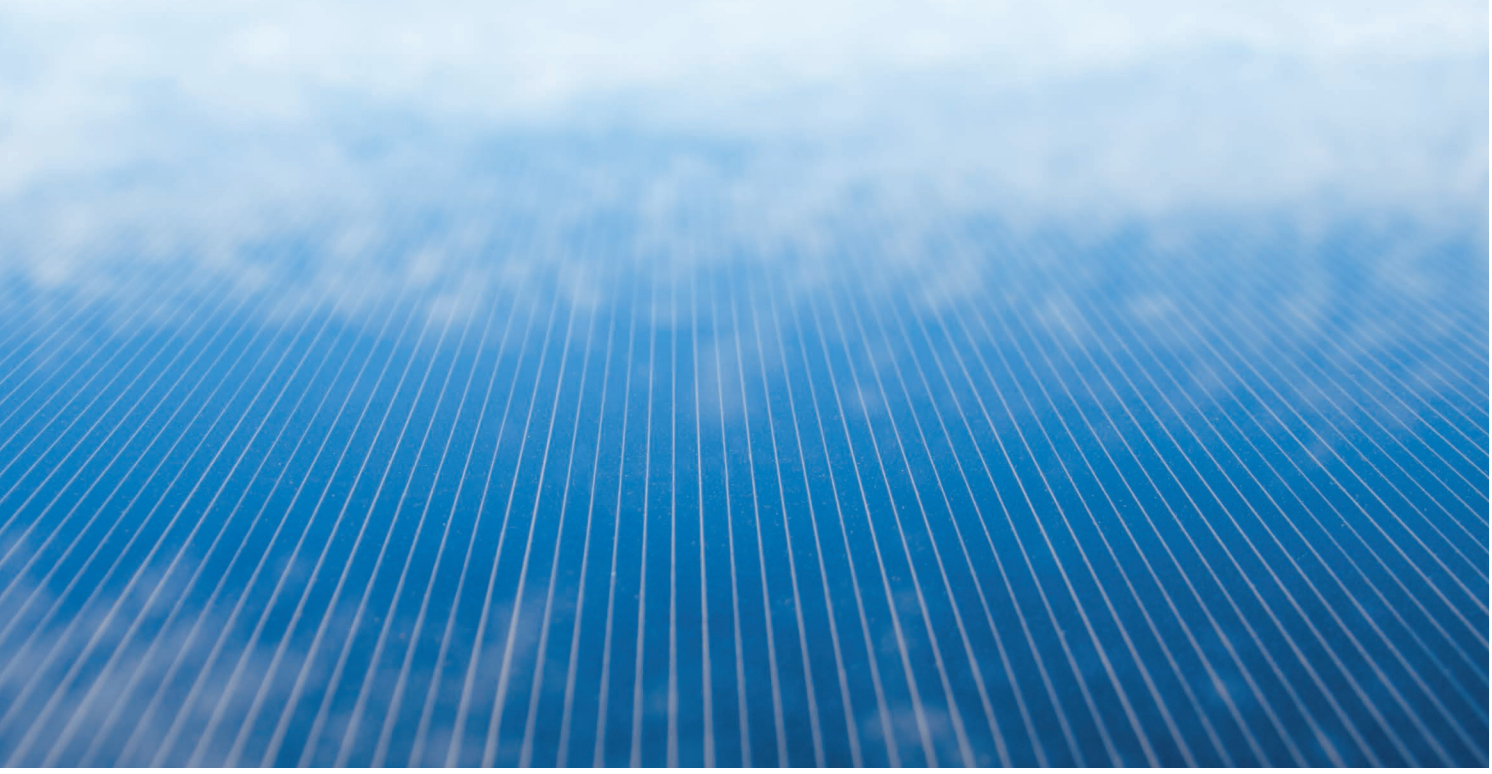


First Solar 2017 Annual Report

First Solar®

About First Solar

First Solar is a leading global provider of comprehensive photovoltaic (PV) solar systems which use its advanced module and system technology. The company's integrated power plant solutions deliver an economically attractive alternative to fossil-fuel electricity generation today. From raw material sourcing through end-of-life module recycling, First Solar's renewable energy systems protect and enhance the environment. With over 17 gigawatts installed worldwide, First Solar has developed, financed, engineered, constructed and operated some of the world's largest and most successful PV power plants in existence, establishing the company as the partner of choice for customers globally.

First Solar®

To Our Shareholders

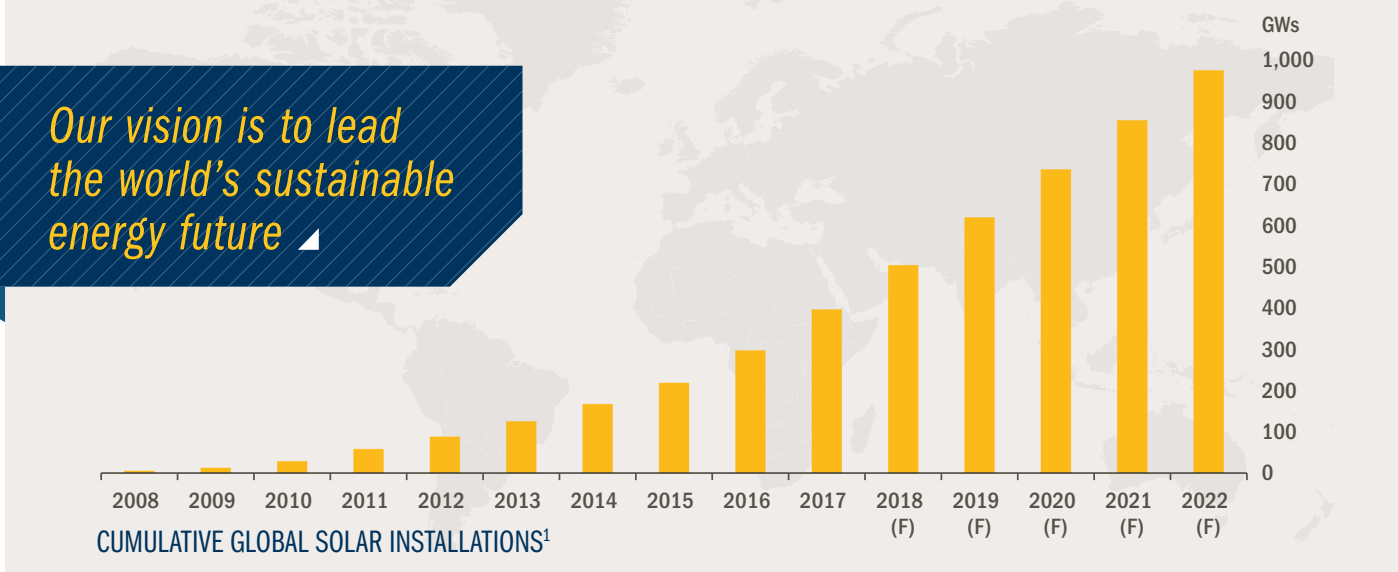
When I joined First Solar in early 2011, the cumulative global installed base of solar PV was less than 40 gigawatts (GW). Now, seven years later, that number has surpassed 400GW, a tenfold increase. While this growth in solar PV generation is impressive, the momentum is still building. With estimates of more than 575GW of new solar PV capacity to be installed during the next five years,[1] the International Energy Association has stated they "expect that solar PV capacity growth will be higher than any other renewable technology through 2022."[2]

MARK WIDMAR
CEO

While the solar PV industry has grown rapidly, many industry participants have struggled with profitability, liquidity and ultimately generating attractive returns on capital deployed. The major reason for this is the lack of differentiation across all facets of competitors' enterprises, including products, manufacturing, supply chains and so forth. Lacking a differentiated business, the only competitive advantage available to many solar companies is scale, and the key lever to driving sales for these companies is cutting prices. With a differentiated module technology, a differentiated manufacturing process that is less capital intensive, distinct development, EPC and O&M capabilities, and a balanced business model focused on growth, profitability and liquidity, First Solar's strategy stands apart from the competition.

At First Solar **our vision is to lead the world's sustainable energy future**. With the combination of strong industry growth and our points of differentiation, we believe that we can turn this vision into reality and achieve attractive returns for our shareholders.

Our vision is to lead the world's sustainable energy future



CUMULATIVE GLOBAL SOLAR INSTALLATIONS[1]

[1] GTM Research. PV Pulse, February 2018
[2] International Energy Association. Renewables 2017 report, October 4, 2017

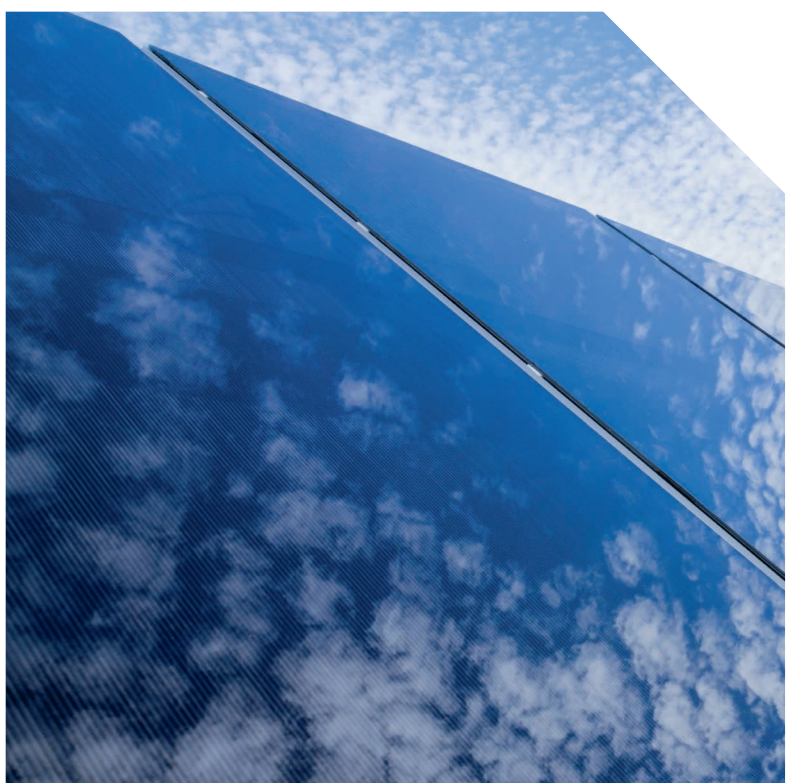
Technology Advantage

At the heart of First Solar's success has been our differentiated CdTe technology, which is an ideal material for making solar modules. For example, CdTe has a bandgap that is ideally matched to the solar spectrum, which means it is **more effective than other technologies at absorbing sunlight**. In addition, with a semiconductor material layer that is 1/50th the thickness of a silicon wafer, it is **much less material intensive**. CdTe is also easily deposited directly onto glass via First Solar's patented technology, which means that it has **superior manufacturability**. Combining these advantages with the superior energy yield from CdTe modules in real world conditions results in a highly differentiated product. Now, with the higher efficiency and larger form factor of Series 6, we are positioned to unlock the full potential of this unique technology. Not only is Series 6 expected to have an approximately 40 percent lower manufacturing cost per watt than Series 4,[3] but the larger module size and the addition of a frame also reduces the balance of systems (BOS) installation cost. We believe **Series 6 is the right combination of efficiency, cost, BOS compatibility and quality** that will allow us to scale our business profitably.

Series 6 is the right combination of efficiency, cost, BOS compatibility and quality that will allow us to scale our business profitably.

For this reason we recently **introduced a roadmap to deploy more than 5GW of Series 6 production** over the next three years. Expanding Series 6 manufacturing capacity not only provides an opportunity to increase market share and improve returns on capital, but also enables the scaling of fixed operating expenses. With minimal incremental operating expense required to transact more third-party module sales, we expect the increased manufacturing scale to benefit operating income.

[3] 40 percent reduction is compared to 2016 Series 4 cost per watt



Sustainability Advantage

In addition to providing a cost and performance advantage, our CdTe technology is also a leader among sustainable energy solutions. While all solar technologies have a lower impact on the environment than generation by fossil fuels, a distinguishing feature of our technology is the substantial benefit it possesses compared to other PV modules. On a lifecycle basis, **our thin-film modules have the smallest carbon footprint, lowest water use and fastest energy payback time in the industry**. In addition, a third-party study which evaluated the environmental footprint of five different PV technologies found that the impact of First Solar's technology is about two-thirds lower than the average PV module.

Our lower carbon solar technology not only has positive environmental benefits, but also provides a competitive advantage in commercial discussions. Early in 2017 we were awarded a greater than 100MW module supply agreement in France, not only as a result of our competitive offering, but also because of the significant environmental benefits that our module technology offers.

We invite you to learn more by reading our 2017 Sustainability Report which is available on our website.

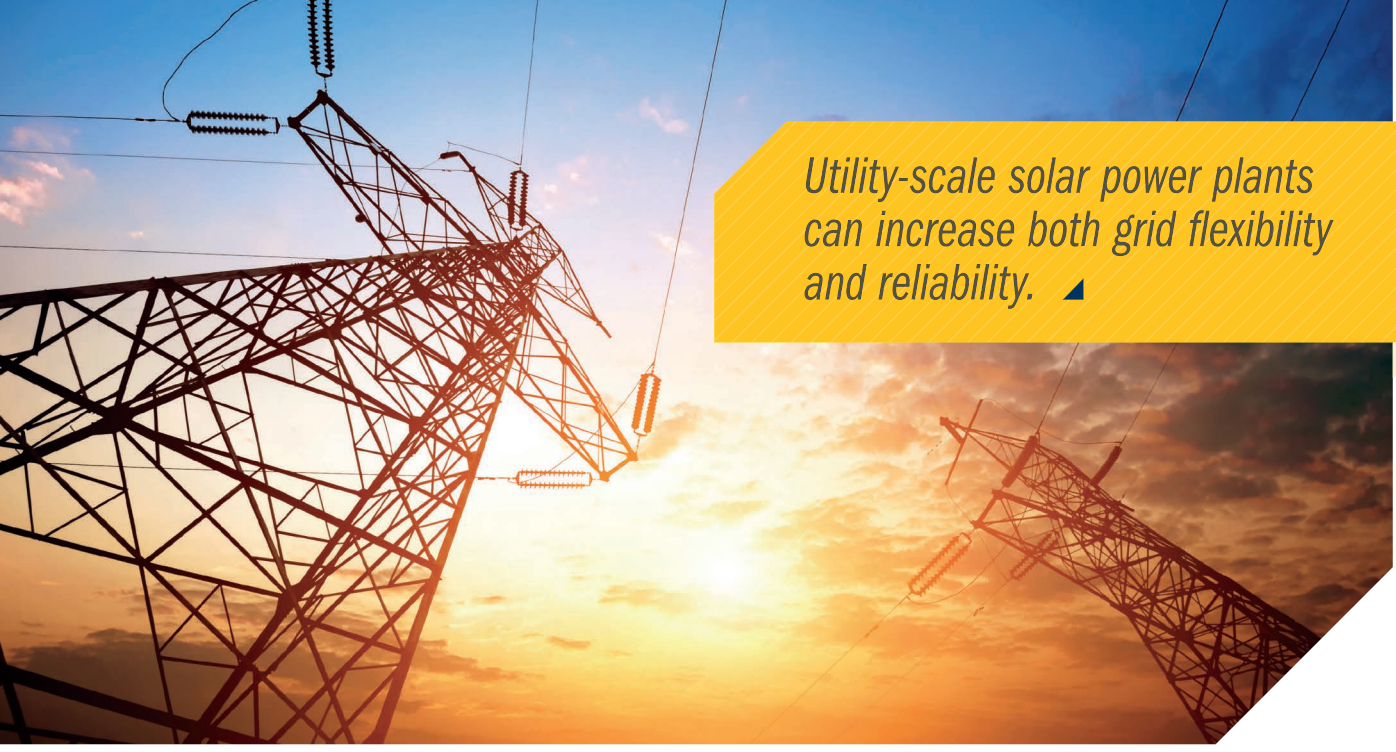
Customer Engagement

Another point of differentiation is First Solar's focus on developing long-lasting partnerships with strategic customers. In an industry that is often transactional in nature, our focus is on leveraging our far-reaching industry experience and integrated solutions to address the unmet needs of our customers.

For example, we were recently selected by Tampa Electric, a leading energy provider in Florida, to construct several hundred megawatts of solar projects. As the long-term owner of these assets, Tampa Electric focused on selecting a partner that could **optimize the total cost of ownership and incorporate advanced plant capabilities**. First Solar's comprehensive solutions, technology advantage, a design approach tailored to utility ownership values, experience constructing utility-scale solar PV plants and financial strength were all part of Tampa Electric's decision criteria. With utility demand for solar PV expected to grow in the coming years, we anticipate that **long-term solar ownership by utilities will continue to increase**. Our focus is on developing strong customer relationships to become the partner of choice for these utilities.

Our success with corporate customers also highlights our efforts to forge deep customer relationships. In early 2018 we announced that we signed a 150MW PPA that will help a major global corporation advance towards their goal of 100 percent renewable power. Our ability to offer turn-key solutions and a willingness to work on an innovative deal structure to meet the customers' needs were critical elements in winning this business. With more than 125 global corporations having made commitments to 100 percent renewable energy,[4] **we anticipate strong demand growth in corporate solar procurement** in the coming years.

[4] RE100



Utility-scale solar power plants can increase both grid flexibility and reliability.

Industry Thought Leadership

With broad experience designing and constructing solar power plants, and integrating multiple gigawatts of our modules into the grid, **First Solar has accumulated unique expertise** that can be utilized to develop solutions to the most pressing needs of the industry.

For example, in markets with higher levels of renewable penetration it can become increasingly challenging to add more solar to the grid. To help address this issue, First Solar, in partnership with CAISO[5] and NREL,[6] demonstrated how utility-scale **solar power plants equipped with advanced plant controls can provide essential services** that increase both grid flexibility and reliability. This important analysis was recognized with a NARUC[7] innovation award and has provided operators with an increased understanding of how to integrate more solar into the grid.

Storage is another emerging trend in the industry, and has the potential to increase solar penetration by enabling solar PV plants to be fully dispatchable. As demonstrated by our recent announcement with APS, First Solar is at the forefront of this industry-shaping trend. First Solar was selected by APS to develop and construct a 65MW AC solar power plant with a 50MW battery, capable of delivering power for more than three hours. This solar PV plus storage (PVS) project is unique in that it will serve APS with a firm peaking resource which will allow APS to meet customer electricity demand into the evening hours. **Demand for utility-scale PVS solutions is expected to grow rapidly** in coming years and we believe our experience will allow us to capitalize on this opportunity.

[5] California Independent System Operator
[6] National Renewable Energy Lab
[7] National Association of Regulatory Utility Commissioners

Year In Review

As we look to the future with excitement, it is also important to take a moment to reflect back on some of the tremendous accomplishments we achieved during the past year. Despite the fact that 2017 began with uncertainty around global demand strength and pressure on module pricing, we executed well and provided strong financial results to our shareholders. We **generated a record $1.3 billion of operating cash flow in 2017**, which contributed to our ending **cash and marketable security balance of over $3 billion**. Having spent approximately $0.5 billion, or 35 percent, of the total capital required to build more than 5GW of Series 6 capacity, we are encouraged by our liquidity position at this stage of the transition period.

Here are some other highlights from the past year.

TECHNOLOGY AND OPERATIONS

During 2017 we made tremendous progress on our Series 6 product transition. Over the course of the year **we installed our first Series 6 manufacturing line in our Ohio factory**, **began tool installation at a second factory in Malaysia, retrofitted a legacy factory in Vietnam and commenced construction of a fourth factory**, also in Vietnam. Even with this rapid pace of deployment, our Series 6 progress remains on track relative to our expectations, and the accomplishments of the past year are a testament to the tireless work of our highly experienced research and development, and manufacturing teams. Our Series 6 product readiness efforts in 2017 culminated with **the completion of our first Series 6 module** late in the year. We are now on the cusp of beginning Series 6 high volume manufacturing in Ohio with the other factories following closely behind. Since our decision in late 2016 to transition to Series 6, we have made remarkable progress in a short period of time.

While our primary focus remains on the Series 6 transition we have also made significant improvements to our Series 4 product. In 2017 we **increased the fleet average efficiency of our Series 4 module to 17 percent** and lowered the module cost per watt by 14 percent as compared to the prior year. Highlighting the success of our CdTe technology and our manufacturing excellence, we recently achieved a significant milestone as **we produced our 200 millionth module** since the inception of the company. With an increase in module efficiency of more than 50 percent and a reduction in module cost per watt of over 70 percent during the past decade, the progress we have made on this manufacturing journey is extraordinary.

