestone Requirements in the Purchase, Use and Maintenance Agreement between the BLOOM ENERGY CORPORATION (**Seller**) and Buyer dated October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the **PUMA**).

Terms defined in the PUMA have the same meaning where used in this Certificate.

This certificate is provided in respect of a Tranche with aggregate System capacity of _____ kW (the "**Subject Tranche**").

Seller hereby certifies that in respect of the Subject Tranche:

(1) Seller, on Buyer's behalf, has received approval of site plans and single-line drawings from one or more PPA Customers for Facilities with aggregate System Capacity equal to or greater than the aggregate System Capacity of such Subject Tranche (and all previously-invoiced Tranches);

(2) Seller has received all materials required for the commencement of fabrication of Bloom Systems with aggregate System Capacity equal to or greater than the aggregate System Capacity such Subject Tranche, and all materials required as of such time to allow for completion of such fabrication in order to achieve Commencement of Operations of such Facilities (and all previously-invoiced Tranches) within ninety (90) days hereof; and

(3) Each of the representations and warranties of Seller in the PUMA is true and correct in all respects as of the date of this Seller's Deposit Milestone Certificate.

This Deposit Milestone Certificate may be relied upon by Buyer.

Signed for and on behalf of BLOOM ENERGY CORPORATION

……

By: ……

Name:……..

Title:……..

Exhibit G

Form of Tranche Notice

To: **2016 ESA PROJECT COMPANY, LLC (Buyer)**

This Tranche Notice, dated _____, 201_, is given pursuant to Section 2.2 of the Purchase, Use and Maintenance Agreement between the BLOOM ENERGY CORPORATION (**Seller**) and Buyer dated October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the **PUMA**). Terms defined in the PUMA have the same meaning where used in this Tranche Notice.

Seller hereby notifies Buyer that Seller expects that Facilities with aggregate System Capacity of __kW will be included in a Tranche that Seller reasonably expects will satisfy the applicable Deposit Milestones in such the [1st / 2nd / 3rd / 4th] Calendar Quarter of 201_.

Seller hereby certifies that, as of the date of this Tranche Notice, no Seller Default has occurred and is continuing under the PUMA.

This Tranche Notice may be relied upon by Buyer.

Signed for and on behalf of BLOOM ENERGY CORPORATION

By: _____

Name: _____

Title: _____

Exhibit H

Form of Seller's Certificate of Installation

To: **2016 ESA PROJECT COMPANY, LLC (Buyer)**

This Certificate is given pursuant to paragraph (e) of the definition of Commencement of Operations in the Purchase, Use and Maintenance Agreement between the BLOOM ENERGY CORPORATION (**Seller**) and Buyer dated October 24, 2016, amended and restated as of June 26, 2017, amended and restated a second time as of March 16, 2018, and amended and restated a third time as of September 26, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the **PUMA**).

Terms defined in the PUMA have the same meaning where used in this Certificate.

This certificate is provided in respect of the Facility(ies) set forth on Exhibit A hereto.

Seller hereby certifies that in respect of each Facility:

1. Each Bloom System comprising the Facility has been installed, commissioned and tested in accordance with the Performance Standards and all other requirements of the PUMA;

2. Seller has performed and successfully completed all necessary acts under the applicable Interconnection Agreement (including performance testing) and has obtained permission from the applicable Person granting Buyer permission to interconnect such Facility with the distribution or transmission facilities of the Transmitting Utility;

3. All BOF and BOF Work necessary for the operation of the Facility has been installed, commissioned and tested in accordance with the Performance Standards and all other requirements of the PUMA; and

4. Each of the representations and warranties of Seller in the PUMA is true and correct in all respects as of the date of this Seller's Certificate of Installation.

This Certificate may be relied upon by Buyer.

Signed for and on behalf of BLOOM ENERGY CORPORATION

……

By: ……

Name:……..

Title:……..

ATTACHMENT A

COMPLETED FACILITIES

Table 1

Facility List

Serial No.	Location of Facility	Unit Model	System Capacity (kW-AC)

Exhibit I

Assignment Agreements

Updated as of: September 26, 2018

1. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of April 26, 2018
2. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 22, 2018.
3. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 30, 2018.
4. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of September 26, 2018.

Exhibit J

Seller Corporate Safety Plan

Seller will maintain and adhere to a Seller Corporate Safety Plan at all times during the term of this Agreement. Such plan will be maintained, in writing, at Seller corporate headquarters and will include, without limitation programs with respect to:

- Contractor Environmental Health & Safety Program
- Injury and Illness Prevention Program
- Heat Illness Prevention Program
- Emergency Action and Fire Prevention Plan
- Hazard Communication Program
- Corporate Electrical Standard – Specific Electrical Safe Work Practices
- Electrical Safety Awareness
- Lockout/Tagout
- Fall Protection Program (Working at Heights)
- Ladder Safety Program
- Powered Industrial Trucks (PIT)
- Hoist Safety Program
- Personal Protective Equipment (PPE)
- Respiratory Protection Program
- Hearing Conservation Program
- Hand and/or Powered Tools Safety Program
- Hot Work Process
- First Aid / CPR Program

Exhibit K

Subcontractor Quality Plan

Seller will adhere to the following standards and processes as applicable when engaging subcontractors for performance under this Agreement.

- General contractors will be subject to the terms and conditions set forth in The American Institute of Architects Document A107 – 2007 as amended in certain cases
- General contractors are required to complete a Bloom Energy Contractor Qualification Training Program
- General contractor superintendents and foremen must be certified and qualified by Seller to be on site
- Standard safety protocols will be observed at all times:
    - Site superintendents are OSHA30 certified
    - Seller superintendents ensure general contractors follow all local and state OSHA and owner requirements
    - Confirmation of "Injury and Illness Prevention Program"
    - Seller included in the ISN program – 3rd party safety evaluation
- A project superintendent assigned by Seller will review subcontractor work according to a standard site verification check list
- Contractors will submit Contractor Quality Guarantees for each site providing written verification of points of assurance including torques per site, Megger testing and line flushing
- Prestart verification conducted for all sites to review and confirm the quality of subcontractor work
- Prior to commencement of operations, Seller conducts an "OK to Start" meeting during which subcontractor quality of work is reviewed and confirmed as resolved
- All incidents are logged in a database and reviewed on an ongoing basis by Seller quality management as well as at the OK to Start meeting
- Quarterly business reviews conducted with general contractors to formally review incident data and mitigate process and workmanship issues.

Exhibit L

Projected Tolling Rates

[***] PPA

Projected Tolling Rates	
Period*	**$/kWh**
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
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[***]	[***]

[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

Period 1 commences on the Commencement of Operations Date of the applicable Facility and extends until (and including) the first December 31 or June 30 to occur following the six-month anniversary of such Commencement of Operations Date (e.g., for a Facility with a Commencement of Operations Date occurring on September 15, 2018, Period 1 extends until June 30, 2019). Subsequent Periods follow, in each case extending until (and including) the subsequent December 31 or June 30.

Exhibit M

Parties' Managers and Service Fees

Seller's Initial Operations Manager: [***]

Buyer's Initial Buyer Managers: [***]
[***]

Service Fees:

Calendar Months since Commencement of Operations for the applicable Facility	Rate ($/kW)
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
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[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

In addition, Services Fees for such Facility shall be increased by an amount equal to [***] of rated capacity of the Battery Solution if such Facility includes a Battery Solution, and [***].

In addition, from and after the [***] calendar month after Commencement of Operations for a Facility, Services Fees for such Facility shall be increased by an amount equal to:

- [***] per AOM per calendar month;
- [***] of System Capacity per calendar month if such Facility includes a Low-Pressure Gas Booster;
- [***] per UPM per calendar month if such Facility [***];
- [***] per UPM per calendar month if such Facility [***].

SCHEDULE 3.3

DESIGN AND INSTALLATIONS PROCEDURES

Seller will perform the following activities in connection with the design and installation of each Facility, to the extent necessary to cause such Facility to achieve Commencement of Operations:

- Initial site visits and studies to assess site suitability, including but not limited to due diligence research with local Authorities Having Jurisdiction (AHJs) and utilities, site load validation, and utility locates. When necessary, title reports may be pulled, gas composition may be tested, and geotechnical studies may also be done.
- Produce a complete set of construction drawings, either internally or in conjunction with an external design firm, in accordance with: local, state, and national codes; local electric and gas utility requirements; and site-specific or host customer requirements.
- Procure all necessary permits and/or approvals as required by the local AHJs, including but not limited to Planning, Building, and Fire Departments.
- Secure technical approval to interconnect with the local electric utility, and coordinate the electric interconnection agreement between the host customer and the local utility.
- Engage the local gas utility to design the gas interconnection approach, and coordinate the gas contract for gas delivery to the Bloom system between the host customer and the local utility.
- Secure a general contractor to build the site as designed, obtain final building department sign-off, and pass any other required inspections. Provide Bloom Energy-trained site supervision at key milestones during the construction process to ensure smooth inspections and a positive host customer experience.
- Perform system commissioning once construction is complete and inspections are passed, ensuring the systems operate as intended and reach full power. Remedy any issues preventing full power prior to turning operation over to Bloom's Service team.
- Act as the interface with the host customer, securing all necessary design approvals and site access permissions, as well as coordinating construction schedules. Ensure primary personnel responsible for interfacing with Bloom's system are educated in safety procedures. Deliver customer manuals and emergency procedures to the customer upon project completion, as well as any other close-out documentation required by the contract

SCHEDULE 3.4

COMMISSIONING PROCEDURES

Seller will perform the following activities in connection with the commissioning of each Facility, to the extent necessary to cause such Facility to achieve Commencement of Operations:

- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]
- [***]

SCHEDULE 4.2

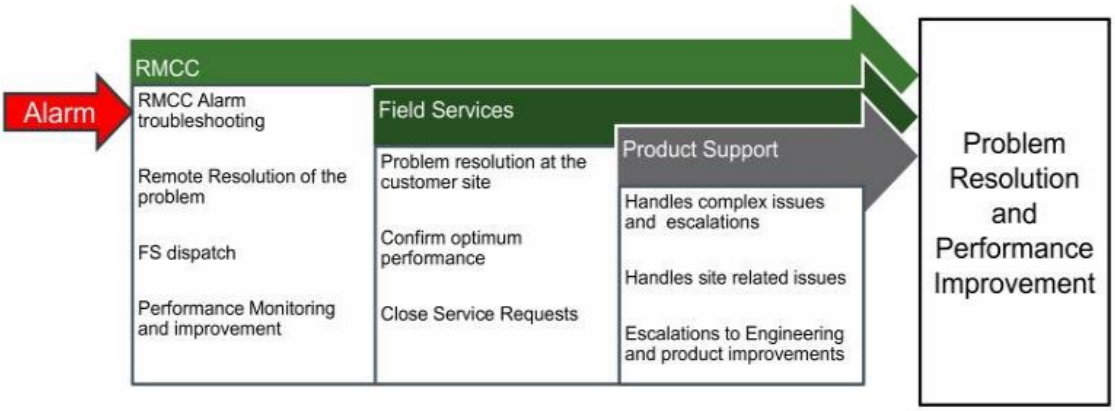
OPERATION AND MAINTENANCE PROCEDURES

Seller will perform the following operation and maintenance activities for each Facility, to the extent necessary to cause such Facility to perform in accordance with the Warranty Specifications:

- Annual maintenance activities:
  - Check Surge Protection Device and replace as necessary
  - Replace main blower filter element
  - Replace AC unit filter element if applicable
  - Replace auxiliary blower filter element
  - Remove any debris and vacuum inside of each cabinet
  - Remove any debris from the exterior of cabinets
  - Check all FCM hotbox enclosures for any leaking or cracks
  - Replace door filters
  - NG conditioning canister replacement
- Site obligations:
  - An e-mail announcement of a service appointment will be sent to address(es) specified by the client informing of a service visit in advance of a service visit
  - Field Service personnel will sign in at a security office as required by client
  - Field Service personnel will safely and securely maintain and repair the systems as needed in accordance with our established and released procedures
  - Bloom HR and EH&S will work with clients to fulfill requirements for certification of drug testing, training, and other Environmental Health & Safety (EH&S) procedures
- Site visit protocols:
  - Works with customers and Product Development to resolve issues
  - Provides detailed documentation for each maintenance element performed
  - Inspection of installed equipment to ensure peak performance
  - Inspection of all components to ensure proper operation within product and environmental specifications
  - Clearly and professionally interact with customer regarding status of site visits, performance of their systems and general fuel cell education
- Spare Parts
  - Bloom Energy Product Support maintains a list of all spare parts including field replaceable units (FRUs) and consumables for each of its commercial products
  - Spare parts are stocked in localized third party logistics depots in each service zone

- The most common and most critical parts are stocked in each local depot and replenished on a weekly schedule
- Parts not stocked in localized depots are dispatched from our Milpitas, CA warehouse via FedEx or other carriers and couriers

- Failure Response Protocol:



- Emergency Response Protocol:
  - Contact lists of BE personnel to be contacted during normal business hours and during off hours (24-7-365 emergency escalation path) are provided for each region where Energy Servers are located in order to remedy situations posing a risk to persons or property
  - Remote shutdown from Bloom RMCC if required
  - Emergency power off button provided onsite
- Remote monitoring:
  - 24/7/365 performance monitoring and control of fleet
  - 1st level troubleshooting
  - Cross-functional interface with engineering, software, controls, quality
  - Optimize performance
  - Support new customer site start-ups
  - Customer performance analysis – daily
- Standards Compliance:
  - Complies with Rule 21 interconnection
  - ANSI/CSA FC 1: Stationary Fuel Cell Power Systems – Safety
  - IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems
  - NFPA 853 – The Standard for Installation of Stationary Fuel Cell Power Systems