Our operational excellence extends far beyond our module manufacturing. With **over 7.5GW of cumulative modules installed**, First Solar's EPC team provides tremendous value to the company and our customers. Based on improvements implemented this past year, we expect to reduce BOS cost on major projects in 2018 by 20 percent, relative to 2017. Our Operations and Maintenance (O&M) group produced excellent results in 2017 with **average 99.6 percent effective availability across our operating fleet**, and new bookings of nearly 2.9GW. Our combined EPC and O&M experience allows us to provide comprehensive power plant solutions to corporate energy buyers, utilities and other customers.

If **200M** modules were laid end to end lengthwise, they would stretch **151,500** miles

= 6x around earth

Global Markets

2017 was a record year with net bookings of 7.7GW DC, which included 2.6GW DC of Series 6 bookings. This tremendous accomplishment was due in part to increased global demand, but was also a testament to the appeal of our Series 6 module and our collaborative approach to working with customers.

Here are some highlights of our success.

UNITED STATES

The 6GW of net bookings in 2017 highlighted the continued trend of broad-based solar growth in the U.S. The net bookings spanned across 20 states with more than 30 different customers. Increasingly **we are seeing solar growth in new regions of the country** as a result of the attractive economics and reliable nature of solar power.

We also sold a number of significant projects last year which contributed to our financial results. During the course of the year we sold the 250MW AC Moapa project, the 179MW AC Switch Station I and Switch Station II projects and the 280MW AC California Flats project.

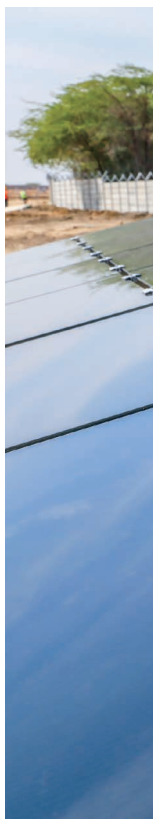
6GW
NET BOOKINGS

20
STATES

30+
CUSTOMERS

Notably, the power delivered from the Switch Station projects, and a portion of the California Flats project, will directly or indirectly be consumed by corporate customers. In combination with a greater than 400MW DC module supply agreement that we booked in 2017 **our modules are currently powering or will be powering more than 830MW DC of corporate renewables** in the U.S.

The positive bookings momentum has continued into 2018, with over 500MW DC of project development bookings in recent months. In addition to the APS PVS project and corporate customer PPA already mentioned, we signed a 200MW AC PPA with Georgia Power. Once completed, this project will be one of the largest solar power plants in the southeastern U.S. Together these projects bring our contracted U.S. development and EPC pipeline as of today to over 1.6GW DC.



INTERNATIONAL MARKETS

Our 2017 **international bookings were sizeable with 1.7GW DC contracted** primarily in Australia, India, France and Japan.

With more than 500MW DC booked, Australia was a particularly strong market. While the majority of the bookings were module supply agreements, we also increased our development pipeline in Australia with the signing of the Beryl project. The project is expected to be completed in mid-2019 and brings our contracted pipeline to over 100MW AC in Australia.

In India we maintained our strong presence with module bookings of over 400MW DC. In late 2017 **we also sold our first two development projects in India**, with the sale of an additional 155MW AC of projects expected in 2018.

In Japan we booked three additional development projects during 2017, bringing our total contracted pipeline to over 240MW DC. We anticipate selling some of our first projects in 2018, and continue to have a very healthy pipeline of mid-to-late stage bookings opportunities in addition to our contracted pipeline.

Conclusion

It is an exciting time to be at First Solar. There was an amount of risk associated with our decision in late 2016 to restructure the company and accelerate our Series 6 roadmap. However, now almost six quarters later, we are beginning to realize the benefits of this undertaking, as evidenced by our strong Series 6 bookings and solid financial position.

With a differentiated technology, a sustainability advantage, and distinctive capabilities to solve the unmet needs of our customers and the industry, First Solar is positioned to lead into the future. We thank our shareholders for their continued support and look forward to the opportunities ahead.

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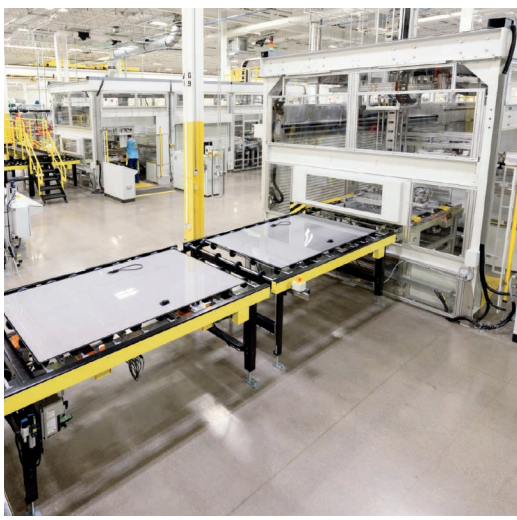
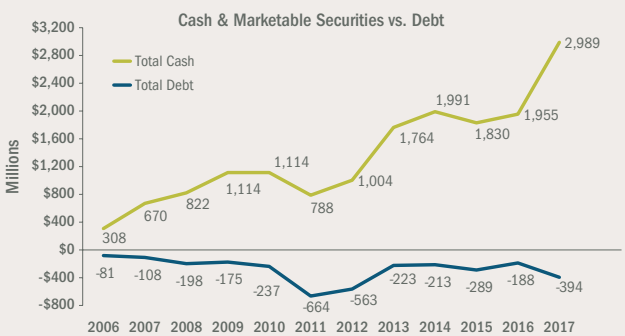
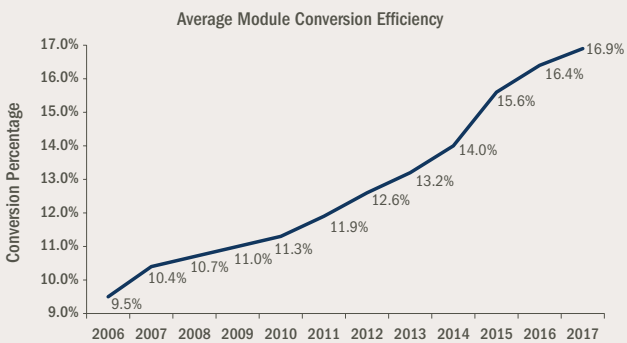


2017 Highlights





UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

(Mark one)

[x] **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2017

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: 001-33156

First Solar, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**20-4623678**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*

350 West Washington Street, Suite 600
Tempe, Arizona 85281
(Address of principal executive offices, including zip code)

(602) 414-9300
(Registrant's telephone number, including area code)

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

Title of each class	**Name of each exchange on which registered**
Common stock, $0.001 par value	The NASDAQ Stock Market LLC

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes [x] No [ ]

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

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 [x] No [ ]

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes [x] 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, 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 [x]	Accelerated filer [ ]	Non-accelerated filer [ ]
Smaller reporting company [ ]	Emerging growth company [ ]	*(Do not check if a smaller reporting 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 [x]

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant on June 30, 2017, the last business day of the registrant's most recently completed second fiscal quarter, was approximately $2.4 billion (based on the closing sales price of the registrant's common stock on that date). As of February 16, 2018, 104,474,656 shares of the registrant's common stock, $0.001 par value per share, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this Annual Report on Form 10-K, to the extent not set forth herein, is incorporated by reference from the registrant's definitive proxy statement relating to the Annual Meeting of Shareholders to be held in 2018, which will be filed with the Securities and Exchange Commission within 120 days after the end of the fiscal year to which this Annual Report on Form 10-K relates.

FIRST SOLAR, INC.

FORM 10-K FOR THE YEAR ENDED DECEMBER 31, 2017

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Throughout this Annual Report on Form 10-K, we refer to First Solar, Inc. and its consolidated subsidiaries as "First Solar," "the Company," "we," "us," and "our." When referring to our manufacturing capacity, total sales, and solar module sales, the unit of electricity in watts for megawatts ("MW") and gigawatts ("GW") is direct current ("DC" or "$_{DC}$") unless otherwise noted. When referring to our projects or systems, the unit of electricity in watts for MW and GW is alternating current ("AC" or "$_{AC}$") unless otherwise noted.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the Securities Act of 1933, as amended (the "Securities Act"), which are subject to risks, uncertainties, and assumptions that are difficult to predict. All statements in this Annual Report on Form 10-K, other than statements of historical fact, are forward-looking statements. These forward-looking statements are made pursuant to safe harbor provisions of the Private Securities Litigation Reform Act of 1995. The forward-looking statements include statements, among other things, concerning: effects resulting from certain module manufacturing changes and associated restructuring activities; our business strategy, including anticipated trends and developments in and management plans for our business and the markets in which we operate; future financial results, operating results, revenues, gross margin, operating expenses, products, projected costs (including estimated future module collection and recycling costs), warranties, solar module technology and cost reduction roadmaps, restructuring, product reliability, investments in unconsolidated affiliates, and capital expenditures; our ability to continue to reduce the cost per watt of our solar modules; the impact of public policies, such as tariffs or other trade remedies imposed on solar cells and modules; our ability to expand manufacturing capacity worldwide; our ability to reduce the costs to develop and construct photovoltaic ("PV") solar power systems; research and development ("R&D") programs and our ability to improve the conversion efficiency of our solar modules; sales and marketing initiatives; and competition. In some cases, you can identify these statements by forward-looking words, such as "estimate," "expect," "anticipate," "project," "plan," "intend," "seek," "believe," "forecast," "foresee," "likely," "may," "should," "goal," "target," "might," "will," "could," "predict," "continue," and the negative or plural of these words, and other comparable terminology. Forward-looking statements are only predictions based on our current expectations and our projections about future events. All forward-looking statements included in this Annual Report on Form 10-K are based upon information available to us as of the filing date of this Annual Report on Form 10-K and therefore speak only as of the filing date. You should not place undue reliance on these forward-looking statements. We undertake no obligation to update any of these forward-looking statements for any reason, whether as a result of new information, future developments, or otherwise. These forward-looking statements involve known and unknown risks, uncertainties, and other factors that may cause our actual results, levels of activity, performance, or achievements to differ materially from those expressed or implied by these statements, including, but not limited to:

- structural imbalances in global supply and demand for PV solar modules;
- the market for renewable energy, including solar energy;
- our competitive position and other key competitive factors;
- reduction, elimination, or expiration of government subsidies, policies, and support programs for solar energy projects;
- our ability to execute on our long-term strategic plans;
- our ability to execute on our solar module technology and cost reduction roadmaps;
- interest rate fluctuations and both our and our customers' ability to secure financing;
- our ability to attract new customers and to develop and maintain existing customer and supplier relationships;
- our ability to successfully develop and complete our systems business projects;
- our ability to convert existing production facilities to support new product lines, such as Series 6™ ("Series 6") module manufacturing;

- general economic and business conditions, including those influenced by U.S., international, and geopolitical events;
- environmental responsibility, including with respect to cadmium telluride ("CdTe") and other semiconductor materials;
- claims under our limited warranty obligations;
- changes in, or the failure to comply with, government regulations and environmental, health, and safety requirements;
- future collection and recycling costs for solar modules covered by our module collection and recycling program;
- our ability to protect our intellectual property;
- our ability to prevent and/or minimize the impact of cyber-attacks or other breaches of our information systems;
- our continued investment in R&D;
- the supply and price of components and raw materials, including CdTe;
- our ability to attract and retain key executive officers and associates; and
- all other matters discussed in Item 1A. "Risk Factors" and elsewhere in this Annual Report on Form 10-K, our subsequently filed Quarterly Reports on Form 10-Q, and our other filings with the Securities and Exchange Commission (the "SEC").

You should carefully consider the risks and uncertainties described under this section.

PART I

Item 1. *Business*

Company Overview

We are a leading global provider of comprehensive PV solar energy solutions. We design, manufacture, and sell PV solar modules with an advanced thin film semiconductor technology and also develop, design, construct, and sell PV solar power systems that primarily use the modules we manufacture. Additionally, we provide operations and maintenance ("O&M") services to system owners. We have substantial, ongoing R&D efforts focused on module and system-level innovations. We are the world's largest thin film PV solar module manufacturer and one of the world's largest PV solar module manufacturers. Our mission is to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership, and operational excellence.

In addressing overall global demand for electricity, our high-efficiency CdTe modules and fully integrated systems business provide competitively priced utility-scale PV solar energy solutions, which compete on an economic basis in many climates with traditional forms of energy generation and provide low cost electricity to end-users. Our vertically-integrated capabilities enable us to provide such solutions, accelerate the adoption of our technology, and successfully sell into key markets around the world. We seek to offer leadership across the entire solar value chain, resulting in more reliable and cost effective PV solar energy solutions for our customers.

Business Strategy

We believe the following strategies and points of differentiation provide the foundation for our leading industry position and enable us to remain one of the preferred providers of PV solar energy solutions.

Differentiated Technology

As a field-proven technology, our CdTe solar modules offer certain advantages over traditional crystalline silicon based solar modules by delivering competitive efficiency, higher real-world energy yield, and long-term reliability. Proven to deliver up to 8% more usable energy per nameplate watt than competing technologies in certain geographic markets and with a record of reliable system performance, our CdTe technology delivers more energy, more consistently, over the lifetime of a PV solar power system. Our recently introduced Series 6 module technology, with its combination of high conversion efficiencies, low manufacturing costs, larger form factor, and balance of systems ("BoS") component compatibility, is expected to further enhance our competitive position once production of such module technology begins in 2018. We expect our transition to Series 6 module technology to enable us to maximize the intrinsic cost advantage of CdTe thin film technology versus crystalline silicon.

In terms of energy yield, in many climates our CdTe solar modules provide a significant energy production advantage over most crystalline silicon solar modules of equivalent efficiency rating. For example, our CdTe solar modules provide a superior temperature coefficient, which results in stronger system performance in typical high insolation climates as the majority of a system's generation, on average, occurs when module temperatures are well above 25°C (standard test conditions). In addition, our CdTe solar modules provide a superior spectral response in humid environments where atmospheric moisture alters the solar spectrum relative to laboratory standards. Our CdTe solar modules also provide a better shading response than conventional crystalline silicon solar modules, which may lose up to three times as much power as CdTe solar modules when shading occurs. As a result of these factors, our PV solar power systems typically produce more annual energy in real world field conditions than competing systems with the same nameplate capacity.

Manufacturing Process

Our modules are manufactured in a high-throughput, automated environment that integrates all manufacturing steps into a continuous flow line. Such manufacturing process eliminates the multiple supply chain operators and expensive

and time-consuming batch processing steps that are used to produce crystalline silicon solar modules. At the outset, a sheet of glass enters the production line and in less than 3.5 hours is transformed into a completed module, which is flash tested, boxed, and ready for shipment. With over 17 GW of modules sold worldwide, we have a demonstrated history of manufacturing success and innovation. We currently have multiple production lines at our manufacturing facilities in Perrysburg, Ohio and Kulim, Malaysia and plan to also utilize our manufacturing facility in Ho Chi Minh City, Vietnam for the production of Series 6 modules. As we transition our remaining manufacturing capacity to Series 6 module technology, we expect to ramp down production of our Series 4™ ("Series 4") modules over the next several years. This transition process, which has resulted in a temporary reduction in production capacity, allows us to use our existing manufacturing infrastructure to more quickly and cost effectively deploy our Series 6 module technology to best position us for long-term competitiveness and growth.

Vertical Integration

We are vertically integrated across substantially the entire solar value chain. Many of the efficiencies, cost reductions, and capabilities that we deliver to our customers are not easily replicable for other industry participants that are not vertically integrated in a similar manner. Accordingly, our operational model offers PV solar energy solutions that benefit from our wide range of capabilities, including: advanced PV solar module manufacturing; project development; engineering and plant optimization; grid integration and plant control systems; procurement and construction consulting; and O&M services.

Financial Viability

Our commitment is to create long-term shareholder value through a balance of growth, profitability, and liquidity. Despite substantial downward pressure on the price of solar modules due to pricing competition and significant capacity in the industry, we have continued to deliver strong and balanced financial performance. Such performance has also enabled us to fund our Series 6 transition and capacity expansion initiatives using cash flows generated by our operations. Accordingly, our financial viability provides strategic optionality as we evaluate how to invest in our business and generate returns for our shareholders. Our bankability and financial viability also enable us to offer meaningful module and system warranties after installation, which provide us with a competitive advantage relative to some of our peers in the solar industry in the context of project financing and offering PV solar energy solutions to long-term owners.

Sustainability

In addition to our financial commitments, we are also committed to minimizing the environmental impacts and enhancing the social and economic benefits of our products across their life cycle, from raw material sourcing through end-of-life module recycling. Accordingly, our modules and systems provide an ecologically leading solution to climate change, energy security, and water scarcity, which also enables our customers to achieve their sustainability objectives. On a lifecycle basis, our thin film module technology has the smallest carbon footprint, fastest energy payback time, and lowest water use of any PV solar technology on the market.

As a result of our specialized manufacturing process, our modules have approximately half the carbon footprint of conventional crystalline silicon modules and a fraction of the carbon footprint of conventional energy sources. Furthermore, our technology displaces up to 98% of greenhouse gas emissions and other air pollutants when replacing traditional forms of energy generation. Our manufacturing process also facilitates the fastest energy payback time (which is the amount of time a system must operate to recover the energy required to produce it) of all PV solar technologies. In less than six months under high irradiance conditions, our PV solar power systems produce more energy than was required to create them, which represents a 50-fold energy return on investment over a 25-year system lifetime and an abundant net energy gain to the electricity grid. Our modules also use up to 300 times less water per MW hour than conventional energy and up to 12 times less water than other solar technologies. In addition, our industry-leading recycling process further enhances our sustainability advantage by recovering approximately 90% of the glass for reuse in new glass products and over 90% of the semiconductor material for reuse in new First Solar modules.

Offerings and Capabilities

We are focusing on markets and energy applications in which solar power can be a least-cost, best-fit energy solution, particularly in regions with high solar resources, significant current or projected electricity demand, and/or relatively high existing electricity prices. We differentiate our product offerings by geographic market and localize the solution, as needed. Our consultative approach to our customers' solar energy needs and capabilities results in customized solutions to meet their economic goals. As a result, we have designed our product and service offerings according to the following business areas:

- *PV Solar Modules*. Our modules couple our leading-edge CdTe technology with the manufacturing excellence and quality control that comes from being one of the world's most experienced producers of advanced PV solar modules. Our technology demonstrates a proven performance advantage over most crystalline silicon solar modules of equivalent efficiency rating by delivering competitive efficiency, higher real-world energy yield, and long-term reliability. We are able to provide such product performance, quality, and reliability to our customers due, in large part, to investing more in R&D than any other solar company in the world.

- *Utility-Scale Power Plant*. We have extensive, proven experience in developing and constructing reliable grid-connected power systems for utility-scale generation. Our grid-connected PV solar power systems diversify the energy portfolio, reduce fossil-fuel consumption, reduce the risk of fuel price volatility, and save costs, proving that centralized solar generation can deliver dependable and affordable solar electricity to the grid in many places around the world. Our plant control systems provide reliability services, such as frequency control, voltage control, ramping capacity, and automated generation control, which enable expanded integration of PV solar power systems into the power grid. Such reliability services also help balance the grid during times of high renewable energy generation. Our solar energy systems also offer a meaningful value proposition by eliminating commodity price risks thereby providing a long-term fixed price with relatively low operating costs. When compared to the price of power derived from a conventional source of energy, a fixed price cannot be achieved unless the cost of hedging is included. Hedging costs of a commodity such as natural gas, along with the costs of credit support required for a long-term hedge, can significantly increase conventional energy costs. Additional benefits of our grid-connected power systems include reductions of fuel imports and improvements in energy security; enhanced peaking generation and faster time-to-power; and managed variability through accurate forecasting.

- *EPC Services*. We provide engineering, procurement, and construction ("EPC") services to projects developed by us and other system owners such as utilities, independent power producers, and commercial and industrial companies. EPC services include engineering design and related services, BoS procurement, advanced development of grid integration solutions, and construction contracting and management. Depending on the customer and market needs, we may provide our full EPC services or any combination of individual products and services within our EPC capabilities. Our vertical integration combined with our partner collaboration enables us to identify and make system-level innovations, which creates further value for our customers.