    - NFPA 70 – The National Electrical Code
    - NFPA 54 – The National Fuel Gas Code
- Subcontracted Services. The following may in some cases be performed by subcontractors:
    - Water DI system replenishment
    - STS and transfer switch maintenance and repair
    - Some annual maintenance and upgrade work
    - Filter delivery, replacement, removal
    - High Voltage transformer and switchgear maintenance
    - Circuit breaker and similar maintenance
    - Battery replacement
    - Some fuel cell module performance upgrades
    - NG conditioning canister replacement
- Management Staff:
    - Customer Installations Group (CIG) – Turnkey design, engineering, procurement, permitting and installation
    - Services – Commissioning, operations and monitoring of servers
    - Customer Experience – Interface with customer
    - PPA Operations – Certain administrative duties
- All Energy Servers are instrumented to securely record over 1000 data points per server and stored in a Data Historian that resides in a Secure Co-located Data Center and Backed Up for data recovery
- CIG and Service employees are subject to drug tests, background checks and other screening protocols based on customer site requirements
- Bloom Energy maintains a Code of Safe Practices and ensures that copies are provided to all applicable field service technicians and includes:
    - Injury and illness prevention program
    - Required Personal Protection Equipment (PPE)
    - Corporate EH&S Standard
    - Proper use of Powered Industrial Trucks
    - Contracted Crane Operations
    - Ladder safety program
    - Electrical Safety and Lock-Out Tag-Out (LOTO)
    - Fall protection
    - First Aid/CPR program
    - Contractor EH&S program
    - Bloom Energy Safety Commitment

▪ **SCHEDULE 4.6**

APPROVED MAJOR SERVICE PROVIDERS

Core States Group / CoreStates, Inc.
3401 Centre Lake Drive Suite 330
Ontario, CA 91761
909.467.8907
www.core-eng.com

Newco Construction of America, Inc.
17830 Front Street
Mount Dora, FL 32757
352-735-3877
www.newcoconstruction.com

PacifiCore Construction
1342 Bell Ave Suite 3A
Tustin, CA 91780
657-859-40505
www.pacificoreconstruction.com

Rubicon Professional Services
107 Tindall Road Suite #11
Middletown, NJ 07748
732-832-2975
www.RubiconPS.com

CONFIDENTIAL

EXECUTION VERSION

AMENDMENT NO. 1 TO
THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT

This AMENDMENT NO. 1 TO THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT (this " Amendment "), is entered into effective as of September 28, 2018 (" Effective Date ") by and between BLOOM ENERGY CORPORATION, a Delaware corporation (" Seller "), and 2016 ESA PROJECT COMPANY, LLC, a Delaware limited liability company (" Buyer ," and together with Seller, the " Parties "). Capitalized terms used and not otherwise defined herein have the meanings given to them in the Third A&R PUMA (as defined below). All Section, annex and exhibit references, unless otherwise indicated, shall be references to Sections, annexes and exhibits of the Third A&R PUMA and the rules of interpretation set forth in the Third A&R PUMA apply as if set forth herein.

RECITALS

WHEREAS , reference is hereby made to that certain Purchase, Use and Maintenance Agreement, dated as of October 24, 2016, by and between Buyer and Seller, as amended by (a) that certain Amendment No. 1 dated as of February 15, 2017, and (b) that certain Amendment No. 2 dated as of April 28, 2017 (the " Original PUMA ");

WHEREAS , reference is hereby made to (i) that certain First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 26, 2017, which amended and restated in its entirety the Original PUMA, and (ii) that certain Amendment No. 1 to First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 11, 2017 (the " First A&R PUMA ");

WHEREAS , reference is hereby made to (i) that certain Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of March 16, 2018, which amended and restated in its entirety the First A&R PUMA, (ii) that certain Amendment No. 1 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of April 26, 2018, (iii) that certain Amendment No. 2 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 22, 2018, and (iv) that certain Amendment No. 3 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 30, 2018 (the " Second A&R PUMA ");

WHEREAS , reference is hereby made to that certain Third Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 26, 2018, which amended and restated in its entirety the Second A&R PUMA (the " Third A&R PUMA ");

WHEREAS , Buyer and 2017 Fuel Cell Operating Company I, LLC (" 2017 Fuel Cell Operating Company I "), a Delaware limited liability company, are entering into an Assignment and Assumption Agreement contemporaneously herewith pursuant to which Buyer will take assignment of and assume certain PPAs previously entered into by 2017 Fuel Cell Operating Company I; and

WHEREAS , Buyer and Seller wish to amend the Third A&R PUMA to update the list of PPAs subject to the Third A&R PUMA, as further set forth herein.

NOW , **THEREFORE** , in consideration of the mutual promises and covenants set forth herein, and for other consideration, the receipt and adequacy of which is hereby acknowledged, the Parties hereto hereby agree as follows:

AGREEMENT

Section 1. Amendments to the Third A&R PUMA .

(a) Annex D to the Third A&R PUMA is hereby amended and restated in its entirety to read as set forth on **Attachment 1** attached hereto.

(b) Exhibit I to the Third A&R PUMA is hereby amended and restated in its entirety to read as set forth on **Attachment 2** attached hereto.

Section 2. No Other Changes or Waivers . Except as expressly provided or contemplated by this Amendment, all of the terms, conditions and provisions of the Third A&R PUMA remain unaltered and in full force and effect. Except as specifically provided herein, the execution, delivery and performance of this Amendment shall not be deemed as a waiver of any other matters or any future matters. The Third A&R PUMA and this Amendment shall be read and construed as one instrument.