- *O&M Services*. By leveraging our extensive experience in plant optimization and advanced diagnostics, we have developed one of the largest and most advanced O&M programs in the industry, which includes more than 7 GW_{DC} of utility-scale PV solar power systems. Despite this scale, we have historically maintained an average fleet system effective availability greater than 99%. Utilizing a state of the art Global Operations Center, our team of O&M associates provide a variety of services to optimize system performance and comply with power purchase agreements ("PPA"), other agreements, and regulations. Our products and services are engineered to maximize energy output and revenue for our customers while significantly reducing their unplanned maintenance costs. Plant owners benefit from predictable expenses over the life of the contract and reduced risk of energy loss. Our O&M program is compliant with the North American Electric Reliability Corporation ("NERC") standards and is designed to be scalable to accommodate the growing O&M needs of customers worldwide. We offer our O&M services to solar power plant owners that use either our solar modules or modules manufactured by third-parties.

Market Overview

Solar energy is one of the fastest growing forms of renewable energy with numerous economic and environmental benefits that make it an attractive complement to and/or substitute for traditional forms of energy generation. In recent years, the price of PV solar power systems, and accordingly the cost of producing electricity from such systems, has dropped to levels that are competitive with or even below the wholesale price of electricity in many markets. The rapid price decline that PV solar energy has experienced in recent years has opened new possibilities to develop systems in some locations with limited or no financial incentives. The fact that a PV solar power system requires no fuel provides a unique and valuable hedging benefit to owners of such systems relative to traditional energy generation assets. Once installed, PV solar power systems can function for 25 or more years with relatively less maintenance or oversight compared to traditional forms of energy generation. In addition to these economic benefits, solar energy has substantial environmental benefits. For example, PV solar power systems generate no greenhouse gas and other emissions and use no or minimal amounts of water compared to traditional forms of electricity generation. Worldwide solar markets continue to develop, aided by the above factors as well as demand elasticity resulting from declining industry average selling prices, both at the module and system level, which make solar power more affordable.

The solar industry continues to be characterized by intense pricing competition, both at the module and system levels. In particular, module average selling prices in the United States and several other key markets have experienced an accelerated decline in recent years, and module average selling prices are expected to continue to decline globally to some degree in the future. In the aggregate, we believe manufacturers of solar cells and modules have significant installed production capacity, relative to global demand, and the ability for additional capacity expansion. We believe the solar industry may from time to time experience periods of structural imbalance between supply and demand (i.e., where production capacity exceeds global demand), and that such periods will put pressure on pricing. Additionally, intense competition at the system level may result in an environment in which pricing falls rapidly, thereby further increasing demand for solar energy solutions but constraining the ability for project developers, EPC companies, and vertically-integrated solar companies such as First Solar to sustain meaningful and consistent profitability. In light of such market realities, we are focusing on our strategies and points of differentiation, which include our advanced module and system technologies, our manufacturing process, our vertically-integrated business model, our financial viability, and the sustainability of our modules and systems.

Global Markets

We have established and are continuing to develop a global business presence. Energy markets are by their nature localized, with different drivers and market forces impacting electricity generation and demand in a particular region or for a particular application. Accordingly, our business is evolving worldwide and is shaped by the varying ways in which our PV solar energy solutions can be a compelling and economically viable solution to energy needs in different markets and applications. The following markets represent the key markets for our PV solar modules and systems.

The Americas

Multiple markets within the United States, which accounted for 77% of our 2017 net sales, exemplify favorable characteristics for a solar market, including (i) sizeable electricity demand, particularly around growing population centers and industrial areas; (ii) strong demand for renewable energy generation; and (iii) abundant solar resources. In those areas and applications in which these factors are more pronounced, our PV solar energy solutions compete favorably on an economic basis with traditional forms of energy generation. The market penetration of PV solar is also impacted by certain state and federal support programs, including the current 30% federal investment tax credit, as described under "Support Programs." We have significant experience and a market leadership position in developing, engineering, constructing, and maintaining utility-scale power plants in the United States, particularly in California and other southwestern states, and increasingly in southeastern states. Currently, our solar projects in the United States account for a majority of the advanced-stage pipeline of projects that we are either currently constructing or expect to construct. See Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations – Systems Project Pipeline" for more information about these projects.

Asia-Pacific

Australia. Australia continues to be a promising region for PV solar energy with strong growth in 2017 that is expected to continue in 2018. This growth is being driven by an increased demand for PPAs from Australian utilities and large industrial off-takers. In recent years, we redirected our strategy in Australia away from EPC services to focus more on utility-scale project development and module sales. Moving into 2018, we expect to pursue a robust Australian development pipeline, including self-developed projects in Queensland, New South Wales, and Victoria. In addition to this growing development pipeline, we plan to deliver modules to various third-party developers in 2018.

Japan. Japan's electricity markets have various characteristics, which make them attractive markets for PV solar energy. In particular, Japan has few domestic fossil fuel resources and relies heavily on fossil fuel imports. The country has also introduced certain initiatives to limit its reliance on nuclear power as a result of previous issues with such technology. Accordingly, the Japanese government has announced a long-term goal of dramatically increasing installed solar power capacity and has provided various incentives for solar power installations. These programs are expected to maintain strong solar demand over the next several years. We are partnering with local companies to develop, construct, and operate PV solar power systems, which will further mitigate Japan's dependence on fossil fuel imports and nuclear power. Our sales offerings in Japan also include our solar modules and O&M services. In December 2017, we executed sales agreements for multiple projects in Japan totaling 15 MW_{AC}, which are the first projects we developed, constructed, and sold in the country. We are also in the process of constructing a 59 MW_{AC} project in Ishikawa prefecture, a 40 MW_{AC} project in Miyagi prefecture, and a 19 MW_{AC} project in Tochigi prefecture. We have secured rights to sell power for these projects under separate 20-year PPAs with local power companies.

India. There is significant potential for PV solar energy in India due to its growing energy needs, substantial population centers, lack of electrification to many parts of the country, high energy costs, strong irradiance, and aggressive renewable energy targets set by the government, which include increasing the country's solar capacity to 100 GW by the year 2022. To support this initiative, several key regulations have been announced relating to ramping up renewable purchase obligations, implementing penal provisions for non-compliance with the obligations under the Indian Electricity Act, budgetary allocations for establishing a Green Transmission Corridor, and the creation of numerous solar parks in various states with dedicated transmission infrastructure to be installed by the government. In addition to these measures, the Indian government also introduced the Renewable Generation Obligations, which mandate that all thermal power generators must implement new renewable energy generation capacity to match 10% of their new thermal generation capacity. Overall, these policy and regulatory measures have been introduced to create significant and sustained demand for PV solar in India. Accordingly, we continue to sell modules and develop utility-scale PV solar projects in India to address the energy and renewable purchase obligation needs of utilities and target the open access industrial and commercial power demand.

In December 2017, we completed the sale of our 25 MW_{AC} Polepally and 10 MW_{AC} Mahabubnagar projects, which are the first projects we developed, constructed, and sold in India. During 2017, we also executed definitive sales agreements for our Winsol and Hindupur projects, which total 155 MW_{AC}, and commissioned two additional projects totaling 40 MW_{AC} in Karnataka, for which we have secured rights to sell power under separate 25-year PPAs to the state owned electricity distribution companies. We continue to maintain our strong module presence in India with over 1.8 GW_{DC} of installed modules.

Europe, the Middle East, and Africa

Europe. Historically, PV solar energy adoption in Europe was driven to a large degree by feed-in-tariffs ("FiTs") and other incentive programs in Germany, France, the Netherlands, Italy, and Spain. However, PV solar energy in the region is transitioning to its next phase, in which growth will be driven by the degree to which PV solar energy solutions can compete economically with more traditional forms of energy generation, especially in areas with high prevailing electricity prices, strong electricity demand, and strong solar resources. In particular, Germany, France, the Netherlands, and Spain are all running tenders in which utility-scale PV solar projects can bid for capacity. Such tenders and other recent market developments indicate the potential for significant growth in the demand for PV solar energy. We continue

to pursue module sales activities in France, the Netherlands, Germany, and Turkey and are actively evaluating additional sales opportunities in other markets where we are collaborating with certain local partners for the distribution of our modules or select project development opportunities.

The Middle East. The market potential for solar energy in the Middle East continues to be driven by a combination of strong economic fundamentals, aggressive tariff pricing, abundant solar resources, and robust policy. The United Arab Emirates (the "UAE"), Saudi Arabia, Egypt, and Jordan have established utility-scale solar programs, which are at varying degrees of maturity. The UAE and Jordan lead the region with policy mechanisms designed to ramp up the amount of renewable energy in their generation portfolios. Oman, Qatar, and Kuwait are also promising markets with indicators of future potential for solar energy. While there are several motives for investing in solar energy, including energy security, diversification of generation portfolios, and the minimization of domestic consumption of hydrocarbons, the common factor is that the economics of PV solar energy have made it a compelling energy generation source. Since establishing a presence in the Middle East in 2013, we have approximately 300 MW_{DC} of installed modules across the region.

Africa. Africa offers strong potential for PV solar energy, which can play a useful role in meeting the region's diversified energy needs. As the overall African market matures, the engagement of experienced project developers and support from international lenders are expected to further the adoption and growth of utility-scale PV solar energy solutions. Our primary focus in Africa is the sale of modules for utility-scale projects. Additionally, we are working with our channel partners to provide various solutions to the distributed generation and commercial and industrial markets.

Support Programs

Although we compete in key markets that do not require solar-specific government subsidies or support programs, our net sales and profits remain subject, in the near term, to regulation and variability based on the availability and size of government subsidies and economic incentives, such as quotas, renewable portfolio standards, and tendering systems. In addition to these support programs, financial incentives for PV solar energy generation include tax incentives, grants, loans, rebates, and production incentives. Although we expect to become less impacted by, and less dependent on these forms of government support over time, such programs will continue to play varying roles in accelerating the adoption of PV solar power systems around the world.

In Europe, renewable energy targets, in conjunction with tenders for utility-scale PV solar and other support measures, have contributed to the growth in PV solar markets. Renewable energy targets prescribe how much energy consumption must come from renewable sources, while incentive policies and competitive tender policies are intended to support new supply development by providing certainty to investors. Various European Union ("EU") directives on renewable energy have set targets for all EU member states in support of the goal of a 35% share of energy from renewable sources in the EU by 2030.

Tax incentive programs exist in the United States at both the federal and state level and can take the form of investment and production tax credits, accelerated depreciation, and sales and property tax exemptions and abatements. At the federal level, investment tax credits for business and residential solar systems have gone through several cycles of enactment and expiration since the 1980s. In 2015, the U.S. Congress extended the 30% federal energy investment tax credit ("ITC") for both residential and commercial solar installations through 2019. The credit will step down to 26% in 2020, 22% in 2021, and remain at 10% permanently beginning in 2022. The ITC has been an important economic driver of solar installations in the United States, and its extension is expected to contribute to greater medium-term demand visibility in the United States. The positive impact of the ITC depends to a large degree on the availability of tax equity for project financing, and any significant reduction in the availability of tax equity in the future could make it more difficult to develop and construct projects requiring financing. The eventual step-down of the ITC to 10% underscores the need for the levelized cost of electricity ("LCOE"), meaning the net present value of a system's total life cycle costs divided by the quantity of energy that is expected to be produced over the system's life, of solar systems to continue to decline and remain competitive with other sources of energy generation.

In October 2017, the U.S. Environmental Protection Agency Administrator issued a Notice of Proposed Rulemaking proposing to repeal the previous U.S. presidential administration's Clean Power Plan (the "Rule"), which establishes standards to limit carbon dioxide emissions from existing power generation facilities. Accordingly, there is significant uncertainty regarding what effects, if any, the Rule may have on PV solar markets. The implementation and adoption of the Rule remains subject to ongoing litigation initiated by states and other stakeholders.

The majority of states in the United States have enacted legislation adopting Renewable Portfolio Standard ("RPS") mechanisms. Under a RPS, regulated utilities and other load serving entities are required to procure a specified percentage of their total retail electricity sales to end-user customers from eligible renewable resources, such as solar energy generation facilities, by a specified date. Some programs may further require that a specified portion of the total percentage of renewable energy must come from solar generation facilities or other technologies. RPS legislation and implementing regulations vary significantly from state to state, particularly with respect to the percentage of renewable energy required to achieve the state's RPS, the definition of eligible renewable energy resources, and the extent to which renewable energy credits (certificates representing the generation of renewable energy) qualify for RPS compliance. Measured in terms of the volume of renewable electricity required to meet its RPS mandate, California's RPS program is the most significant in the United States, and the California market for renewable energy has dominated the western U.S. region for the past several years. First enacted in 2002, California's RPS statute has been amended several times to increase the overall percentage requirement as well as to accelerate the target date for program compliance. Pursuant to amendments enacted by the California Legislature in 2015, the California RPS program now requires utilities and other obligated load serving entities to procure 50% of their total retail electricity demand from eligible renewable resources by 2030. In 2017, approximately 29% of our total net sales were derived from our systems projects or third-party module sales to solar power projects in California.

Various proposed and contemplated environmental and tax policies may create regulatory uncertainty in the renewable energy sector, including the solar energy sector, and may lead to a reduction or removal of various clean energy programs and initiatives designed to curtail climate change. For more information about the risks associated with these potential government actions, see Item 1A. "Risk Factors – The reduction, elimination, or expiration of government subsidies, economic incentives, tax incentives, renewable energy targets, and other support for on-grid solar electricity applications, or other adverse public policies, such as tariffs or other trade remedies imposed on solar cells and modules, could negatively impact demand and/or price levels for our solar modules and systems and limit our growth or lead to a reduction in our net sales, thereby adversely impacting our operating results."

Business Segments

We operate our business in two segments. Our modules segment involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. Third-party customers of our modules segment include integrators and operators of PV solar power systems. Our second segment is our fully integrated systems segment, through which we provide complete turn-key PV solar power systems, or solar solutions, that draw upon our capabilities, which include (i) project development, (ii) EPC services, and (iii) O&M services. We may provide our full EPC services or any combination of individual products and services within our EPC capabilities depending upon the customer and market opportunity. All of our systems segment products and services are for PV solar power systems, which primarily use our solar modules, and we sell such products and services to utilities, independent power producers, commercial and industrial companies, and other system owners. Additionally, within our systems segment we may temporarily own and operate certain of our systems for a period of time based on strategic opportunities or market factors.

See Note 22. "Segment and Geographical Information" to our consolidated financial statements included in this Annual Report on Form 10-K for further information on our business segments.

Modules Business

Solar Modules

Since the inception of First Solar, our flagship module has been manufactured using our advanced CdTe thin film technology. Each Series 4 module is a glass laminate approximately 2ft x 4ft (60cm x 120cm) in size that encapsulates thin film semiconductor materials. Our modules had an average rated power per module of approximately 118 watts, 114 watts, and 107 watts for the years ended December 31, 2017, 2016, and 2015, respectively. Our Series 4 module, which offers up to 8% more energy than conventional crystalline silicon modules of equivalent efficiency rating, is compatible with advanced 1500-volt plant architectures. Our Series 4A™ module variant features anti-reflective coated glass, which further enhances energy production. Our module semiconductor structure is a single-junction polycrystalline thin film that uses CdTe as the absorption layer. CdTe has absorption properties that are well matched to the solar spectrum and can deliver competitive conversion efficiencies using approximately 1-2% of the amount of semiconductor material that is used to manufacture conventional crystalline silicon solar modules.

In November 2016, we announced plans for the introduction of our Series 6 module, which will be manufactured using similar materials and processes as our legacy module technologies that have been proven in high volume production and have been in the field for over a decade. Each Series 6 module is approximately 4ft x 6ft (123cm x 201cm) in size and is expected to have an average rated power per module of over 420 watts. We expect to begin production of our Series 6 modules in 2018.

Manufacturing Process

We manufacture our CdTe solar modules on high-throughput, integrated production lines in an automated, proprietary, and continuous process. Our solar modules employ a thin layer of semiconductor material to convert sunlight into electricity. Our manufacturing process eliminates the multiple supply chain operators and expensive and time-consuming batch processing steps that are used to produce crystalline silicon solar modules. We currently manufacture solar modules at our Perrysburg, Ohio and Kulim, Malaysia manufacturing facilities, and plan to utilize our manufacturing facility in Ho Chi Minh City, Vietnam for the production of Series 6 modules. As we transition our manufacturing capacity to Series 6 module technology, we expect to ramp down production of our Series 4 modules over the next several years.

Our CdTe manufacturing processes includes the following three stages: (i) the deposition stage, (ii) the cell definition and treatment stage, and (iii) the assembly and test stage. In the deposition stage, panels of transparent oxide-coated glass are robotically loaded onto the production line where they are cleaned, laser-mark identified with a serial number, heated, and coated with thin layers of CdTe and other semiconductor materials using our proprietary vapor transport deposition technology, after which the semiconductor-coated plates are cooled rapidly to increase glass strength. In the cell definition and treatment stage, we use high-speed lasers to transform the large continuous semiconductor coating on the glass plate into a series of interconnected cells that deliver the desired current and voltage output. In this stage, we also treat the semiconductor film using proprietary chemistries and processes to improve the device's performance, and we apply a metal sputtered back contact. Finally, in the assembly and test stage, we apply busbars, inter-layer material, and a rear glass cover sheet that is laminated to encapsulate the device. A junction box, termination wires, and an under-mount frame (for Series 6 modules) are then applied to complete the assembly. The final assembly stage is the only stage in our production line that requires manual processing.

We maintain a robust quality and reliability assurance program that monitors critical process parameters and measures product performance to ensure that industry and more stringent internal standards are met. Acceptance testing for electrical leakage, visual quality, and power measurement on a solar simulator are also conducted prior to a module being boxed for shipment. The quality and reliability tests complement production surveillance with an ongoing monitoring program, subjecting production modules to accelerated life stress testing to help ensure ongoing conformance to requirements of the International Electrotechnical Commission and Underwriters Laboratories Inc. These programs help assure delivery of power and performance in the field with a high level of product quality and reliability.

Research, Development, and Engineering

Our R&D model differentiates us from much of our competition due to its vertical integration, from advanced research to product development, manufacturing, and applications. We continue to devote substantial resources to our R&D efforts, which generally focus on continually improving the conversion efficiency and energy yield of our solar modules. We also focus our R&D activities on continuously improving module durability and manufacturing efficiencies, including throughput improvement, volume ramp, and material cost reduction. Based on publicly available information, we lead all PV solar module manufacturers in R&D investment, maintaining a rate of innovation that enables rapid efficiency gains and cost reductions.

In the course of our R&D activities, we explore various technologies in our efforts to sustain competitive differentiation in our modules. We primarily conduct our R&D activities and qualify process and product improvements for full production at our Perrysburg, Ohio plant and then use a systematic process to propagate them to our other production lines. We believe that our systematic approach to technology change management provides continuous improvements and ensures uniform adoption across our production lines. In addition, our CdTe production lines are replicas or near replicas of each other and, as a result, a process or production improvement on one line can be rapidly and reliably deployed to other production lines.

We regularly produce research cells in our laboratories, some of which are tested for performance and certified by independent labs, such as the National Renewable Energy Laboratory. Cell efficiency measures the proportion of light converted to electricity in a single solar cell at standard test conditions. Our research cells are produced using laboratory equipment and methods and are not intended to be representative of our manufacturing capability. Our module conversion efficiency has improved on average more than half a percent every year for the last ten years. We currently hold two world records for CdTe PV efficiency, achieving an independently certified research cell efficiency of 22.1% and a full area module efficiency of 18.2%. We believe that our record cells demonstrate a potential long-term module efficiency entitlement of over 20% using our commercial-scale manufacturing equipment. For information regarding our research and development expense for the years ended December 31, 2017, 2016, and 2015, see Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations – Results of Operations."

Customers

During 2017, we sold the majority of our solar modules (not included in our systems projects) to integrators and operators of systems in the United States, India, and Turkey, and such third-party module sales represented approximately 27% of our total net sales. During 2017, Zorlu Enerji and RCR O'Donnell Griffin Pty, Ltd each accounted for more than 10% of our modules business net sales.

We continue to invest in key geographic markets, particularly in areas with abundant solar resources and sizable electricity demand, and additional customer relationships to diversify our customer base. We also collaborate with strategic partners in community solar solutions, which address the residential and small business sectors to provide a broad range of customers with access to competitively priced solar energy regardless of the suitability of their rooftops. Community solar utilizes relatively small ground-mounted installations that provide clean energy to utilities, which then offer consumers the ability to buy into a specific community installation and benefit from the solar power generated by that resource. The demand for such offerings continues to build as states across the country are beginning to enact community solar policies, and utilities are looking to diversify their energy generation portfolio in order to meet customer demand for affordable, clean energy. We also collaborate with providers of Community Choice Aggregation programs, which allow cities and counties to purchase power on behalf of residents and businesses to provide clean energy options at competitive prices. Our expertise in utility-scale generation and module technology, paired with community solar and/or Community Choice Aggregation, allows residential power consumers to "go solar," including those who live in apartment buildings or whose home rooftops cannot accommodate solar panels.

Competition

The solar energy and renewable energy sectors are highly competitive and continually evolving as participants in these sectors strive to distinguish themselves within their markets and compete within the larger electric power industry. We face intense competition for sales of solar modules, which has resulted in and may continue to result in reduced average selling prices and loss of market share. With respect to our modules business, our primary sources of competition are crystalline silicon solar module manufacturers, as well as other thin film solar module manufacturers. In addition, we expect to compete with future entrants into the PV solar industry that offer new technological solutions. We also face competition from semiconductor manufacturers and semiconductor equipment manufacturers or their customers that produce PV solar cells, solar modules, or turn-key production lines. We also compete with companies that currently offer or are developing other renewable energy technologies (including wind, hydroelectric, geothermal, biomass, and tidal technologies), as well as traditional energy generation sources.

Certain of our existing or future competitors may have direct or indirect access to sovereign capital, which could enable such competitors to operate at minimal or negative operating margins for sustained periods of time. Among PV solar module manufacturers, the principal methods of competition include sales price per watt, conversion efficiency, energy yield, reliability, warranty terms, and customer payment terms. If competitors reduce module pricing to levels near or below their manufacturing costs, or are able to operate at minimal or negative operating margins for sustained periods of time, our results of operations could be adversely affected. We believe the solar industry may from time to time experience periods of structural imbalance between supply and demand (i.e., where production capacity exceeds global demand), and that such periods will put pressure on pricing, which could adversely affect our results of operations. For additional information, see Item 1A. "Risk Factors – Competition in solar markets globally and across the solar value chain is intense, and could remain that way for an extended period of time. An increased global supply of PV modules has caused and may continue to cause structural imbalances in which global PV module supply exceeds demand, which could have a material adverse effect on our business, financial condition, and results of operations."

Raw Materials

Our CdTe module manufacturing process uses approximately 30 types of raw materials and components to construct a solar module. One critical raw material in our production process is CdTe. Of the other raw materials and components, the following are also critical to our manufacturing process: front glass coated with transparent conductive oxide, other semiconductor materials, organics such as photo resist, tempered back glass, frames, packaging components such as interlayer, cord plate/cord plate cap, lead wire, and solar connectors. Before we use these materials and components in our manufacturing process, a supplier must undergo a rigorous qualification process. We continually evaluate new suppliers and currently are qualifying new suppliers and materials. When possible, we attempt to use suppliers that can provide a raw material supply source that is near our manufacturing locations, reducing the cost and lead times for such materials. Several of our key raw materials and components are either single-sourced or sourced from a limited number of suppliers.

Solar Module Collection and Recycling Program

We are committed to extended producer responsibility and take into account the environmental impact of our products over their entire life cycle. As part of such efforts, we established the solar industry's first comprehensive module collection and recycling program. Our module recycling process is designed to enable the recovery of valuable materials, including the glass and encapsulated semiconductor material, for use in new modules or other products and minimizes the environmental impacts associated with our modules at the end of their useful lives. Approximately 90% of each collected First Solar module can be recycled into materials for reuse. For customer sales contracts that include modules covered under this program, we agree to pay the costs for the collection and recycling of qualifying solar modules, and the end-users agree to notify us, disassemble their solar power systems, package the solar modules for shipment, and revert ownership rights over the modules back to us at the end of the modules' service lives. We currently have recycling facilities operating at each of our manufacturing facilities in the United States and Malaysia and at our former manufacturing facility location in Germany.

The EU's Waste Electronics and Electrical Equipment ("WEEE") directive places the obligation of recycling (including collection, treatment, and environmentally sound disposal) of electrical and electronic equipment products upon producers, and such directive is applicable to PV solar modules in EU member states. For modules covered under our program that were previously sold into and installed in the EU, we continue to maintain a commitment to cover the estimated collection and recycling costs consistent with our historical program. Additionally, as a result of the transposition of the WEEE directive by the EU member states, we have adjusted our offerings, as required, in various EU member states to ensure compliance with specific EU member state WEEE regulations.

Solar Module Warranties

We provide a limited PV solar module warranty covering defects in materials and workmanship under normal use and service conditions for approximately 10 years. We also typically warrant that modules installed in accordance with agreed-upon specifications will produce at least 98% of their labeled power output rating during the first year, with the warranty coverage reducing by 0.5% every year thereafter throughout the approximate 25-year performance warranty period. As an alternative form of our standard limited module power output warranty, we also offer an aggregated or system-level limited module performance warranty. This system-level limited module performance warranty is designed for utility-scale systems and provides 25-year system-level energy degradation protection. For additional information on our solar module warranty programs, refer to Item 1A. "Risk Factors – Problems with product quality or performance, including our Series 4 modules and Series 6 modules, may cause us to incur significant and/or unexpected warranty and related expenses, damage our market reputation, and prevent us from maintaining or increasing our market share."

Systems Business

Project Development

Project development activities generally include (i) site selection and securing rights to acquire or use the site, (ii) obtaining the requisite interconnection and transmission studies, (iii) executing an interconnection agreement, (iv) obtaining environmental and land-use permits, (v) maintaining effective site control, and (vi) entering into a PPA with an off-taker of the power to be generated by the project. The sequence of such development activities varies by international location and, in certain locations, may begin by initially bidding for PPA or off-take agreements. These activities culminate in receiving the right to construct and operate a PV solar power system. Depending on the market opportunity or geographic location, we may acquire projects in various stages of development or acquire project companies from developers in order to complete the development process, construct a system incorporating our modules, and sell the system to a long-term owner. We may also collaborate with local partners in connection with these project development activities. Depending on the type of project or geographic location, PPAs or FiT structures define the price and terms the utility or customer will pay for power produced from the project. Depending primarily on the location, stage of development upon our acquisition of the project, and/or other site attributes, the development cycle typically ranges from one to two years but can be as long as five years. We may be required to incur significant costs for preliminary engineering, permitting, legal, and other expenses before we can determine whether a project is feasible, economically attractive, or capable of being built. If there is a delay in obtaining any required regulatory approvals, we may be forced to incur additional costs or impair our project assets, and the termination rights of the off-taker under the PPA may be triggered.

EPC Services

EPC services include engineering design and related services, BoS procurement, advanced development of grid integration solutions, and construction contracting and management. We provide the majority of our EPC services to our self-developed projects intended to be sold; however, we may also provide EPC services to other system owners such as utilities, independent power producers, and commercial and industrial companies. Depending on the customer and market need, we may provide our full EPC services or any combination of individual products and services within our EPC capabilities.

We conduct performance testing of a system prior to substantial completion to confirm the system meets its operational and capacity expectations noted in the EPC agreement. For PV solar power systems we construct, we typically provide limited warranties for defects in engineering design, installation, and BoS part workmanship for a period of one to two years following the substantial completion of a system or a block within the system. We may also provide an energy performance test during the first or second year of a system's operation to demonstrate that the actual energy generation for the applicable year meets or exceeds the modeled energy expectation, after certain adjustments, such as irradiance, weather, module degradation, soiling, curtailment, and other conditions that may affect a system's energy output but are unrelated to quality, design, or construction.

O&M Services

Our typical O&M service arrangements involve the performance of standard activities associated with operating and maintaining a PV solar power system. We perform such activities pursuant to the scope of services outlined in the underlying contract. These activities are considered necessary to optimize system performance and comply with PPAs, other agreements, and regulations. Although the scope of our services may vary by contract, our O&M service arrangements generally include 24/7 system monitoring, certain PPA and other agreement compliance, NERC compliance, large generator interconnection agreement compliance, energy forecasting, performance engineering analysis, regular performance reporting, turn-key maintenance services including spare parts and corrective maintenance repair, warranty management, and environmental services. As part of our O&M services, we also typically provide an effective availability guarantee, which stipulates that a system will be available to generate a certain percentage of total possible energy during a specific period after adjusting for factors outside of our control as the service provider, such as weather, curtailment, outages, force majeure, and other conditions that may affect system availability.

Customers

Our systems customers consist of utilities, independent power producers, commercial and industrial companies, and other system owners, such as investors who are looking for long-term investment vehicles that are expected to generate consistent returns. Such customers may purchase completed systems, which include our solar modules, or any combination of development, EPC services, and/or O&M services. During 2017, the substantial majority of our systems business sales were in North America, and the principal customer of our systems business was Capital Dynamics, Inc. ("Capital Dynamics"), who accounted for more than 10% of our systems business net sales.

In certain markets, the emergence of utility-owned generation has increased the number of potential project buyers as such utility customers benefit from a potentially low cost of capital available through rate-basing utility investments. Given their long-term ownership profile, utility-owned generation customers typically seek to partner with vertically-integrated companies, such as First Solar, who can provide a broad spectrum of utility-scale generation solutions, including reliable PV solar technology, project development and construction, and O&M services, thereby mitigating their long-term ownership risks. The wholesale commercial and industrial market also represents a promising opportunity given our utility-scale PV solar power system expertise. The demand for corporate renewables is accelerating, with corporations worldwide committing to the RE100 campaign, a collaborative, global initiative of influential businesses committed to 100% renewable electricity. We believe we also have a competitive advantage in the commercial and industrial market due to customers' sensitivity to the bankability and financial viability of their suppliers and geographically diverse operating locations. With our strong development experience, financial strength, and global footprint, we are well positioned to meet their needs. For example, we recently completed the sale of our California Flats project in Monterey County, California, from which Apple Inc. will purchase electricity from 130 MW_{AC} of the project under a 25-year PPA.

Competition

With respect to our systems business, we face competition from other providers of renewable energy solutions, including developers of PV solar power systems and developers of other forms of renewable energy projects, such as wind, hydroelectric, geothermal, biomass, and tidal projects. To the extent other solar module manufacturers become more

vertically integrated, we expect to face increased competition from such companies as well. We also face competition from other EPC companies and joint venture type arrangements between EPC companies and solar companies. Certain current or potential future competitors may have a low cost of capital and/or access to foreign capital. The decline in module prices over the last several years has increased interest in solar energy worldwide, and there are limited barriers to entry in certain parts of the PV solar value chain, depending on the geographic market. Accordingly, competition at the system level can be intense, thereby exerting downward pressure on system-level average selling prices industry-wide. See Item 1A. "Risk Factors – Competition at the system level can be intense, thereby potentially exerting downward pressure on system-level profit margins industry-wide, which could reduce our profitability and adversely affect our results of operations."

Research, Development, and Engineering

Our systems related R&D activities are primarily focused on the objective of lowering the LCOE of a PV solar power system through reductions in BoS costs, improved system design, and energy yield enhancements associated with systems that use our modules. Such R&D efforts are also focused on continuing to improve our systems in terms of grid integration and reliability. We conduct our R&D activities for systems primarily in the United States. Innovations related to system design, inverters and power converters, hardware platforms and installation techniques, and know-how, among other things, can and are expected in the future to continue to reduce BoS costs, which can represent a significant portion of the costs associated with the construction of a typical utility-scale PV solar power system. For information regarding our research and development expense for the years ended December 31, 2017, 2016, and 2015, see Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations – Results of Operations."

Own and Operate

From time to time, we may temporarily own and operate, or retain interests in, certain of our systems for a period of time based on strategic opportunities or market factors. The ability to do so provides certain potential benefits, including greater control over the sales process and offering a lower risk profile to project buyers. As of December 31, 2017, we owned and operated a number of systems in various geographic markets, including Chile, India, the United States, and the Asia-Pacific region. As an owner and operator of certain U.S. systems, we may be subject to the authority of the Federal Energy Regulatory Commission ("FERC"), as well as various other local, state, and federal regulatory bodies. For more information about risks related to owning and operating such systems, please see Item 1A. "Risk Factors – As an owner and operator of PV solar power systems that deliver electricity to the grid, certain of our affiliated entities may be regulated as public utilities under U.S. federal and state law, which could adversely affect the cost of doing business and limit our growth." For more information about the economics of such ownership and the impacts on our liquidity see Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources."

Intellectual Property

Our success depends, in part, on our ability to maintain and protect our proprietary technology and to conduct our business without infringing on the proprietary rights of others. We rely primarily on a combination of patents, trademarks, and trade secrets, as well as associate and third-party confidentiality agreements, to safeguard our intellectual property. We regularly file patent applications to protect inventions arising from our R&D activities and are currently pursuing patent applications in the United States and other countries. Our patent applications and any future patent applications might not result in a patent being issued with the scope of the claims we seek, or at all, and any patents we may receive may be challenged, invalidated, or declared unenforceable. In addition, we have registered and/or have applied to register trademarks and service marks in the United States and a number of foreign countries for "First Solar."

With respect to proprietary know-how that is not patentable and processes for which patents are difficult to enforce, we rely on, among other things, trade secret protection and confidentiality agreements to safeguard our interests. We believe that many elements of our PV solar module manufacturing processes, including our unique materials sourcing,

involve proprietary know-how, technology, or data that are not covered by patents or patent applications, including technical processes, equipment designs, algorithms, and procedures. We have taken security measures to protect these elements. Our R&D personnel have entered into confidentiality and proprietary information agreements with us. These agreements address intellectual property protection issues and require our associates to assign to us all of the inventions, designs, and technologies they develop during the course of employment with us. We also require our customers and business partners to enter into confidentiality agreements before we disclose sensitive aspects of our modules, technology, or business plans.

We have not been subject to any material intellectual property infringement or misappropriation claims.

Environmental, Health, and Safety Matters

Our operations include the use, handling, storage, transportation, generation, and disposal of hazardous materials and wastes. We are subject to various national, state, local, and international laws and regulations relating to the protection of the environment, including those governing the discharge of pollutants into the air and water; the use, management, and disposal of hazardous materials and wastes; occupational health and safety; and the cleanup of contaminated sites. Therefore, we could incur substantial costs, including cleanup costs, fines, and civil or criminal sanctions and costs arising from third-party property damage or personal injury claims as a result of violations of, or liabilities under, environmental and occupational health and safety laws and regulations or non-compliance with environmental permits required for our operations. We believe we are currently in substantial compliance with applicable environmental and occupational health and safety requirements and do not expect to incur material expenditures for environmental and occupational health and safety controls in the foreseeable future. However, future developments such as the implementation of new, more stringent laws and regulations, more aggressive enforcement policies, or the discovery of unknown environmental conditions may require expenditures that could have a material adverse effect on our business, financial condition, or results of operations. See Item 1A. "Risk Factors – Environmental obligations and liabilities could have a substantial negative impact on our financial condition, cash flows, and results of operations."

Corporate History

We were incorporated in Delaware in February 2006. Our common stock has been listed on The NASDAQ Global Select Market ("NASDAQ") under the symbol FSLR since our initial public offering in November 2006.

Associates

As of December 31, 2017, we had approximately 4,100 associates (our term for full and part-time employees), including approximately 2,900 in our modules business and approximately 400 associates that work directly in our systems business. The remainder of our associates are in R&D, sales and marketing, and general and administrative positions. None of our associates are currently represented by labor unions or covered by a collective bargaining agreement. As we expand domestically and internationally, we may encounter either regional laws that mandate union representation or associates who desire union representation or a collective bargaining agreement. We believe that our relations with our associates are good.

Information about Geographic Areas

We have significant manufacturing, development, construction, sales, and marketing operations both within and outside the United States. We manufacture our solar modules at our manufacturing facilities in Perrysburg, Ohio and Kulim, Malaysia and plan to also utilize our manufacturing facility in Ho Chi Minh City, Vietnam.

As part of our long-term strategic plans, we conduct business in various countries across the world, including the United States, countries in the Asia-Pacific region, India, Europe, the Middle East, and Africa. As a result, we are subject to the legal, tax, political, social, regulatory, and economic conditions of an increasing number of foreign jurisdictions. During 2017, the foreign countries with the greatest concentration of customer risk were India and Turkey which

accounted for a total of 9% of our consolidated net sales. The international nature of our operations also subjects us to a number of risks, including fluctuations in exchange rates, adverse changes in foreign laws or regulatory requirements, and tariffs, taxes, and other trade restrictions. See Item 1A. "Risk Factors – Our substantial international operations subject us to a number of risks, including unfavorable political, regulatory, labor, and tax conditions in the United States and/or foreign countries" and "We may be unable to fully execute on our long-term strategic plans, which could have a material adverse effect on our business, financial condition, or results of operations." See Note 22. "Segment and Geographical Information" to our consolidated financial statements included in this Annual Report on Form 10-K for information about our net sales and long-lived assets by geographic region.

Available Information

We maintain a website at www.firstsolar.com. We make available free of charge on our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements, and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after we electronically file such materials with, or furnish them to, the SEC. The information contained in or connected to our website is not incorporated by reference into this report. We use our website as one means of disclosing material non-public information and for complying with our disclosure obligations under the SEC's Regulation FD. Such disclosures are typically included within the Investor Relations section of our website at investor.firstsolar.com. Accordingly, investors should monitor such portions of our website in addition to following our press releases, SEC filings, and public conference calls and webcasts. The public may also read and copy any materials that we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains a website at www.sec.gov that contains reports and other information regarding issuers, such as First Solar, that file electronically with the SEC.

Executive Officers of the Registrant

Our executive officers and their ages and positions as of February 22, 2018 were as follows:

Name	Age	Position
Mark R. Widmar	52	Chief Executive Officer
Alexander R. Bradley	36	Chief Financial Officer
Georges Antoun	55	Chief Commercial Officer
Philip Tymen deJong	58	Chief Operations Officer
Raffi Garabedian	51	Chief Technology Officer
Paul Kaleta	62	Executive Vice President, General Counsel and Secretary
Christopher R. Bueter	54	Executive Vice President, Human Resources

Mark R. Widmar was appointed Chief Executive Officer in July 2016. He joined First Solar in April 2011 as Chief Financial Officer and also served as First Solar's Chief Accounting Officer from February 2012 through June 2015. Mr. Widmar also serves as a director on the board of the general partner of 8point3 Energy Partners LP, the joint yieldco formed by First Solar and SunPower Corporation in 2015 to own and operate a portfolio of selected solar generation assets. From March 2015 to June 2016, Mr. Widmar served as the Chief Financial Officer of the general partner of 8point3 Energy Partners LP. Prior to joining First Solar, Mr. Widmar served as Chief Financial Officer of GrafTech International Ltd., a leading global manufacturer of advanced carbon and graphite materials, from May 2006 through March 2011. Prior to joining GrafTech, Mr. Widmar served as Corporate Controller of NCR Inc. from 2005 to 2006, and was a Business Unit Chief Financial Officer for NCR from November 2002 to his appointment as Controller. He also served as a Division Controller at Dell, Inc. from August 2000 to November 2002 prior to joining NCR. Mr. Widmar also held various financial and managerial positions with Lucent Technologies Inc., Allied Signal, Inc., and Bristol Myers/Squibb, Inc. He began his career in 1987 as an accountant with Ernst & Young. Mr. Widmar holds a Bachelor of Science in Business Accounting and a Masters of Business Administration from Indiana University.

Alexander R. Bradley was appointed interim Chief Financial Officer in July 2016 and confirmed as Chief Financial Officer in October 2016. Mr. Bradley previously served as Vice President, Treasury and Project Finance for First Solar. Mr. Bradley also serves as a director on the board of the general partner of 8point3 Energy Partners LP. From June 2015 to June 2016, Mr. Bradley served as a Vice President of Operations of the general partner of 8point3 Energy Partners LP. Mr. Bradley has led or supported the structuring, sale, and financing of over $10 billion and approximately 2.7 GW of the Company's worldwide development assets, including several of the largest PV power plant projects in North America. Mr. Bradley's professional experience includes more than 10 years in investment banking, mergers and acquisitions, project finance, and business development in the United States and internationally. Prior to joining the Company in May 2008, Mr. Bradley worked at HSBC in investment banking and leveraged finance, in London and New York, covering the energy and utilities sector. He received his Master of Arts from the University of Edinburgh, Scotland.