Section 3. Headings . The Section headings contained in this Amendment are solely for the purpose of reference, are not part of the agreement of the Parties and shall not in any way affect the meaning or interpretation of this Amendment.

Section 4. Governing Law; Jurisdiction; Venue . THIS AMENDMENT SHALL BE GOVERNED BY AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK, WITHOUT GIVING EFFECT TO ANY CONFLICTS OF LAW OR OTHER PRINCIPLES THEREOF THAT WOULD RESULT IN THE APPLICATION OF THE LAWS OF ANOTHER JURISDICTION (OTHER THAN SECTION 5-1401 OF THE NEW YORK GENERAL OBLIGATIONS LAW). THE PARTIES HEREBY IRREVOCABLY SUBMIT TO THE NON-EXCLUSIVE JURISDICTION OF THE COURTS OF THE STATE OF NEW YORK AND OF THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK WITH RESPECT TO ANY DISPUTE ARISING OUT OF OR RELATING TO THIS AMENDMENT. EACH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES TRIAL BY JURY IN ANY ACTION, SUIT OR PROCEEDING RELATING TO ANY SUCH DISPUTE AND FOR ANY COUNTERCLAIM WITH RESPECT THERETO.

Section 5. Severability . If any term or other provision of this Amendment is invalid, illegal or incapable of being enforced by any rule of law or public policy, all other conditions and provisions of this Amendment shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereby is not affected in any manner materially adverse to any Party.

Section 6. Counterparts . This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Signatures delivered by facsimile (or portable document format) will be considered original signatures, and each Party shall thereafter promptly deliver original signatures to the other Party.

[*The remainder of this page intentionally left blank*]

IN WITNESS WHEREOF, the parties have caused this Amendment to be duly executed by their respective officers thereunto duly authorized as of the Effective Date.

BLOOM ENERGY CORPORATION

By: __
Name: Randy Furr
Title: Chief Financial Officer

2016 ESA PROJECT COMPANY, LLC

By: __
Name: Eric Dupont
Title: Vice President

ATTACHMENT 1

ATTACHMENT 2

Annex D

List of PPAs

Updated as of: September 28, 2018

1. That certain Amended and Restated Energy Server Use and License Agreement, dated as of October 27, 2016, by and between Home Depot U.S.A., Inc. and Buyer, as amended by (a) that certain First Amendment to Amended and Restated Energy Server Use and License Agreement dated March 28, 2017, (b) that certain Second Amendment to Amended and Restated Energy Server Use and License Agreement dated January 29, 2018, and (c) that certain Third Amendment to Amended and Restated Energy Server Use and License Agreement dated September 26, 2018 (the " Home Depot PPA ").

2. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17012, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

3. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17013, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

4. That certain Energy Server Use Agreement, dated as of September 27, 2016, by and between FedEx Ground Package System, Inc. and Buyer (the " FedEx PPA ").

5. That certain Energy Server Use and License Agreement, dated as of September 30, 2016, by and between Hoag Memorial Hospital Presbyterian and Buyer.

6. That certain Energy Server Use and License Agreement, dated as of February 15, 2017, by and between Home Depot U.S.A., Inc. and Buyer.

7. That certain Energy Server Use and License Agreement, dated as of March 14, 2017, by and between San Diego Community College District and Buyer.

8. That certain Energy System Use Agreement, dated as of March 24, 2017, by and between AT&T Corp. and Buyer (the " AT&T PPA ").

9. That certain Energy Server Use and License Agreement, dated as of May 31, 2017, by and between Equinix, Inc. and Buyer, together with the Equinix Indemnity Agreement and the Equinix Landlord Consents (collectively, the " Equinix PPA ").

10. That certain Energy Server Use and License Agreement, dated as of August 30, 2017, by and between Intel Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 11, 2017, by and between 2017 ESA Project Company, LLC and Buyer.

11. That certain Energy Server Use and License Agreement, dated as of December 28, 2017, by and between Intel Corporation and Buyer.

12. That certain Energy Services Agreement, dated as of September 29, 2017, by and between The State University of New York and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of April 26, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

13. That certain Energy Server Use Agreement, dated as of November 15, 2017, by and between FedEx Ground Package System, Inc. and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer .

14. That certain Energy Services Agreement, dated as of November 30, 2017, by and between Long Island University and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer .

15. That certain Energy Server Use and License Agreement, dated as of November 30, 2017, by and between New York City Health and Hospitals Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer (the " NYC HHC PPA ") .