Georges Antoun was appointed Chief Commercial Officer in July 2016. He joined First Solar in July 2012 as Chief Operating Officer before being appointed as President, U.S. in July 2015. Mr. Antoun has over 25 years of operational and technical experience, including leadership positions at several global technology companies. Prior to joining First Solar, Mr. Antoun served as Venture Partner at Technology Crossover Ventures ("TCV"), a private equity and venture firm that he joined in July 2011. Before joining TCV, Mr. Antoun was the Head of Product Area IP & Broadband Networks for Ericsson, based in San Jose, California. Mr. Antoun joined Ericsson in 2007, when Ericsson acquired Redback Networks, a telecommunications equipment company, where Mr. Antoun served as the Senior Vice President of World Wide Sales & Operations. After the acquisition, Mr. Antoun was promoted to Chief Executive Officer of the Redback Networks subsidiary. Prior to Redback Networks, Mr. Antoun spent five years at Cisco Systems, where he served as Vice President of Worldwide Systems Engineering and Field Marketing, Vice President of Worldwide Optical Operations, and Vice President of Carrier Sales. Prior to Cisco Systems, he was the Director of Systems Engineering at Newbridge Networks, a data and voice networking company. Mr. Antoun started his career at Nynex (now Verizon Communications), where he was part of its Science and Technology Division. Mr. Antoun also served as a member of the board of directors of Ruckus Wireless, Inc. and Violin Memory, Inc., both publicly-traded companies. He earned a Bachelor of Science degree in Engineering from the University of Louisiana at Lafayette and a Master's degree in Information Systems Engineering from NYU Poly.

Philip Tymen deJong was appointed Chief Operating Officer in July 2015. Mr. deJong has comprehensive leadership responsibility for areas including manufacturing, EPC, quality and reliability, supply chain, and product management. Mr. deJong joined First Solar in January 2010 as Vice President, Plant Management and served in several Senior Vice President roles in manufacturing and operations prior to being appointed Senior Vice President, Manufacturing & EPC in January 2015. Prior to joining First Solar, Mr. deJong was Vice President of Assembly/Test Manufacturing for Numonyx Corporation. Prior to that, he worked for 25 years at Intel Corporation, holding various positions in engineering, manufacturing, wafer fabrication management, and assembly/test manufacturing. Mr. deJong holds a Bachelor of Science degree in Industrial Engineering/Mechanical Engineering from Oregon State University and has completed advanced study at the University of New Mexico Anderson School of Management.

Raffi Garabedian has been the Chief Technology Officer of First Solar since May 2012 and manages the Company's technology, PV module, and power plant system products and roadmaps. Mr. Garabedian joined First Solar in June 2008 as Director of Disruptive Technologies. Prior to First Solar, Mr. Garabedian spent over 15 years in the MEMS (micro-electro-mechanical systems) industry, developing new products ranging from automotive engine control sensors to fiber optic telecommunications switching systems. He was the founding CEO of Touchdown Technologies, Inc., which was acquired by Verigy, as well as Micromachines Inc., which was acquired by Kavlico. Mr. Garabedian is named on approximately 28 issued U.S. patents. Mr. Garabedian earned a Bachelor of Science degree in Electrical Engineering from Rensselaer Polytechnic Institute and a Master of Science degree in Electrical Engineering with a focus on semiconductor and microsystems technology from the University of California Davis.

Paul Kaleta joined First Solar in March 2014 as Executive Vice President & General Counsel. In February 2017, Mr. Kaleta was appointed as First Solar's corporate secretary. Prior to joining First Solar, Mr. Kaleta was Executive Vice President, General Counsel, Shared Services & Secretary, and Chief Compliance Officer for NV Energy, Inc., which

was acquired by Berkshire Hathaway's Energy Group in December 2013. Before that, he was Vice President and General Counsel for Koch Industries, Inc., one of the world's largest privately held companies with diverse businesses worldwide, including refining, petrochemicals, and commodity trading, among others. He also served in a number of legal and other leadership roles for Koch companies. Before joining Koch, he was Vice President and General Counsel of Niagara Mohawk Power Corporation (now part of National Grid). In private practice, Mr. Kaleta was an equity partner in the Washington D.C. law firm Swidler Berlin LLP and an associate in the Washington D.C. office of Skadden, Arps, Slate, Meagher & Flom LLP. He also served as a federal judicial clerk. Mr. Kaleta is the founding chair of the Southern Nevada Chapter of the "I Have a Dream Foundation" (now "Core Academy-powered by The Rogers Foundation"), a member of the board of directors of Advanced Energy Economy, a member of the client advisory council of Lex Mundi, and has taught both energy law and business ethics and leadership, as an adjunct professor, among other industry professional and community activities. Mr. Kaleta holds a juris doctor degree from Georgetown University Law Center and a bachelor's degree from Hamilton College.

Christopher R. Bueter was appointed Executive Vice President, Human Resources in February 2016. Mr. Bueter joined First Solar in November 2009 as Global Director for Industrial Relations and also served as Vice President, Human Resources Global Business Development and Corporate Services, Vice President, Global Human Resources and Labor Relations, and Senior Vice President, Human Resources. Prior to joining First Solar, Mr. Bueter served as the Vice President of Global Employee Relations at Dana Corporation, an American-based worldwide supplier of powertrain components. In his 24 years at Dana Corporation, he served in a variety of roles, including Corporate Director of Employee Relations and Distribution Services Division Human Resources Manager. Mr. Bueter holds a Bachelor of Science in human resources management from the University of Toledo, and a juris doctor degree from the University of Toledo Law School.

Item 1A. ***Risk Factors***

An investment in our stock involves a high degree of risk. You should carefully consider the following information, together with the other information in this Annual Report on Form 10-K, before buying shares of our stock. If any of the following risks or uncertainties occur, our business, financial condition, and results of operations could be materially and adversely affected and the trading price of our stock could decline.

Risks Related to Our Markets and Customers

Competition in solar markets globally and across the solar value chain is intense, and could remain that way for an extended period of time. An increased global supply of PV modules has caused and may continue to cause structural imbalances in which global PV module supply exceeds demand, which could have a material adverse effect on our business, financial condition, and results of operations.

In the aggregate, we believe manufacturers of solar cells and modules have significant installed production capacity, relative to global demand, and the ability for additional capacity expansion. For example, we estimate that in 2017, over 20 GW of capacity was added by solar module manufacturers, particularly but not exclusively in Asia. We believe the solar industry may from time to time experience periods of structural imbalance between supply and demand (i.e., where production capacity exceeds global demand), and that such periods will put pressure on pricing. During the past several years, industry average selling prices per watt have declined, at times significantly, both at the module and system levels, as competitors have reduced prices to sell inventories worldwide. There may be additional pressure on global demand and average selling prices in the future resulting from fluctuating demand in certain major solar markets such as China. If our competitors reduce module pricing to levels near or below their manufacturing costs, or are able to operate at minimal or negative operating margins for sustained periods of time, or if demand for PV modules does not grow sufficiently to justify the current production supply, our business, financial condition, and results of operations could be adversely affected.

If PV solar and related technologies are not suitable for widespread adoption at economically attractive rates of return or if sufficient additional demand for solar modules, related technologies, and systems does not develop or takes longer to develop than we anticipate, our net sales and profit may flatten or decline and we may be unable to sustain profitability.

In comparison to traditional forms of energy generation, the solar energy market continues to be at a relatively early stage of development. If utility-scale PV solar technology proves unsuitable for widespread adoption at economically attractive rates of return or if additional demand for solar modules and systems fails to develop sufficiently or takes longer to develop than we anticipate, we may be unable to grow our business or generate sufficient net sales to sustain profitability. In addition, demand for solar modules, related technologies, and systems in our targeted markets may develop to a lesser extent than we anticipate. Many factors may affect the viability of widespread adoption of utility-scale PV solar technology in our targeted markets, as well as the demand for solar modules and systems generally, including the following:

- cost-effectiveness of the electricity generated by PV solar power systems compared to conventional energy sources, such as natural gas (which fuel source may be subject to significant price fluctuations from time to time), and other non-solar renewable energy sources, such as wind, geothermal, and hydroelectric;

- changes in tax, trade remedies, and other public policy, as well as in economic, market, and other conditions that affect the price of, and demand for, conventional energy resources, non-solar renewable energy resources (e.g., wind and hydroelectric), and energy efficiency programs and products, including increases or decreases in the prices of natural gas, coal, oil, and other fossil fuels and in the prices of competing renewable resources;

- the extent of competition, barriers to entry, and overall conditions and timing relating to the development of solar in new and emerging market segments such as commercial and industrial customers, community solar, community choice aggregators, and microgrids, among other customer segments;

- availability, substance, and magnitude of support programs including federal, state, and local government subsidies, incentives, targets, and renewable portfolio standards, among other policies and programs, to accelerate the development of the solar industry;

- performance, reliability, and availability of energy generated by PV solar power systems compared to conventional and other non-solar renewable energy sources and products, particularly conventional energy generation capable of providing 24-hour, non-intermittent baseload power;

- the development, functionality, scale, cost, and timing of storage solutions; and

- changes in the amount and priorities of capital expenditures by end-users of solar modules and systems (e.g., utilities), which capital expenditures tend to decrease when the economy slows or when interest rates increase, thereby resulting in redirection away from solar generation to development of competing forms of electric generation and to distribution (e.g., smart grid), transmission, and energy efficiency measures.

The reduction, elimination, or expiration of government subsidies, economic incentives, tax incentives, renewable energy targets, and other support for on-grid solar electricity applications, or other adverse public policies, such as tariffs or other trade remedies imposed on solar cells and modules, could negatively impact demand and/or price levels for our solar modules and systems and limit our growth or lead to a reduction in our net sales, thereby adversely impacting our operating results.

Although we believe that solar energy will experience widespread adoption in those applications where it competes economically with traditional forms of energy without any support programs, in certain markets our net sales and profit remain subject to variability based on the availability and size of government subsidies and economic incentives. Federal, state, and local governmental bodies in many countries have provided subsidies in the form of FiTs, rebates,

tax incentives, and other incentives to end-users, distributors, system integrators, and manufacturers of PV solar products. Many of these support programs expire, phase out over time, require renewal by the applicable authority, or may be amended. A summary of certain recent developments in the major government support programs that may impact our business appears under Item 1. "Business – Support Programs." To the extent these support programs are reduced earlier than previously expected or are changed retroactively, such changes could negatively impact demand and/or price levels for our solar modules and systems, lead to a reduction in our net sales, and adversely impact our operating results. Another consideration in the U.S. market, and to a lesser extent in other global markets, is the effect of governmental land-use planning policies and environmental policies on utility-scale PV solar development. The adoption of restrictive land-use designations or environmental regulations that proscribe or restrict the siting of utility-scale solar facilities could adversely affect the marginal cost of such development.

In addition, policies of the U.S. presidential administration may create regulatory uncertainty in the renewable energy industry, including the solar industry, and our business, financial condition, and results of operations could be adversely affected. Members of the U.S. presidential administration, including representatives of the U.S. Department of Energy, have made public statements that indicate that the administration may not be supportive of various clean energy programs and initiatives designed to curtail climate change. For example, in June 2017, the U.S. President announced that the U.S. would withdraw from participation in the 2015 Paris Agreement on climate change mitigation. In addition, the administration has indicated that it may be supportive of overturning or modifying policies of or regulations enacted by the prior administration that placed limitations on gas and coal electricity generation, mining, and/or exploration. Additionally, in October 2017, the U.S. Environmental Protection Agency Administrator issued a Notice of Proposed Rulemaking, proposing to repeal the previous U.S. presidential administration's Clean Power Plan, which establishes standards to limit carbon dioxide emissions from existing power generation facilities. If the current U.S. administration and/or the U.S. Congress takes action, or continues to publicly speak out about the need to take action, in furtherance of any such policies, we would be subject to significant risks, including the following:

- a reduction or removal of clean energy programs and initiatives and the incentives they provide may diminish the market for future solar energy off-take agreements and reduce the ability for solar developers to compete for future solar energy off-take agreements, which may reduce incentives for project developers to develop solar projects and purchase PV solar modules;

- any limitations on the value or availability to potential investors of tax incentives that benefit solar energy projects such as the ITC and accelerated depreciation deductions could result in such investors generating reduced revenues and economic returns and facing a reduction in the availability of affordable financing, thereby reducing demand for PV solar modules. The ITC is a U.S. federal incentive that provides an income tax credit to the owner of the project after the project is placed in service of up to 30% of eligible basis. Under the Modified Accelerated Cost-Recovery System, owners of equipment used in a solar project may claim all of their depreciation deductions with respect to such equipment over five years, even though the useful life of such equipment is generally greater than five years. In addition, in December 2017, the U.S. government enacted comprehensive tax reform legislation commonly referred to as the Tax Cuts and Jobs Act (the "Tax Act"). Under the Tax Act, qualified property placed in service after September 22, 2017 and before January 1, 2023 is generally eligible for 100% expensing, and such property placed in service after December 31, 2022 and before January 1, 2027 is generally eligible for expensing at lower percentages. However, the Tax Act also reduces the U.S. corporate income tax rate to 21% for tax years beginning after December 31, 2017, which could diminish the capacity of potential investors to benefit from incentives such as the ITC and reduce the value of accelerated depreciation deductions and expensing, thereby reducing the relative attractiveness of solar projects as an investment; and

- any effort to overturn federal and state laws, regulations, or policies that are supportive of solar energy generation or that remove costs or other limitations on other types of electricity generation that compete with solar energy projects could negatively impact our ability to compete with traditional forms of electricity generation and materially and adversely affect our business.

Application of U.S. trade laws, or trade laws of other countries, may also impact, either directly or indirectly, our operating results. For example, in April 2017, a U.S.-based manufacturer of solar cells filed a petition under Sections 201 and 202 of the Trade Act of 1974 for global safeguard relief with the U.S. International Trade Commission (the "USITC"). Such petition requested, among other things, the imposition of certain tariffs on crystalline silicon solar cells imported into the United States and the establishment of a minimum price per watt on imported crystalline silicon solar modules. In September 2017, the USITC determined such products are being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the relevant domestic industry and subsequently recommended various remedies to the U.S. President. In January 2018, the President proclaimed tariffs on imported crystalline silicon modules, and a tariff-rate quota on imported crystalline silicon cells, over a four-year period, with the tariff on modules, and the tariff on cells above the first 2.5 GW_{DC} of imports, starting at 30% for the February 2018 to February 2019 period and declining by five percentage points in each subsequent 12-month period. Thin film solar cell products, such as our CdTe technology, are expressly excluded from the tariffs. Some countries and companies have challenged the tariffs under the rules of the World Trade Organization and U.S. law. It is unknown if such tariffs will be applied as originally proclaimed, or how such tariffs, or any other U.S. or global trade remedies or other trade barriers, may directly or indirectly affect U.S. or global markets for solar energy and our business, financial condition, and results of operations.

These examples show that established markets for PV solar development, such as the U.S. market, face uncertainties arising from policy, regulatory, and governmental constraints. While the expected potential of the emerging markets we are targeting is significant, policy promulgation and market development are especially vulnerable to governmental inertia, political instability, the imposition of trade remedies and other trade barriers, geopolitical risk, fossil fuel subsidization, potentially stringent localization requirements, and limited available infrastructure.

We may be unable to fully execute on our long-term strategic plans, which could have a material adverse effect on our business, financial condition, or results of operations.

We face numerous difficulties in executing on our long-term strategic plans, particularly in new foreign jurisdictions, including the following:

- difficulty in accurately prioritizing geographic markets that we can most effectively and profitably serve with our PV offerings, including miscalculations in overestimating or underestimating addressable market demand;
- difficulty in competing against companies who may have greater financial resources and/or a more effective or established localized business presence and/or an ability to operate with minimal or negative operating margins for sustained periods of time;
- difficulty in overcoming the inertia involved in changing local electricity ecosystems as necessary to accommodate large-scale PV solar deployment and integration;
- adverse public policies in countries we operate in and/or are pursuing, including local content requirements, the imposition of trade remedies, or capital investment requirements;
- business climates, such as that in China, that may have the effect of putting foreign companies at a disadvantage relative to domestic companies;
- unstable economic, social, and/or operating environments in foreign jurisdictions, including social unrest, currency, inflation, and interest rate uncertainties;
- the possibility of applying an ineffective commercial approach to targeted markets, including product offerings that may not meet market needs;
- difficulty in generating sufficient sales volumes at economically sustainable profitability levels;

- difficulty in timely identifying, attracting, training, and retaining qualified sales, technical, and other personnel in geographies targeted for expansion;

- difficulty in maintaining proper controls and procedures as we expand our business operations both in terms of complexity and geographical reach, including transitioning certain business functions to low-cost geographies, with any material control failure potentially leading to reputational damage and loss of confidence in our financial reporting accuracy;

- difficulty in competing successfully for market share in overall solar markets as a result of the success of companies participating in the global rooftop PV solar market, which is a segment in which we do not have significant historical experience;

- difficulty in establishing and implementing a commercial and operational approach adequate to address the specific needs of the markets we are pursuing;

- difficulty in identifying effective local partners and developing any necessary partnerships with local businesses on commercially acceptable terms; and

- difficulty in balancing market demand and manufacturing production in an efficient and timely manner, potentially causing our manufacturing capacity to be constrained in some future periods or over-supplied in others.

In addition, please see the Risk Factors entitled "Our substantial international operations subject us to a number of risks, including unfavorable political, regulatory, labor, and tax conditions in the United States and/or foreign countries," and "The reduction, elimination, or expiration of government subsidies, economic incentives, tax incentives, renewable energy targets, and other support for on-grid solar electricity applications, or other adverse public policies, such as tariffs or other trade remedies imposed on solar cells and modules, could negatively impact demand and/or price levels for our solar modules and systems and limit our growth or lead to a reduction in our net sales, thereby adversely impacting our operating results."

We may be unable to profitably provide new solar offerings or achieve sufficient market penetration with such offerings.

We may expand our portfolio of offerings to include solutions that build upon our core competencies but for which we have not had significant historical experience, including variations in our traditional product offerings or other offerings related to commercial and industrial customers and community solar. We cannot be certain that we will be able to ascertain and allocate the appropriate financial and human resources necessary to grow these business areas. We could invest capital into growing these businesses but fail to address market or customer needs or otherwise not experience a satisfactory level of financial return. Also, in expanding into these areas, we may be competing against companies that previously have not been significant competitors, such as companies that currently have substantially more experience than we do in the residential, commercial and industrial, or other targeted offerings. If we are unable to achieve growth in these areas, our overall growth and financial performance may be limited relative to our competitors and our operating results could be adversely impacted.

An increase in interest rates or tightening of the supply of capital in the global financial markets (including a reduction in total tax equity availability) could make it difficult for customers to finance the cost of a PV solar power system and could reduce the demand for our modules or systems and/or lead to a reduction in the average selling price for such offerings.

Many of our customers and our systems business depend on debt and/or equity financing to fund the initial capital expenditure required to develop, build, and/or purchase a PV solar power system. As a result, an increase in interest rates, or a reduction in the supply of project debt financing or tax equity investments (including reductions due to a

change in tax related incentives that benefit tax equity investors, such as the reduction of the U.S. corporate income tax rate to 21% for tax years beginning after December 31, 2017 under the Tax Act, which could reduce the value of these incentives), could reduce the number of solar projects that receive financing or otherwise make it difficult for our customers or our systems business to secure the financing necessary to develop, build, purchase, or install a PV solar power system on favorable terms, or at all, and thus lower demand for our solar modules, which could limit our growth or reduce our net sales. See the Risk Factor entitled "The reduction, elimination, or expiration of government subsidies, economic incentives, tax incentives, renewable energy targets, and other support for on-grid solar electricity applications, or other adverse public policies, such as tariffs or other trade remedies imposed on solar cells and modules, could negatively impact demand and/or price levels for our solar modules and systems and limit our growth or lead to a reduction in our net sales, thereby adversely impacting our operating results" for additional information. In addition, we believe that a significant percentage of our customers install systems as an investment, funding the initial capital expenditure through a combination of equity and debt. An increase in interest rates and the reduction of the U.S. corporate income tax rate as described above could lower an investor's return on investment in a system, increase equity return requirements, or make alternative investments more attractive relative to PV solar power systems and, in each case, could cause these customers to seek alternative investments.

Risks Related to our Operations, Manufacturing, and Technology

Our future success depends on our ability to effectively balance manufacturing production with market demand, convert existing production facilities to support new product lines, such as our transition to Series 6 module manufacturing, and, when necessary, continue to build new manufacturing plants over time in response to such demand and add production lines in a cost-effective manner, all of which are subject to risks and uncertainties.