16. That certain Energy Services Agreement, dated as of June 29, 2018, by and between New York State Office of Mental Health and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 30, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

17. That certain Energy Services Agreement, dated as of November 10, 2017, by and between Agilent Technologies, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

18. That certain Energy Services Agreement, dated as of December 8, 2017, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as amended by that certain First Amendment to Energy Services Agreement, dated as of September 14, 2018, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

19. That certain Energy Services Agreement, dated as of March 29, 2018, by and between II-VI Incorporated and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 28, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

20. That certain Energy Services Agreement, dated as of September 18, 2018, by and between CoreSite Real Estate 1656 McCarthy, L.P. and Buyer (the " CoreSite PPA ").

21. That certain Energy Services Agreement, dated as of December 28, 2018 by and between Santa Clara University and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 28, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

ATTACHMENT 3

Exhibit I

Assignment Agreements

Updated as of: September 28, 2018

1. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of April 26, 2018
2. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 22, 201 8.
3. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 30, 2018.
4. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of September 26, 2018.
5. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of September 28, 2018.

AMENDMENT NO. 2 TO
THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT

This AMENDMENT NO. 2 TO THIRD AMENDED AND RESTATED PURCHASE, USE AND MAINTENANCE AGREEMENT (this " Amendment "), is entered into effective as of December 19, 2018 (" Effective Date ") by and between BLOOM ENERGY CORPORATION, a Delaware corporation (" Seller "), and 2016 ESA PROJECT COMPANY, LLC, a Delaware limited liability company (" Buyer ," and together with Seller, the " Parties "). Capitalized terms used and not otherwise defined herein have the meanings given to them in the Third A&R PUMA (as defined below). All Section, annex and exhibit references, unless otherwise indicated, shall be references to Sections, annexes and exhibits of the Third A&R PUMA and the rules of interpretation set forth in the Third A&R PUMA apply as if set forth herein.

RECITALS

WHEREAS , reference is hereby made to that certain Purchase, Use and Maintenance Agreement, dated as of October 24, 2016, by and between Buyer and Seller, as amended by (a) that certain Amendment No. 1 dated as of February 15, 2017, and (b) that certain Amendment No. 2 dated as of April 28, 2017 (the " Original PUMA ");

WHEREAS , reference is hereby made to (i) that certain First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 26, 2017, which amended and restated in its entirety the Original PUMA, and (ii) that certain Amendment No. 1 to First Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 11, 2017 (the " First A&R PUMA ");

WHEREAS , reference is hereby made to (i) that certain Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of March 16, 2018, which amended and restated in its entirety the First A&R PUMA, (ii) that certain Amendment No. 1 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of April 26, 2018, (iii) that certain Amendment No. 2 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 22, 2018, and (iv) that certain Amendment No. 3 to Second Amended and Restated Purchase, Use and Maintenance Agreement, dated as of June 30, 2018 (the " Second A&R PUMA ");

WHEREAS , reference is hereby made to (i) that certain Third Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 26, 2018, which amended and restated in its entirety the Second A&R PUMA, and (ii) that certain Amendment No. 1 to Third Amended and Restated Purchase, Use and Maintenance Agreement, dated as of September 28, 2018 (the " Third A&R PUMA ");

WHEREAS , Buyer and 2017 Fuel Cell Operating Company I, LLC (" 2017 Fuel Cell Operating Company I "), a Delaware limited liability company, are entering into an Assignment and Assumption Agreement contemporaneously herewith pursuant to which Buyer will take assignment of and assume certain PPAs previously entered into by 2017 Fuel Cell Operating Company I;

WHEREAS , Buyer and 2018 ESA Project Company, LLC (" 2018 ESA Project Company "), a Delaware limited liability company, are entering into an Assignment and Assumption Agreement contemporaneously herewith pursuant to which Buyer will take assignment of and assume certain PPAs previously entered into by 2018 ESA Project Company; and

WHEREAS , Buyer and Seller wish to amend the Third A&R PUMA to update the list of PPAs subject to the Third A&R PUMA, as further set forth herein.

NOW , **THEREFORE** , in consideration of the mutual promises and covenants set forth herein, and for other consideration, the receipt and adequacy of which is hereby acknowledged, the Parties hereto hereby agree as follows:

AGREEMENT

Section 1. Amendments to the Third A&R PUMA .

(a) Annex D to the Third A&R PUMA is hereby amended and restated in its entirety to read as set forth on **Attachment 1** attached hereto.

(b) Exhibit I to the Third A&R PUMA is hereby amended and restated in its entirety to read as set forth on **Attachment 2** attached hereto.

Section 2. No Other Changes or Waivers . Except as expressly provided or contemplated by this Amendment, all of the terms, conditions and provisions of the Third A&R PUMA remain unaltered and in full force and effect. Except as specifically provided herein, the execution, delivery and performance of this Amendment shall not be deemed as a waiver of any other matters or any future matters. The Third A&R PUMA and this Amendment shall be read and construed as one instrument.

Section 3. Headings . The Section headings contained in this Amendment are solely for the purpose of reference, are not part of the agreement of the Parties and shall not in any way affect the meaning or interpretation of this Amendment.