Our future success depends on our ability to effectively balance manufacturing production with market demand, convert existing production facilities to support new product lines, such as our transition to Series 6 module manufacturing, and increase both our manufacturing capacity and production throughput over time in a cost-effective and efficient manner. If we cannot do so, we may be unable to expand our business, decrease our manufacturing cost per watt, maintain our competitive position, satisfy our contractual obligations, sustain profitability, or create long-term shareholder value. Our ability to expand production capacity, or to convert existing production facilities to support new product lines, such as our transition to Series 6 module manufacturing, is subject to significant risks and uncertainties, including the following:

- delays and cost overruns as a result of a number of factors, many of which may be beyond our control, such as our inability to secure successful contracts with equipment vendors;
- our custom-built equipment taking longer and costing more to manufacture than expected and not operating as designed;
- delays or denial of required approvals by relevant government authorities;
- being unable to hire qualified staff;
- failure to execute our expansion or conversion plans effectively;
- manufacturing concentration risk resulting from a current majority of our production lines worldwide being located in one geographic area, Malaysia, and the possible inability to meet customer demand in the event of compromises to shipping processes, supply chain, or other aspects of such facility;
- difficulty in balancing market demand and manufacturing production in an efficient and timely manner, potentially causing our manufacturing capacity to be constrained in some future periods or over-supplied in others; and

- incurring manufacturing asset write-downs, write-offs, and other charges and costs, which may be significant, during those periods in which we idle, slow down, shut down, convert, or otherwise adjust our manufacturing capacity.

We face intense competition from manufacturers of crystalline silicon solar modules, as well as other thin film solar modules; if global supply exceeds global demand, it could lead to a further reduction in the average selling price for PV solar modules, which could reduce our net sales and adversely affect our results of operations.

The solar and renewable energy industries are highly competitive and are continually evolving as participants strive to distinguish themselves within their markets and compete with the larger electric power industry. Within the global PV solar industry, we face intense competition from crystalline silicon solar module manufacturers and other thin film solar module manufacturers. Existing or future solar module manufacturers might be acquired by larger companies with significant capital resources, thereby further intensifying competition with us. In addition, the introduction of a low cost disruptive technology could adversely affect our ability to compete, which could reduce our net sales and adversely affect our results of operations.

Even if demand for solar modules continues to grow, the rapid manufacturing capacity expansion undertaken by many module manufacturers, particularly manufacturers of crystalline silicon cells and modules, has created and may continue to cause periods of structural imbalance in which supply exceeds demand. See the Risk Factor entitled "Competition in solar markets globally and across the solar value chain is intense, and could remain that way for an extended period of time. An increased global supply of PV modules has caused and may continue to cause structural imbalances in which global PV module supply exceeds demand, which could have a material adverse effect on our business, financial condition, and results of operations," for additional information. In addition, we believe any significant decrease in the cost of silicon feedstock or polysilicon would reduce the manufacturing cost of crystalline silicon modules and lead to further pricing pressure for solar modules and potentially an oversupply of solar modules. We also believe many crystalline silicon cell and wafer manufacturers are transitioning from lower efficiency Back Surface Field ("BSF") multi-crystalline cells (the legacy technology against which we have generally competed in our markets) to higher efficiency Passivated Emitter Rear Contact ("PERC") multi-crystalline and mono-crystalline cells at competitive cost structures. As a result, we expect that in the future, our primary competition might transition to multi-crystalline and mono-crystalline PERC based modules with higher conversion efficiencies. Additionally, while conventional solar modules, including the solar modules we produce, are monofacial, meaning their ability to produce energy is a function of direct and diffuse irradiance on their front side, certain manufacturers of mono-crystalline PERC solar modules are pursuing the commercialization of bifacial modules that also capture diffuse irradiance on the back side of a module. Such technology can improve the overall energy production of a module relative to nameplate efficiency when applied in certain applications and BoS configurations, which could potentially lower the overall LCOE of a system when compared to systems using conventional solar modules, including the modules we produce.

During any such period, our competitors could decide to reduce their sales prices in response to competition, even below their manufacturing costs, in order to generate sales, and may do so for a sustained period. Other competitors may have direct or indirect access to sovereign capital, which could enable such competitors to operate at minimal or negative operating margins for sustained periods of time. As a result, we may be unable to sell our solar modules or systems at attractive prices, or for a profit, during any period of excess supply of solar modules, which would reduce our net sales and adversely affect our results of operations. Additionally, we may decide to lower our average selling prices to certain customers in certain markets in response to competition, which could also reduce our net sales and adversely affect our results of operations.

Problems with product quality or performance, including our Series 4 modules and Series 6 modules, may cause us to incur significant and/or unexpected warranty and related expenses, damage our market reputation, and prevent us from maintaining or increasing our market share.

We perform a variety of module quality and life tests under different conditions upon which we base our assessments and warranty of module performance over the duration of the warranty. However, if our thin film solar modules,

including our Series 4 modules and Series 6 modules, perform below expectations, we could experience significant warranty and related expenses, damage to our market reputation, and erosion of our market share. With respect to our modules, we provide a limited warranty covering defects in materials and workmanship under normal use and service conditions for approximately 10 years. We also typically warrant that modules installed in accordance with agreed-upon specifications will produce at least 98% of their labeled power output rating during the first year, with the warranty coverage reducing by 0.5% every year thereafter throughout the approximate 25-year performance warranty period. As an alternative form of our standard limited module power output warranty, we also offer an aggregated or system-level limited module performance warranty. This system-level limited module performance warranty is designed for utility-scale systems and provides 25-year system-level energy degradation protection. This warranty represents a practical expedient to address the challenge of identifying, from the potential millions of modules installed in a utility-scale system, individual modules that may be performing below warranty thresholds by focusing on the aggregate energy generated by the system rather than the power output of individual modules. The system-level limited module performance warranty is typically calculated as a percentage of a system's expected energy production, adjusted for certain actual site conditions, with the warranted level of performance declining each year in a linear fashion, but never falling below 80% during the term of the warranty. As a result of these programs, we bear the risk of product warranty claims long after we have sold our solar modules and recognized net sales.

If any of the assumptions used in estimating our module warranties prove incorrect, we could be required to accrue additional expenses, which could adversely impact our financial position, operating results, and cash flows. Although we have taken significant precautions to avoid a manufacturing excursion from occurring, any manufacturing excursions, including any commitments made by us to take remediation actions in respect of affected modules beyond our warranties, could adversely impact our reputation, financial position, operating results, and cash flows.

Although our module performance warranties extend for 25 years, our oldest solar modules manufactured during the qualification of our pilot production line have only been in use since 2001. Accordingly, our warranties are based on a variety of quality and life tests that enable predictions of durability and future performance. These predictions, however, could prove to be materially different from the actual performance during the warranty period, causing us to incur substantial expense to repair or replace defective solar modules or provide financial remuneration in the future. For example, our solar modules, including our Series 4 modules and Series 6 modules, could suffer various failure modes, including breakage, delamination, corrosion, or performance degradation in excess of expectations, and our manufacturing operations or supply chain could be subject to materials or process variations that could cause affected modules to fail or underperform compared to our expectations. These risks could be amplified as we implement design and process changes in connection with our efforts to improve our products and accelerate module conversion efficiencies as part of our long-term strategic plans and as we transition to Series 6 module manufacturing. In addition, as we increase the number of installations in extreme climates, we may experience increased failure rates due to deployment into such field conditions. Any widespread product failures may damage our market reputation, cause our net sales to decline, require us to repair or replace the defective modules or provide financial remuneration, and result in us taking voluntary remedial measures beyond those required by our standard warranty terms to enhance customer satisfaction, which could have a material adverse effect on our operating results.

In resolving claims under both the limited defect and power output warranties, we typically have the option of either repairing or replacing the covered modules or, under the limited power output warranty, providing additional modules to remedy the power shortfall or making certain cash payments; however, historical versions of our module warranty did not provide a refund remedy. Consequently, we may be obligated to repair or replace the covered modules under such historical programs. As our manufacturing process may change from time-to-time in accordance with our technology roadmap, we may elect to stop production of older versions of our modules that would constitute compatible replacement modules. In some jurisdictions, our inability to provide compatible replacement modules could potentially expose us to liabilities beyond the limitations of our module warranties, which could adversely impact our reputation, financial position, operating results, and cash flows.

For PV solar power systems we construct, we typically provide limited warranties for defects in engineering design, installation, and BoS part workmanship for a period of one to two years following the substantial completion of a

system or a block within the system. In resolving claims under such BoS warranties, we have the option of remedying the defect through repair or replacement. As with our modules, these warranties are based on a variety of quality and life tests that enable predictions of durability and future performance. Any failures in BoS equipment or system construction beyond our expectations may also adversely impact our reputation, financial position, operating results, and cash flows.

Our failure to further refine our technology, reduce module manufacturing and BoS costs, and develop and introduce improved PV products could render our solar modules or systems uncompetitive and reduce our net sales, profitability, and/or market share.

We need to continue to invest significant financial resources in R&D to continue to improve our module conversion efficiencies, lower the LCOE of our PV solar power systems, and otherwise keep pace with technological advances in the solar industry. However, R&D activities are inherently uncertain, and we could encounter practical difficulties in commercializing our research results. We seek to continuously improve our products and processes, including, for example, our transition to Series 6 module manufacturing, and the resulting changes carry potential risks in the form of delays, performance, additional costs, or other unintended contingencies. In addition, our significant expenditures on R&D may not produce corresponding benefits. Other companies are developing a variety of competing PV technologies, including advanced multi-crystalline silicon cells, PERC or advanced p-type crystalline silicon cells, high-efficiency n-type crystalline silicon cells, copper indium gallium diselenide thin films, amorphous silicon thin films, and new emerging technologies such as hybrid perovskites, which could produce solar modules or systems that prove more cost-effective or have better performance than our solar modules or systems.

In addition, other companies could potentially develop a highly reliable renewable energy system that mitigates the intermittent power generation drawback of many renewable energy systems, or offer other value-added improvements from the perspective of utilities and other system owners, in which case such companies could compete with us even if the LCOE associated with such new systems is higher than that of our systems. As a result, our solar modules or systems may be negatively differentiated or rendered obsolete by the technological advances of our competitors, which would reduce our net sales, profitability, and/or market share. In addition, we often forward price our products and services in anticipation of future cost reductions and technology improvements, and thus, an inability to further refine our technology and execute our module technology and cost reduction roadmaps could adversely affect our operating results.

If our estimates regarding the future costs of collecting and recycling CdTe solar modules covered by our solar module collection and recycling program are incorrect, we could be required to accrue additional expenses and face a significant unplanned cash burden.

As necessary, we fund any incremental amounts for our estimated collection and recycling obligations each year. We determine the funding requirement, if any, based on estimated costs of collecting and recycling covered modules, estimated rates of return on our restricted investments, and an estimated solar module life of 25 years less amounts already funded in prior years. We estimate the cost of our collection and recycling obligations based on the present value of the expected probability-weighted future cost of collecting and recycling the solar modules, which includes estimates for the cost of packaging materials; the cost of freight from the solar module installation sites to a recycling center; the material, labor, capital costs; the scale of recycling centers; and an estimated third-party profit margin and return on risk for collection and recycling services. We base these estimates on (i) our experience collecting and recycling our solar modules, (ii) the expected timing of when our solar modules will be returned for recycling, and (iii) the expected economic conditions at the time the solar modules will be collected and recycled. If our estimates prove incorrect, we could be required to accrue additional expenses and could also face a significant unplanned cash burden at the time we realize our estimates are incorrect or end-users return their modules, which could adversely affect our operating results. In addition, participating end-users can return their modules covered under the collection and recycling program at any time. As a result, we could be required to collect and recycle covered CdTe solar modules earlier than we expect.

Our failure to protect our intellectual property rights may undermine our competitive position, and litigation to protect our intellectual property rights or defend against third-party allegations of infringement may be costly.

Protection of our proprietary processes, methods, and other technology is critical to our business. Failure to protect and monitor the use of our existing intellectual property rights could result in the loss of valuable technologies. We rely primarily on patents, trademarks, trade secrets, copyrights, and contractual restrictions to protect our intellectual property. We regularly file patent applications to protect certain inventions arising from our R&D and are currently pursuing such patent applications in various countries in accordance with our strategy for intellectual property in that jurisdiction. Our existing patents and future patents could be challenged, invalidated, circumvented, or rendered unenforceable. Our pending patent applications may not result in issued patents, or if patents are issued to us, such patents may not be sufficient to provide meaningful protection against competitors or against competitive technologies.

We also rely upon unpatented proprietary manufacturing expertise, continuing technological innovation, and other trade secrets to develop and maintain our competitive position. Although we generally enter into confidentiality agreements with our associates and third parties to protect our intellectual property, such confidentiality agreements are limited in duration and could be breached and may not provide meaningful protection for our trade secrets or proprietary manufacturing expertise. Adequate remedies may not be available in the event of unauthorized use or disclosure of our trade secrets and manufacturing expertise. In addition, others may obtain knowledge of our trade secrets through independent development or legal means. The failure of our patents or confidentiality agreements to protect our processes, equipment, technology, trade secrets, and proprietary manufacturing expertise, methods, and compounds could have a material adverse effect on our business. In addition, effective patent, trademark, copyright, and trade secret protection may be unavailable or limited in some foreign countries, especially any developing countries into which we may expand our operations. In some countries, we have not applied for patent, trademark, or copyright protection.

Third parties may infringe or misappropriate our proprietary technologies or other intellectual property rights, which could have a material adverse effect on our business, financial condition, and operating results. Policing unauthorized use of proprietary technology can be difficult and expensive. Additionally, litigation may be necessary to enforce our intellectual property rights, protect our trade secrets, or determine the validity and scope of the proprietary rights of others. We cannot ensure that the outcome of such potential litigation will be in our favor, and such litigation may be costly and may divert management attention and other resources away from our business. An adverse determination in any such litigation may impair our intellectual property rights and may harm our business, prospects, and reputation. In addition, we have no insurance coverage against such litigation costs and would have to bear all costs arising from such litigation to the extent we are unable to recover them from other parties.

Some of our manufacturing equipment is customized and sole sourced. If our manufacturing equipment fails or if our equipment suppliers fail to perform under their contracts, we could experience production disruptions and be unable to satisfy our contractual requirements.

Some of our manufacturing equipment, including manufacturing equipment related to the production of our Series 6 modules, is customized to our production lines based on designs or specifications that we provide to equipment manufacturers, which then undertake a specialized process to manufacture the custom equipment. As a result, the equipment is not readily available from multiple vendors and would be difficult to repair or replace if it were to become delayed, damaged, or stop working. If any piece of equipment fails, production along the entire production line could be interrupted. In addition, the failure of our equipment manufacturers to supply equipment in a timely manner or on commercially reasonable terms could delay our expansion or conversion plans, otherwise disrupt our production schedule, and/or increase our manufacturing costs, all of which would adversely impact our operating results.

Several of our key raw materials and components are either single-sourced or sourced from a limited number of third-party suppliers, and their failure to perform could cause manufacturing delays and impair our ability to deliver solar modules to customers in the required quality and quantities and at a price that is profitable to us.

Our failure to obtain raw materials and components that meet our quality, quantity, and cost requirements in a timely manner could interrupt or impair our ability to manufacture our solar modules or increase our manufacturing costs. Several of our key raw materials and components are either single-sourced or sourced from a limited number of third-party suppliers. As a result, the failure of any of our suppliers to perform could disrupt our supply chain and adversely impact our operations. In addition, some of our suppliers are smaller companies that may be unable to supply our increasing demand for raw materials and components as we expand our business. We may be unable to identify new suppliers or qualify their products for use on our production lines in a timely manner and on commercially reasonable terms. A constraint on our production may result in our inability to meet our capacity plans and/or our obligations under our customer contracts, which would have an adverse impact on our business. Additionally, reductions in our production volume may put pressure on suppliers, resulting in increased material and component costs.

A disruption in our supply chain for CdTe could interrupt or impair our ability to manufacture solar modules and could adversely impact our profitability and long-term growth prospects.

A key raw material used in our module production process is a CdTe compound. Tellurium, one of the main components of CdTe, is mainly produced as a by-product of copper refining, and therefore, its supply is largely dependent upon demand for copper. Our supply of CdTe could be limited if any of our current suppliers or any of our future suppliers are unable to acquire an adequate supply of tellurium in a timely manner or at commercially reasonable prices. If our current suppliers or any of our future suppliers cannot obtain sufficient tellurium, they could substantially increase prices or be unable to perform under their contracts. Furthermore, if our competitors begin to use or increase their demand for tellurium, our requirements for tellurium increase, new applications for tellurium become available, or adverse trade laws or policies restrict our ability to obtain tellurium from foreign vendors or make doing so cost prohibitive, the supply of tellurium and related CdTe compounds could be reduced and prices could increase. As we may be unable to pass such increases in the costs of our raw materials through to our customers, a substantial increase in tellurium prices or any limitations in the supply of tellurium could adversely impact our profitability and long-term growth objectives.

If any future production lines are not built in line with our committed schedules, it may impair any future growth plans. If any future production lines do not achieve operating metrics similar to our existing production lines, our solar modules could perform below expectations and cause us to lose customers.

If we are unable to systematically replicate our production lines as necessary over time and achieve and sustain similar operating metrics in our future production lines as we have achieved at our existing production lines, such as the future production lines at our manufacturing facility in Ho Chi Minh City, Vietnam, our manufacturing capacity could be substantially constrained, our manufacturing costs per watt could increase, and our growth could be limited. Such factors may result in lower net sales and lower net income than we anticipate. For instance, future production lines could produce solar modules that have lower conversion efficiencies, higher failure rates, and higher rates of degradation than solar modules from our existing production lines, and we could be unable to determine the cause of the lower operating metrics or develop and implement solutions to improve performance.

Our substantial international operations subject us to a number of risks, including unfavorable political, regulatory, labor, and tax conditions in the United States and/or foreign countries.

We have significant manufacturing, development, construction, sales, and marketing operations both within and outside the United States and expect to continue to expand our operations worldwide. As a result, we are subject to the legal, political, social, tax, and regulatory requirements, and economic conditions of many jurisdictions.

Risks inherent to international operations include, but are not limited to, the following:

- difficulty in enforcing agreements in foreign legal systems;
- difficulty in forming appropriate legal entities to conduct business in foreign countries and the associated costs of forming those legal entities;
- varying degrees of protection afforded to foreign investments in the countries in which we operate and irregular interpretations and enforcement of laws and regulations in such jurisdictions;
- foreign countries may impose additional income and withholding taxes or otherwise tax our foreign operations, impose tariffs, or adopt other restrictions on foreign trade and investment, including currency exchange controls;
- fluctuations in exchange rates may affect demand for our products and services and may adversely affect our profitability and cash flows in U.S. dollars to the extent that our net sales or our costs are denominated in a foreign currency and the cost associated with hedging the U.S. dollar equivalent of such exposures is prohibitive; the longer the duration of such foreign currency exposure, the greater the risk;
- anti-corruption compliance issues, including the costs related to the mitigation of such risk;
- risk of nationalization or other expropriation of private enterprises;
- changes in general economic and political conditions in the countries in which we operate, including changes in government incentive provisions;
- unexpected adverse changes in U.S. or foreign laws or regulatory requirements, including those with respect to environmental protection, import or export duties, and quotas;
- opaque approval processes in which the lack of transparency may cause delays and increase the uncertainty of project approvals;
- difficulty in staffing and managing widespread operations;
- difficulty in repatriating earnings;
- difficulty in negotiating a successful collective bargaining agreement in applicable foreign jurisdictions;
- trade barriers such as export requirements, tariffs, taxes, local content requirements, anti-dumping regulations and requirements, and other restrictions and expenses, which could increase the effective price of our solar modules and make us less competitive in some countries; and
- difficulty of, and costs relating to, compliance with the different commercial and legal requirements of the overseas countries in which we offer and sell our solar modules.

Our business in foreign markets requires us to respond to rapid changes in market conditions in these countries. Our overall success as a global business depends, in part, on our ability to succeed in differing legal, regulatory, economic, social, and political conditions. We may not be able to develop and implement policies and strategies that will be effective in each location where we do business.

Risks Related to Our Systems Business

Project development or construction activities may not be successful; projects under development may not receive required permits, real property rights, PPAs, interconnection, and transmission arrangements; or financing or construction may not commence or proceed as scheduled, which could increase our costs and impair our ability to recover our investments.

The development and construction of solar energy generation facilities and other energy infrastructure projects involve numerous risks. We may be required to spend significant sums for land and interconnection rights, preliminary engineering, permitting, legal services, and other expenses before we can determine whether a project is feasible, economically attractive, or capable of being built. Success in developing a particular project is contingent upon, among other things:

- obtaining financeable land rights, including land rights for the project site, transmission lines, and environmental mitigation;
- entering into financeable arrangements for the purchase of the electrical output and renewable energy attributes generated by the project;
- receipt from governmental agencies of required environmental, land-use, and construction and operation permits and approvals;
- receipt of tribal government approvals for projects on tribal land;
- receipt of governmental approvals related to the presence of any protected or endangered species or habitats, migratory birds, wetlands or other jurisdictional water resources, and/or cultural resources;
- negotiation of development agreements, public benefit agreements, and other agreements to compensate local governments for project impacts;
- negotiation of state and local tax abatement and incentive agreements;
- receipt of rights to interconnect the project to the electric grid or to transmit energy;
- negotiation of satisfactory EPC agreements;
- securing necessary rights of way for access and transmission lines;
- securing necessary water rights for project construction and operation;
- securing appropriate title coverage, including coverage for mineral rights, mechanics' liens, etc.;
- obtaining financing, including debt, equity, and funds associated with the monetization of tax credits and other tax benefits;
- payment of PPA, interconnection, and other deposits (some of which are non-refundable);
- providing required payment and performance security for the development of the project, such as through the provision of letters of credit; and
- timely implementation and satisfactory completion of construction.

Successful completion of a particular project may be adversely affected, delayed and/or rendered infeasible by numerous factors, including:

- delays in obtaining and maintaining required governmental permits and approvals, including appeals of approvals obtained;
- potential permit and litigation challenges from project stakeholders, including local residents, environmental organizations, labor organizations, tribes, and others who may oppose the project;
- in connection with any such permit and litigation challenges, grants of injunctive relief to stop development and/or construction of a project;
- discovery of unknown impacts to protected or endangered species or habitats, migratory birds, wetlands or other jurisdictional water resources, and/or cultural resources at project sites;
- discovery of unknown title defects;
- discovery of unknown environmental conditions;
- unforeseen engineering problems;
- construction delays and contractor performance shortfalls;
- work stoppages;
- cost over-runs;
- labor, equipment, and material supply shortages, failures, or disruptions;
- cost or schedule impacts arising from changes in local, state, or federal land-use or regulatory policies;
- changes in electric utility procurement practices;
- risks arising from transmission grid congestion issues;
- project delays that could adversely impact our ability to maintain interconnection rights;
- additional complexities when conducting project development or construction activities in foreign jurisdictions (either on a stand-alone basis or in collaboration with local business partners), including operating in accordance with the FCPA and applicable local laws and customs;
- unfavorable tax treatment or adverse changes to tax policy;
- adverse weather conditions;
- water shortages;
- adverse environmental and geological conditions; and
- force majeure and other events out of our control.

If we fail to complete the development of a solar energy project, fail to meet one or more agreed upon target construction milestone dates, fail to achieve system-level capacity, or fail to meet other contract terms, we may be subject to forfeiture of significant deposits under PPAs or interconnection agreements or termination of such agreements, incur significant liquidated damages, penalties, and/or other obligations under other project related agreements, and may not be able to recover our investment in the project. If we are unable to complete the development of a solar energy project, we may impair some or all of these capitalized investments, which would have an adverse impact on our net income in the period in which the loss is recognized.

We may be unable to acquire or lease land, obtain necessary interconnection and transmission rights, and/or obtain the approvals, licenses, permits, and electric transmission grid interconnection and transmission rights necessary to build and operate PV solar power systems in a timely and cost effective manner, and regulatory agencies, local communities, labor unions, tribes, or other third parties may delay, prevent, or increase the cost of construction and operation of the system we intend to build.

In order to construct and operate our PV solar power systems, we need to acquire or lease land and rights of way, obtain interconnection rights, negotiate agreements with affected transmission systems, and obtain all necessary local, county, state, federal, and foreign approvals, licenses, and permits, as well as rights to interconnect the systems to the transmission grid and transmit energy generated from the system. We may be unable to acquire the land or lease interests needed, may not obtain or maintain satisfactory interconnection rights, may have difficulty reaching agreements with affected transmission systems and/or incur unexpected network upgrade costs, may not receive or retain the requisite approvals, permits, licenses, and interconnection and transmission rights, or may encounter other problems that could delay or prevent us from successfully constructing and operating such systems.

Many of our proposed projects are located on or require access through public lands administered by state and federal agencies pursuant to competitive public leasing and right-of-way procedures and processes. Our projects may also be located on tribal land pursuant to land agreements that must be approved by tribal governments and federal agencies. The authorization for the use, construction, and operation of systems and associated transmission facilities on federal, tribal, state, and private lands will also require the assessment and evaluation of mineral rights, private rights-of-way, and other easements; environmental, agricultural, cultural, recreational, and aesthetic impacts; and the likely mitigation of adverse impacts to these and other resources and uses. The inability to obtain the required permits and other local, state, federal, and tribal approvals, and any excessive delays in obtaining such permits and approvals due, for example, to litigation or third-party appeals, could potentially prevent us from successfully constructing and operating such systems in a timely manner and could result in the potential forfeiture of any deposit we have made with respect to a given project. Moreover, project approvals subject to project modifications and conditions, including mitigation requirements and costs, could affect the financial success of a given project. Changing regulatory requirements and the discovery of unknown site conditions could also affect the financial success of a given project.

In addition, local labor unions may increase the cost of project development in California and elsewhere. We may also be subject to labor unavailability and/or increased union labor requirements due to multiple simultaneous projects in a geographic region.

Competition at the system level can be intense, thereby potentially exerting downward pressure on system-level profit margins industry-wide, which could reduce our profitability and adversely affect our results of operations.

The significant decline in PV solar module prices over the last several years continues to create a challenging environment for module manufacturers, but it has also helped drive demand for solar electricity worldwide. Aided by such lower module prices, our customers and potential customers have in many cases been willing and able to bid aggressively for new projects and PPAs, using low cost assumptions for modules, BoS parts, installation, maintenance, and other costs as the basis for such bids. Relatively low barriers to entry for solar project developers and EPC companies, including those we compete with, have led to, depending on the market and other factors, intense competition at the system level, which may result in an environment in which system-level pricing falls rapidly, thereby further increasing demand for solar energy solutions but constraining the ability for project developers, EPC companies, and vertically-

integrated solar companies such as First Solar to sustain meaningful and consistent profitability. Accordingly, while we believe our system offerings and experience are positively differentiated in many cases from that of our competitors, we may fail to correctly identify our competitive position, we may be unable to develop or maintain a sufficient magnitude of new system projects worldwide at economically attractive rates of return, and we may not otherwise be able to achieve meaningful profitability under our long-term strategic plans.

Depending on the market opportunity, we may be at a disadvantage compared to potential system-level competitors. For example, certain of our competitors may have a stronger and/or more established localized business presence in a particular geographic region. Certain of our competitors may be larger entities that have greater financial resources and greater overall brand name recognition than we do and, as a result, may be better positioned to impact customer behavior or adapt to changes in the industry or the economy as a whole. Certain competitors may also have direct or indirect access to sovereign capital and/or other incentives, which could enable such competitors to operate at minimal or negative operating margins for sustained periods of time.

Additionally, large-scale solar systems are still in their relatively early stages of existence, and, depending on the geographic area, certain potential customers may still be in the process of educating themselves about the points of differentiation among various available providers of PV solar energy solutions, including a company's proven overall experience and bankability, system design and optimization expertise, grid interconnection and stabilization expertise, and proven O&M capabilities. If we are unable over time to meaningfully differentiate our offerings at scale, or if available competitive pricing is prioritized over the value we believe is added through our system offerings and experience, from the viewpoint of our potential customer base, our business, financial condition, and results of operations could be adversely affected.

We may not be able to obtain long-term contracts for the sale of power produced by our projects at prices and on other terms favorable to attract financing and other investments; with regard to projects for which electricity is or will be sold on an open contract basis rather than under a PPA, our results of operations could be adversely affected to the extent prevailing spot electricity prices decline in an unexpected manner.

Obtaining long-term contracts for the sale of power produced by our projects at prices and on other terms favorable to us is essential for obtaining financing and commencing construction of our projects. We must compete for PPAs against other developers of solar and renewable energy projects. This intense competition for PPAs has resulted in downward pressure on PPA pricing for newly contracted projects. In addition, we believe the solar industry may experience periods of structural imbalance between supply and demand that put downward pressure on module pricing. This downward pressure on module pricing would also create downward pressure on PPA pricing for newly contracted projects. See the Risk Factor entitled "Competition at the system level can be intense, thereby potentially exerting downward pressure on system-level profit margins industry-wide, which could reduce our profitability and adversely affect our results of operations" for additional information. If falling PPA pricing results in forecasted project revenue that is insufficient to generate returns anticipated to be demanded in the project sale market, our business, financial condition, and results of operations could be adversely affected.

Other sources of power, such as natural gas-fired power plants, have historically been cheaper than the cost of solar power, and certain types of generation projects, such as natural gas-fired power plants, can deliver power on a firm basis. The inability to compete successfully against other power producers or otherwise enter into PPAs favorable to us would negatively affect our ability to develop and finance our projects and negatively impact our revenue. In addition, the availability of PPAs is dependent on utility and corporate energy procurement practices that could evolve and shift allocation of market risks over time. In addition, PPA availability and terms are a function of a number of economic, regulatory, tax, and public policy factors, which are also subject to change. Also, certain of our projects may be scheduled for substantial completion prior to the commencement of a long-term PPA with a major off-taker, in which case we would be required to enter into a stub-period PPA for the intervening time period or sell down the project. We may not be able to do either on terms that are commercially attractive to us. Finally, the electricity from certain of our projects is or is expected to be sold on an open contract basis for a period of time rather than under a PPA. If prevailing spot

electricity prices relating to any such project were to decline in an unexpected manner, such project may decline in value and our results of operations could otherwise be adversely affected.

Lack of transmission capacity availability, potential upgrade costs to the transmission grid, and other systems constraints could significantly impact our ability to build PV solar power systems and generate solar electricity power sales.

In order to deliver electricity from our PV solar power systems to our customers, our projects generally need to connect to the transmission grid. The lack of available capacity on the transmission grid could substantially impact our projects and cause reductions in project size, delays in project implementation, increases in costs from transmission upgrades, and potential forfeitures of any deposit we have made with respect to a given project. In addition, there could be unexpected costs required to complete transmission and network upgrades that adversely impact the economic viability of our PV solar power systems. These transmission and network issues and costs, as well as issues relating to the availability of large equipment such as transformers and switchgear, could significantly impact our ability to interconnect our systems to the transmission grid, build such systems, and generate solar electricity sales.

Our systems business is largely dependent on us and third parties arranging financing from various sources, which may not be available or may only be available on unfavorable terms or in insufficient amounts.

The construction of large utility-scale solar power projects in many cases requires project financing, including non-recourse project specific debt financing in the bank loan market and institutional debt capital markets. Uncertainties exist as to whether our planned projects will be able to access the debt markets in a magnitude sufficient to finance their construction. If we are unable to arrange such financing or if it is only available on unfavorable terms, we may be unable to fully execute our systems business plan. In addition, we generally expect to sell interests in our projects by raising project equity capital from tax-oriented, strategic industry, and other equity investors. Such equity sources may not be available or may only be available in insufficient amounts or on unfavorable terms, in which case our ability to sell interests in our projects may be delayed or limited, and our business, financial condition, and results of operations may be adversely affected. Uncertainty in or adverse changes to tax policy, including the amount of ITC, accelerated depreciation, expensing, and the reduction of the U.S. corporate income tax rate to 21% for tax years beginning after December 31, 2017 under the Tax Act (which could reduce the value of these tax related incentives) may reduce project value or negatively affect our ability to timely secure equity investment for our projects. Even if such financing sources are available, the counterparty to many of our fixed-price EPC contracts, which own the projects we are constructing, are often special purpose vehicles that do not have significant assets other than their interests in the project and have pledged all or substantially all of these assets to secure the project-related debt and certain other sources of financing. If the owner defaults on its payments or other obligations to us, we may face difficulties in collecting payment of amounts due to us for the costs previously incurred or for the amounts previously expended or committed to be expended to purchase equipment or supplies (including intercompany purchases of modules), or for termination payments we are entitled to under the terms of the related EPC contract. If we are unable to collect the amounts owed to us, or are unable to complete the project because of an owner default, we may be required to record a charge against earnings related to the project, which could result in a material loss.

In addition, for projects to which we provide EPC services but are not the project developer, our EPC activities are in many cases dependent on the ability of third parties to finance their system projects on acceptable terms. Depending on prevailing conditions in the credit markets, interest rates and other factors, such financing may not be available or may only be available on unfavorable terms or in insufficient amounts. If third parties are limited in their ability to access financing to support their purchase of system construction services from us, we may not realize the cash flows that we expect from such sales, which could adversely affect our ability to invest in our business and/or generate revenue. See also the Risk Factor above entitled "An increase in interest rates or tightening of the supply of capital in the global financial markets (including a reduction in total tax equity availability) could make it difficult for customers to finance the cost of a PV solar power system and could reduce the demand for our modules or systems and/or lead to a reduction in the average selling price for such offerings."

Developing solar power projects may require significant upfront investment prior to the signing of an EPC contract and commencing construction, which could adversely affect our business and results of operations.

Our solar power project development cycles, which span the time between the identification of a site location and the construction of a system, vary substantially and can take years to mature. As a result of these long project development cycles, we may need to make significant up-front investments of resources (including, for example, payments for land rights, large transmission and PPA deposits, or other payments, which may be non-refundable) in advance of the signing of EPC contracts, commencing construction, receiving cash proceeds, or recognizing any revenue, which may not be recognized for several additional months or years following contract signing. Our potential inability to enter into sales contracts with customers on favorable terms after making such upfront investments could cause us to forfeit certain nonrefundable payments or otherwise adversely affect our business and results of operations. Furthermore, we may become constrained in our ability to simultaneously fund our other business operations and these systems investments through our long project development cycles.

Our liquidity may also be adversely affected to the extent the project sales market weakens and we are unable to sell interests in our solar projects on pricing, timing, and other terms commercially acceptable to us. In such a scenario, we may choose to continue to temporarily own and operate certain solar projects for a period of time, after which interests in the projects may be sold to third parties.

We may be unable to accurately estimate costs under fixed-price EPC agreements in which we act as the general contractor for our customers in connection with the construction and installation of their PV solar power systems.

We may enter into fixed-price EPC contracts in which we act as the general contractor for our customers in connection with the installation of their PV solar power systems. All essential costs are estimated at the time of entering into the EPC contract for a particular project, and these are reflected in the overall fixed-price that we charge our customers for the project. These cost estimates are preliminary and may or may not be covered by contracts between us or the subcontractors, suppliers, and other parties to the project. In addition, we require qualified, licensed subcontractors to install many of our systems. Shortages of such skilled labor could significantly delay a project or otherwise increase our costs. Should actual results prove different from our estimates (including those due to unexpected increases in inflation, commodity prices, or labor costs) or we experience delays in execution and we are unable to commensurately increase the EPC sales price, we may not achieve our expected margins or we may be required to record a loss in the relevant fiscal period.

We may be subject to unforeseen costs, liabilities, or obligations when providing O&M services. In addition, certain of our O&M agreements include provisions permitting the counterparty to terminate the agreement without cause.

We may provide ongoing O&M services to system owners under separate service agreements, pursuant to which we generally perform standard activities associated with operating a PV solar power system, including 24/7 monitoring and control, compliance activities, energy forecasting, and scheduled and unscheduled maintenance. Our costs to perform these services are estimated at the time of entering into the O&M agreement for a particular project, and these are reflected in the price we charge our customers, including certain agreements which feature fixed pricing. Should our estimates of O&M costs prove inaccurate (including any unexpected serial defects, unavailability of parts, or increases in inflation, labor, or BoS costs), our growth strategy and results of operations could be adversely affected. Because of the potentially long-term nature of these O&M agreements, the adverse impacts on our results of operations could be significant, particularly if our costs are not capped under the terms of the agreements. In addition, certain of our O&M agreements include provisions permitting the counterparty to terminate the agreement without cause or for convenience. The exercise of such termination rights, or the use of such rights as leverage to re-negotiate terms and conditions of the O&M agreement, including pricing terms, could adversely impact our results of operations. We may also be subject to substantial costs in the event we do not achieve certain thresholds under the effective availability guarantees included in our O&M agreements.

Our systems business is subject to regulatory oversight and liability if we fail to operate PV solar power systems in compliance with electric reliability rules.

The ongoing O&M services that we provide for system owners may subject us to regulation by the NERC, or its designated regional representative, as a "generator operator," or "GOP," under electric reliability rules filed with FERC. Our failure to comply with the reliability rules applicable to GOPs could subject us to substantial fines by NERC, subject to FERC's review. In addition, the system owners that receive our O&M services may be regulated by NERC as "generator owners," or "GOs," and we may incur liability for GO violations and fines levied by NERC, subject to FERC's review, based on the terms of our O&M agreements. Finally, as a system owner and operator, we may in the future be subject to regulation by NERC as a GO.

Risks Related to Regulations

Existing regulations and policies, changes thereto, and new regulations and policies may present technical, regulatory, and economic barriers to the purchase and use of PV products or systems, which may significantly reduce demand for our modules, systems, or services.

The market for electricity generation products is heavily influenced by local, state, federal, and foreign government regulations and policies concerning the electric utility industry, as well as policies promulgated by electric utilities. These regulations and policies often relate to electricity pricing and interconnection of customer-owned electricity generation. In the United States and in a number of other countries, these regulations and policies have been modified in the past and may be modified again in the future. These regulations and policies could deter end-user purchases of PV products or systems and investment in the R&D of PV solar technology. For example, without a mandated regulatory exception for PV solar power systems, utility customers are often charged interconnection or standby fees for putting distributed power generation on the electric utility grid. If these interconnection standby fees were applicable to PV solar power systems, it is likely that they would increase the cost of using such systems for end-users, which could make the systems less desirable, thereby adversely affecting our business, financial condition, and results of operations. In addition, with respect to utilities that utilize a peak-hour pricing policy or time-of-use pricing methods whereby the price of electricity is adjusted based on electricity supply and demand, electricity generated by PV solar power systems currently benefits from competing primarily with expensive peak-hour electricity, rather than the less expensive average price of electricity. Modifications to the peak-hour pricing policies of utilities, such as to a flat rate for all times of the day, would require PV solar power systems to achieve lower prices in order to compete with the price of electricity from other sources and would adversely impact our operating results.

Our modules, systems, and services (such as O&M) are subject to oversight and regulation in accordance with national and local ordinances relating to building codes, safety, environmental protection, utility interconnection and metering, and other matters, and tracking the requirements of individual jurisdictions is complex. Any new government regulations or utility policies pertaining to our modules, systems, or services may result in significant additional expenses to us or our customers and, as a result, could cause a significant reduction in demand for our modules, systems, or services. In addition, any regulatory compliance failure could result in significant management distraction, unplanned costs, and/or reputational damage.

We could be adversely affected by any violations of the U.S. Foreign Corrupt Practices Act (the "FCPA"), the U.K. Bribery Act, and other foreign anti-bribery laws.

The FCPA generally prohibits companies and their intermediaries from making improper payments to non-U.S. government officials for the purpose of obtaining or retaining business. Other countries in which we operate also have anti-bribery laws, some of which prohibit improper payments to government and non-government persons and entities, and others (e.g., the FCPA and the U.K. Bribery Act) extend their application to activities outside of their country of origin. Our policies mandate compliance with all applicable anti-bribery laws. We currently operate in, and pursuant to our long-term strategic plans may further expand into, key parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-bribery laws may conflict with

local customs and practices. In addition, due to the level of regulation in our industry, our operations in certain jurisdictions, including India, China, South America, and the Middle East, require substantial government contact, either directly by us or through intermediaries over whom we have less direct control, such as subcontractors, agents, and partners (such as joint venture partners), where norms can differ from U.S. standards. Although we have implemented policies, procedures, and, in certain cases, contractual arrangements designed to facilitate compliance with these anti-bribery laws, our officers, directors, associates, subcontractors, agents, and partners may take actions in violation of our policies, procedures, contractual arrangements, and anti-bribery laws. Any such violation, even if prohibited by our policies, could subject us and such persons to criminal and/or civil penalties or other sanctions potentially by government prosecutors from more than one country, which could have a material adverse effect on our business, financial condition, cash flows, and reputation.