Section 4. Governing Law; Jurisdiction; Venue . THIS AMENDMENT SHALL BE GOVERNED BY AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK, WITHOUT GIVING EFFECT TO ANY CONFLICTS OF LAW OR OTHER PRINCIPLES THEREOF THAT WOULD RESULT IN THE APPLICATION OF THE LAWS OF ANOTHER JURISDICTION (OTHER THAN SECTION 5-1401 OF THE NEW YORK GENERAL OBLIGATIONS LAW). THE PARTIES HEREBY IRREVOCABLY SUBMIT TO THE NON-EXCLUSIVE JURISDICTION OF THE COURTS OF THE STATE OF NEW YORK AND OF THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK WITH RESPECT TO ANY DISPUTE ARISING OUT OF OR RELATING TO THIS AMENDMENT. EACH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES TRIAL BY JURY IN ANY ACTION, SUIT OR PROCEEDING RELATING TO ANY SUCH DISPUTE AND FOR ANY COUNTERCLAIM WITH RESPECT THERETO.

Section 5. Severability . If any term or other provision of this Amendment is invalid, illegal or incapable of being enforced by any rule of law or public policy, all other conditions and provisions of this Amendment shall nevertheless remain in full force and effect so long as the economic or legal substance of the

transactions contemplated hereby is not affected in any manner materially adverse to any Party.

Section 6. Counterparts . This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Signatures delivered by facsimile (or portable document format) will be considered original signatures, and each Party shall thereafter promptly deliver original signatures to the other Party.

[*The remainder of this page intentionally left blank*]

IN WITNESS WHEREOF, the parties have caused this Amendment to be duly executed by their respective officers thereunto duly authorized as of the Effective Date.

BLOOM ENERGY CORPORATION

By: __
Name: Randy Furr
Title: Chief Financial Officer

2016 ESA PROJECT COMPANY, LLC

By: __
Name: Eric Dupont
Title: Vice President

ATTACHMENT 1

ATTACHMENT 2

Annex D

List of PPAs

Updated as of: December 19, 2018

1. That certain Amended and Restated Energy Server Use and License Agreement, dated as of October 27, 2016, by and between Home Depot U.S.A., Inc. and Buyer, as amended by (a) that certain First Amendment to Amended and Restated Energy Server Use and License Agreement dated March 28, 2017, (b) that certain Second Amendment to Amended and Restated Energy Server Use and License Agreement dated January 29, 2018, and (c) that certain Third Amendment to Amended and Restated Energy Server Use and License Agreement dated September 26, 2018 (the " Home Depot PPA ").

2. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17012, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

3. That certain Master Fuel Cell Energy Services Agreement, Contract Number 17013, dated as of June 30, 2016, by and among Kaiser Foundation Hospitals, Kaiser Foundation Health Plan, Inc., and Buyer.

4. That certain Energy Server Use Agreement, dated as of September 27, 2016, by and between FedEx Ground Package System, Inc. and Buyer (the " FedEx PPA ").

5. That certain Energy Server Use and License Agreement, dated as of September 30, 2016, by and between Hoag Memorial Hospital Presbyterian and Buyer.

6. That certain Energy Server Use and License Agreement, dated as of February 15, 2017, by and between Home Depot U.S.A., Inc. and Buyer.

7. That certain Energy Server Use and License Agreement, dated as of March 14, 2017, by and between San Diego Community College District and Buyer.

8. That certain Energy System Use Agreement, dated as of March 24, 2017, by and between AT&T Corp. and Buyer (the " AT&T PPA ").

9. That certain Energy Server Use and License Agreement, dated as of May 31, 2017, by and between Equinix, Inc. and Buyer, together with the Equinix Indemnity Agreement and the Equinix Landlord Consents (collectively, the " Equinix PPA ").

10. That certain Energy Server Use and License Agreement, dated as of August 30, 2017, by and between Intel Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 11, 2017, by and between 2017 ESA Project Company, LLC and Buyer.

11. That certain Energy Server Use and License Agreement, dated as of December 28, 2017, by and between Intel Corporation and Buyer.

12. That certain Energy Services Agreement, dated as of September 29, 2017, by and between The State University of New York and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of April 26, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

13. That certain Energy Server Use Agreement, dated as of November 15, 2017, by and between FedEx Ground Package System, Inc. and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer .

14. That certain Energy Services Agreement, dated as of November 30, 2017, by and between Long Island University and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer .

15. That certain Energy Server Use and License Agreement, dated as of November 30, 2017, by and between New York City Health and Hospitals Corporation and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 22, 2018, by and between 2017 ESA Project Company, LLC and Buyer (the " NYC HHC PPA ") .

16. That certain Energy Services Agreement, dated as of June 29, 2018, by and between New York State Office of Mental Health and 2017 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of June 30, 2018, by and between 2017 ESA Project Company, LLC and Buyer.

17. That certain Energy Services Agreement, dated as of November 10, 2017, by and between Agilent Technologies, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

18. That certain Energy Services Agreement, dated as of December 8, 2017, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as amended by that certain First Amendment to Energy Services Agreement, dated as of September 14, 2018, by and between Taylor Fresh Foods, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 26, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

19. That certain Energy Services Agreement, dated as of March 29, 2018, by and between II-VI Incorporated and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 28, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

20. That certain Energy Services Agreement, dated as of September 18, 2018, by and between CoreSite Real Estate 1656 McCarthy, L.P. and Buyer (the " CoreSite PPA ").

21. That certain Energy Services Agreement, dated as of December 28, 2018 by and between Santa Clara University and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of September 28, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

22. That certain Energy Services Agreement, dated as of December 28, 2017, by and between Partners Healthcare System, Inc. and 2017 Fuel Cell Operating Company I, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of December 19, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

23. That certain Energy Services Agreement, dated as of December 29, 2017, by and between JSR Micro, Inc. and 2017 Fuel Cell Operating Company I, LLC, as amended by (a) that certain Amendment No. 1 to Energy Services Agreement dated February 26, 2018, (b) that certain Amendment No. 2 to Energy Services Agreement dated March 27, 2018, (c) that certain Amendment No. 3 to Energy Services Agreement dated April 20, 2018, and (d) that certain Amendment No. 4 to Energy Services Agreement dated June 27, 2018, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of December 19, 2018, by and between 2017 Fuel Cell Operating Company I, LLC and Buyer.

24. That certain Energy Services Agreement, dated as of March 28, 2018, by and between Agilent Technologies, Inc. and 2018 ESA Project Company, LLC, as assigned to Buyer pursuant to that certain Assignment and Assumption Agreement, dated as of December 19, 2018, by and between 2018 ESA Project Company, LLC and Buyer.

ATTACHMENT 3

Exhibit I

Assignment Agreements

Updated as of: December 19, 2018

1. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of April 26, 2018
2. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 22, 2018.
3. That certain Assignment and Assumption Agreement, by and between 2017 ESA Project Company and Buyer, dated as of June 30, 2018.
4. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of September 26, 2018.
5. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of September 28, 2018.
6. That certain Assignment and Assumption Agreement, by and between 2017 Fuel Cell Operating Company I and Buyer, dated as of December 19, 2018.
7. That certain Assignment and Assumption Agreement, by and between 2018 ESA Project Company and Buyer, dated as of December 19, 2018.

Exhibit 21.1

Subsidiaries of Bloom Energy Corporation

Name of Subsidiary	Jurisdiction
Bloom Energy 2009 PPA Portfolio Holding Company, LLC	Delaware
Diamond State Generation Holdings, LLC	Delaware
2012 V PPA Holdco, LLC	Delaware
2013B ESA Holdco, LLC	Delaware
2014 ESA HoldCo, LLC	Delaware
2015 ESA HoldCo, LLC	Delaware
Bloom Energy (India) Put. Ltd.	India

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (No. 333-226369) of Bloom Energy Corporation of our report dated March 21, 2019 relating to the financial statements, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
San Jose, California
March 21, 2019

EXHIBIT 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER

PURSUANT TO RULE 13A-14(A) AND RULE 15D-14(A)

OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED,

AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, KR Sridhar, certify that:

1. I have reviewed this Annual Report on Form 10-K for the year ended December 31, 2018 of Bloom Energy Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements and other financial information included in this report fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Evaluated the effectiveness of the registrant's disclosure controls and procedures, and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and

   c. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 21, 2019

By: /s/ KR Sridhar

KR Sridhar

Founder, President, Chief Executive Officer and Director

(Principal Executive Officer)

EXHIBIT 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO RULE 13A-14(A) AND RULE 15D-14(A)
OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Randy Furr, certify that:

1. I have reviewed this Annual Report on Form 10-K for the year ended December 31, 2018 of Bloom Energy Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements and other financial information included in this report fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Evaluated the effectiveness of the registrant's disclosure controls and procedures, and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and

   c. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 21, 2019

By: /s/ Randy Furr
Randy Furr
Chief Financial Officer
(Principal Financial Officer)

EXHIBIT 32.1

CERTIFICATIONS OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF
THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K for the year ended December 31, 2018 of Bloom Energy Corporation (the "Company") as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, KR Sridhar, Chief Executive Officer certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

3.

Date: March 21, 2019

By: /s/ KR Sridhar

KR Sridhar
Founder, President, Chief Executive Officer and Director
(Principal Executive Officer)

In connection with the Annual Report on Form 10-K for the year ended December 31, 2018 of Bloom Energy Corporation (the "Company") as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Randy Furr, Chief Financial Officer certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: March 21, 2019

By: /s/ Randy Furr

Randy Furr
Chief Financial Officer
(Principal Financial Officer)