Environmental obligations and liabilities could have a substantial negative impact on our financial condition, cash flows, and results of operations.

Our operations involve the use, handling, generation, processing, storage, transportation, and disposal of hazardous materials and are subject to extensive environmental laws and regulations at the local, state, national, and international levels. These environmental laws and regulations include those governing the discharge of pollutants into the air and water, the use, management, and disposal of hazardous materials and wastes, the cleanup of contaminated sites, and occupational health and safety. As we execute our long-term strategic plans and expand our business into foreign jurisdictions worldwide, our environmental compliance burden may continue to increase both in terms of magnitude and complexity. We have incurred and may continue to incur significant costs in complying with these laws and regulations. In addition, violations of, or liabilities under, environmental laws or permits may result in restrictions being imposed on our operating activities or in our being subjected to substantial fines, penalties, criminal proceedings, third-party property damage or personal injury claims, cleanup costs, or other costs. Such solutions could also result in substantial delay or termination of projects under construction within our systems business, which could adversely impact our results of operations. While we believe we are currently in substantial compliance with applicable environmental requirements, future developments such as more aggressive enforcement policies, the implementation of new, more stringent laws and regulations, or the discovery of presently unknown environmental conditions may require expenditures that could have a material adverse effect on our business, financial condition, and results of operations.

Our solar modules contain CdTe and other semiconductor materials. Elemental cadmium and certain of its compounds are regulated as hazardous materials due to the adverse health effects that may arise from human exposure. Based on existing research, the risks of exposure to CdTe are not believed to be as serious as those relating to exposure to elemental cadmium. In our manufacturing operations, we maintain engineering controls to minimize our associates' exposure to cadmium or cadmium compounds and require our associates who handle cadmium compounds to follow certain safety procedures, including the use of personal protective equipment such as respirators, chemical goggles, and protective clothing. Relevant studies and third-party peer review of our technology have concluded that the risk of exposure to cadmium or cadmium compounds from our end-products is negligible. In addition, the risk of exposure is further minimized by the encapsulated nature of these materials in our products, the physical properties of cadmium compounds used in our products, and the recycling or responsible disposal of our modules. While we believe that these factors and procedures are sufficient to protect our associates, end-users, and the general public from adverse health effects that may arise from cadmium exposure, we cannot ensure that human or environmental exposure to cadmium or cadmium compounds used in our products will not occur. Any such exposure could result in future third-party claims against us, damage to our reputation, and heightened regulatory scrutiny, which could limit or impair our ability to sell and distribute our products. The occurrence of future events such as these could have a material adverse effect on our business, financial condition, and results of operations.

The use of cadmium or cadmium compounds in various products is also coming under increasingly stringent governmental regulation. Future regulation in this area could impact the manufacturing, sale, collection, and recycling of solar modules and could require us to make unforeseen environmental expenditures or limit our ability to sell and distribute our products. For example, European Union Directive 2011/65/EU on the Restriction of the Use of Hazardous

Substances in electrical and electronic equipment (recast RoHS Directive) restricts the use of certain hazardous substances, including cadmium and its compounds, in specified products. Other jurisdictions, such as China, have adopted similar legislation or are considering doing so. Currently, PV solar modules are explicitly excluded from the scope of recast RoHS (Article 2), as adopted by the European Parliament and the Council in June 2011. The next general review of the RoHS Directive is scheduled for 2021, involving a broader discussion of the existing scope. A scope review focusing on additional exclusions was proposed by the European Commission in 2017 under the EU's co-decision process which allows the European Parliament and the European Council to amend the European Commission's proposal on exclusions. The co-decision procedure was completed in 2017 and the existing exclusion of PV modules was maintained. If PV modules were to be included in the scope of future RoHS revisions without an exemption or exclusion, we would be required to redesign our solar modules to reduce cadmium and other affected hazardous substances to the maximum allowable concentration thresholds in the RoHS Directive in order to continue to offer them for sale within the EU. As such actions would be impractical, this type of regulatory development would effectively close the EU market to us, which could have a material adverse effect on our business, financial condition, and results of operations.

As an owner and operator of PV solar power systems that deliver electricity to the grid, certain of our affiliated entities may be regulated as public utilities under U.S. federal and state law, which could adversely affect the cost of doing business and limit our growth.

As an owner and operator of PV solar power systems that deliver electricity to the grid, certain of our affiliated entities may be considered public utilities for purposes of the Federal Power Act, as amended (the "FPA"), and public utility companies for purposes of the Public Utility Holding Company Act of 2005 ("PUHCA 2005"), and are subject to regulation by the FERC, as well as various local and state regulatory bodies.

Some of our affiliated entities may be exempt wholesale generators or qualifying facilities under the Public Utility Regulatory Policies Act of 1978, as amended ("PURPA"), and as such are exempt from regulation under PUHCA 2005. In addition, our affiliated entities may be exempt from most provisions of the FPA, as well as state laws regarding the financial or organizational regulation of public utilities. We are not directly subject to FERC regulation under the FPA. However, we are considered to be a "holding company" for purposes of Section 203 of the FPA, which regulates certain transactions involving public utilities, and such regulation could adversely affect our ability to grow the business through acquisitions. Likewise, investors seeking to acquire our public utility subsidiaries or acquire ownership interests in our securities sufficient to give them control over us and our public utility subsidiaries may require prior FERC approval to do so. Such approval could result in transaction delays or uncertainties.

Public utilities under the FPA are required to obtain FERC acceptance of their rate schedules for wholesale sales of electricity and to comply with various regulations. The FERC may grant our affiliated entities the authority to sell electricity at market-based rates and may also grant them certain regulatory waivers, such as waivers from compliance with FERC's accounting regulations. These FERC orders reserve the right to revoke or revise market-based sales authority if the FERC subsequently determines that our affiliated entities can exercise market power in the sale of generation products, the provision of transmission services, or if it finds that any of the entities can create barriers to entry by competitors. In addition, if the entities fail to comply with certain reporting obligations, the FERC may revoke their power sales tariffs. Finally, if the entities were deemed to have engaged in manipulative or deceptive practices concerning their power sales transactions, they would be subject to potential fines, disgorgement of profits, and/or suspension or revocation of their market-based rate authority. If our affiliated entities were to lose their market-based rate authority, such companies would be required to obtain the FERC's acceptance of a cost-of-service rate schedule and could become subject to the accounting, record-keeping, and reporting requirements that are imposed on utilities with cost-based rate schedules, which would impose cost and compliance burdens on us and have an adverse effect on our results of operations. In addition to the risks described above, we may be subject to additional regulatory regimes at state or foreign levels to the extent we own and operate PV solar power systems in such jurisdictions.

Other Risks

We may not realize the anticipated benefits of past or future business combinations or acquisition transactions, and integration of business combinations may disrupt our business and management.

We have made several acquisitions in prior years and in the future we may acquire additional companies, project pipelines, products, or technologies or enter into joint ventures or other strategic initiatives. We may not realize the anticipated benefits of such business combinations or acquisitions, and each transaction has numerous risks. The risks associated with such transactions may include the following:

- difficulty in assimilating the operations and personnel of the acquired or partner company;
- difficulty in effectively integrating the acquired products or technologies with our current products or technologies;
- difficulty in achieving profitable commercial scale from acquired technologies;
- difficulty in maintaining controls, procedures, and policies during the transition and integration;
- disruption of our ongoing business and distraction of our management and associates from other opportunities and challenges due to integration issues;
- difficulty integrating the acquired or partner company's accounting, management information, and other administrative systems;
- difficulty managing joint ventures with our partners, potential litigation with joint venture partners, and reliance upon joint ventures that we do not control; for example, our ability to effectively manage 8point3 Energy Partners, LP (the "YieldCo" or the "Partnership"), the limited partnership formed with SunPower Corporation ("SunPower" and together with First Solar, the "Sponsors");
- inability to retain key technical and managerial personnel of the acquired business;
- inability to retain key customers, vendors, and other business partners of the acquired business;
- inability to achieve the financial and strategic goals for the acquired and combined businesses, as a result of insufficient capital resources or otherwise;
- incurring acquisition-related costs or amortization costs for acquired intangible assets that could impact our operating results;
- potential impairment of our relationships with our associates, customers, partners, distributors, or third-party providers of products or technologies;
- potential failure of the due diligence processes to identify significant issues with product quality, legal and financial liabilities, among other things;
- potential inability to assert that internal controls over financial reporting are effective;
- potential inability to obtain, or obtain in a timely manner, approvals from governmental authorities, which could delay or prevent such acquisitions; and
- potential delay in customer purchasing decisions due to uncertainty about the direction of our product offerings.

Mergers and acquisitions of companies are inherently risky, and ultimately, if we do not complete the integration of acquired businesses successfully and in a timely manner, we may not realize the anticipated benefits of the acquisitions to the extent anticipated, which could adversely affect our business, financial condition, or results of operations. In addition, we may seek to dispose of our interests in acquired companies, project pipelines, products, or technologies. We may not recover our initial investment in such interests, in part or at all, which could adversely affect our business, financial condition, or results of operations.

We may be unable to complete the sale of our interests in 8point3 Energy Partners LP on the terms and in the timeframe anticipated, or at all, and if we are unable to complete such sale, we may continue to hold the interests and may not be able to achieve the full strategic and financial benefits expected to result from the formation of the Partnership, or the sale could result in shareholder litigation.

In June 2015, the Partnership formed by the Sponsors completed its initial public offering (the "IPO"). The YieldCo is a joint venture vehicle into which we and SunPower each contributed a portfolio of selected solar generation assets from our existing portfolios of assets. Since the formation of the Partnership, we and SunPower have, from time to time, sold interests in solar projects to the Partnership. We launched the YieldCo to enable a competitive cost of capital and greater optionality in the project sales process for a portion of our future project sales.

In February 2018, we entered into an agreement (the "Merger Agreement") with CD Clean Energy and Infrastructure V JV, LLC, an equity fund managed by Capital Dynamics and certain other co-investors and certain other parties, pursuant to which such parties agreed to acquire our interests in the Partnership and its subsidiaries (the "Transaction"). The closing of the Transaction is subject to various conditions, including, among others, approval by the YieldCo's shareholders, and the receipt of consents from third parties and governmental approvals, including approval under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, FERC Section 203 approval, and the approval of the Committee on Foreign Investment in the United States. Known and unknown risks, uncertainties, and other factors could impact the satisfaction of these conditions and therefore the expected timing and likelihood of completion of the Transaction. Failure or delay to satisfy these or other conditions may have adverse consequences, including that the market price of the YieldCo's shares may decline, to the extent that their current market price reflects a market assumption that the Transaction will be completed, certain costs relating to the Transaction, such as certain financial advisor and legal fees, must be paid even if the Transaction is not completed, and our business, financial condition, and results of operations could be materially adversely affected. The YieldCo and Capital Dynamics also have the ability to terminate the Merger Agreement in certain circumstances. If we are unable to close the Transaction, we may continue to hold the interests and may not be able to realize the strategic and financial benefits that we expect to derive from our YieldCo strategy and our investment in the Yieldco. If the Transaction is not completed, we will have to reassess our long-term strategy with respect to our continued ownership of our interests in the YieldCo.

In addition, we may be subject to class action lawsuits relating to the Transaction, and other additional lawsuits that may be filed. Such litigation is common in connection with acquisitions of public companies, regardless of any merits related to the underlying acquisition. While we will evaluate and defend against any actions vigorously, the costs of the defense of such lawsuits and other effects of such litigation could have an adverse effect on our business, financial condition, and operating results.

The viability of the YieldCo strategy and the Transaction are also subject to the risks described in the YieldCo's Annual Report on Form 10-K. In addition, due to the joint venture nature of the YieldCo, we do not exercise control over the YieldCo in the same manner that we could over our wholly-owned subsidiaries, and, as such, the viability of the YieldCo strategy and the Transaction also depend, in part, on our ability to effectively manage our business relationships with SunPower. If we are unable to achieve the strategic and financial benefits expected to result from the YieldCo strategy and the Transaction, our business, financial condition, and results of operations could be materially adversely affected. See Note 12. "Investments in Unconsolidated Affiliates and Joint Ventures" to our consolidated financial statements included in this Annual Report on Form 10-K for additional information regarding the Partnership.

We are subject to litigation risks, including securities class actions and stockholder derivative actions, which may be costly to defend and the outcome of which is uncertain.

From time to time, we are subject to legal claims, with and without merit, that may be costly and which may divert the attention of our management and our resources in general. In addition, our projects may be subject to litigation or other adverse proceedings that may adversely impact our ability to proceed with construction or sell a given project, which may adversely affect our ability to recognize revenue with respect to such project. The results of complex legal proceedings are difficult to predict. Moreover, many of the complaints filed against us do not specify the amount of damages that plaintiffs seek, and we therefore are unable to estimate the possible range of damages that might be incurred should these lawsuits be resolved against us. Certain of these lawsuits assert types of claims that, if resolved against us, could give rise to substantial damages, and an unfavorable outcome or settlement of one or more of these lawsuits, or any future lawsuits, may result in a significant monetary judgment or award against us or a significant monetary payment by us, and could have a material adverse effect on our business, financial condition, or results of operations. Even if these lawsuits, or any future lawsuits, are not resolved against us, the costs of defending such lawsuits may be significant and may not be covered by our insurance policies. Because the price of our common stock has been, and may continue to be, volatile, we can provide no assurance that additional securities or other litigation will not be filed against us in the future. See Note 15. "Commitments and Contingencies – Legal Proceedings" to our consolidated financial statements included in this Annual Report on Form 10-K for more information on our legal proceedings, including our securities class action and derivative actions.

Our future success depends on our ability to retain our key associates and to successfully integrate them into our management team.

We are dependent on the services of our executive officers and other members of our senior management team. The loss of one or more of these key associates or any other member of our senior management team could have a material adverse effect on our business. We may not be able to retain or replace these key associates and may not have adequate succession plans in place. Several of our current key associates including our executive officers are subject to employment conditions or arrangements that contain post-employment non-competition provisions. However, these arrangements permit the associates to terminate their employment with us upon little or no notice and the enforceability of the non-competition provisions in certain jurisdictions is uncertain.

If we are unable to attract, train, and retain key personnel, our business may be materially and adversely affected; any regulatory compliance failure with respect to applicable labor laws and regulations, including the Davis-Bacon and Related Acts, could have an adverse effect on us.

Our future success depends, to a significant extent, on our ability to attract, train, and retain management, operations, sales, training, and technical personnel, including personnel in foreign jurisdictions. Recruiting and retaining capable personnel, particularly those with expertise in the PV solar industry across a variety of technologies, are vital to our success. There is substantial competition for qualified technical personnel, and while we continue to benchmark our organization against the broad spectrum of business in our market space to remain economically competitive, there can be no assurances that we will be able to attract and retain our technical personnel. If we are unable to attract and retain qualified associates, or otherwise experience unexpected labor disruptions within our business, we may be materially and adversely affected.

Labor used on some of our job sites may be subject to the Davis-Bacon and Related Acts (collectively, "Davis-Bacon"). Davis-Bacon requires that personnel assigned to the project be paid at least the prevailing wage and fringe benefits, as established by and in accordance with the regulations promulgated by the U.S. Department of Labor ("DOL"). We have an established policy pursuant to which we evaluate Davis-Bacon requirements in conjunction with our subcontractors and ensure our collective compliance with these requirements. If it is determined that any person working under Davis-Bacon requirements on First Solar projects is not properly classified, is being paid the incorrect prevailing wage, or has not been paid fringe benefits to which he or she was entitled, we could incur additional liability with respect to such worker or be exposed to other adverse outcomes.

We may be exposed to infringement or misappropriation claims by third parties, which, if determined adversely to us, could cause us to pay significant damage awards or prohibit us from the manufacture and sale of our solar modules or the use of our technology.

Our success depends largely on our ability to use and develop our technology and know-how without infringing or misappropriating the intellectual property rights of third parties. The validity and scope of claims relating to PV solar technology patents involve complex scientific, legal, and factual considerations and analysis and, therefore, may be highly uncertain. We may be subject to litigation involving claims of patent infringement or violation of intellectual property rights of third parties. The defense and prosecution of intellectual property suits, patent opposition proceedings, and related legal and administrative proceedings can be both costly and time consuming and may significantly divert the efforts and resources of our technical and management personnel. An adverse determination in any such litigation or proceedings to which we may become a party could subject us to significant liability to third parties, require us to seek licenses from third parties, which may not be available on reasonable terms, or at all, or pay ongoing royalties, require us to redesign our solar modules, or subject us to injunctions prohibiting the manufacture and sale of our solar modules or the use of our technologies. Protracted litigation could also result in our customers or potential customers deferring or limiting their purchase or use of our solar modules until the resolution of such litigation.

Currency translation and transaction risk may negatively affect our results of operations.

Although our reporting currency is the U.S. dollar, we conduct certain business and incur costs in the local currency of most countries in which we operate. As a result, we are subject to currency translation and transaction risk. For example, certain of our net sales in 2017 were denominated in foreign currencies, such as Euros and Indian rupees, and we expect to continue to have net sales denominated in foreign currencies in the future. Joint ventures or other business arrangements with strategic partners outside of the United States have involved, and in the future may involve, significant investments denominated in local currencies. Changes in exchange rates between foreign currencies and the U.S. dollar could affect our results of operations and result in exchange gains or losses. We cannot accurately predict the impact of future exchange rate fluctuations on our results of operations.

We could also expand our business into emerging markets, many of which have an uncertain regulatory environment relating to currency policy. Conducting business in such emerging markets could cause our exposure to changes in exchange rates to increase, due to the relatively high volatility associated with emerging market currencies and potentially longer payment terms for our proceeds.

Our ability to hedge foreign currency exposure is dependent on our credit profile with the banks that are willing and able to do business with us. Deterioration in our credit position or a significant tightening of the credit market conditions could limit our ability to hedge our foreign currency exposures; and therefore, result in exchange gains or losses.

Our largest stockholder has significant influence over us and his interests may conflict with or differ from interests of other stockholders.

Our largest stockholder, Lukas T. Walton (the "Significant Stockholder"), owned approximately 22% of our outstanding common stock as of December 31, 2017. As a result, the Significant Stockholder has substantial influence over all matters requiring stockholder approval, including the election of our directors and the approval of significant corporate transactions such as mergers, tender offers, and the sale of all or substantially all of our assets. The interests of the Significant Stockholder could conflict with or differ from interests of other stockholders. For example, the concentration of ownership held by the Significant Stockholder could delay, defer, or prevent a change of control of our company or impede a merger, takeover, or other business combination, which other stockholders may view favorably.

If our long-lived assets or project related assets become impaired, we may be required to record significant charges to earnings.

We may be required to record significant charges to earnings should we determine that our long-lived assets or project related assets are impaired. Such charges may have a material impact on our financial position and results of operations. We review long-lived and project related assets for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. We consider a project commercially viable or recoverable if it is anticipated to be sold for a profit once it is either fully developed or fully constructed or if the expected operating cash flows from future power generation exceed the cost basis of the asset. If our projects are not considered commercially viable, we would be required to impair the respective assets.

Unanticipated changes in our tax provisions, the enactment of new tax legislation, or exposure to additional income tax liabilities could affect our profitability.

We are subject to income taxes in the jurisdictions in which we operate. In December 2017, the U.S. government enacted the Tax Act. The changes included in the Tax Act are broad and complex, and the final effects of the Tax Act, including those related to the mandatory one-time transition tax on certain accumulated earnings and profits of foreign corporate subsidiaries that may electively be paid over eight years, may differ from the estimates provided elsewhere in this Annual Report on Form 10-K, possibly materially, due to, among other things, changes in interpretations of the Tax Act, any legislative action to address questions that arise because of the Tax Act, any changes in accounting standards for income taxes or related interpretations in response to the Tax Act, any updates or changes to estimates utilized to calculate provisional amounts, or actions we may take as a result of the Tax Act. Additionally, longstanding international tax laws that determine each country's jurisdictional tax rights in cross-border international trade are evolving as a result of the base erosion and profit shifting reporting requirements recommended by the Organisation for Economic Co-operation and Development. As these and other tax laws and regulations change, our business, financial condition, and results of operations could be adversely affected.

We are subject to potential tax examinations in various jurisdictions, and taxing authorities may disagree with our interpretations of U.S. and foreign tax laws and may assess additional taxes. We regularly assess the likely outcomes of these examinations in order to determine the appropriateness of our tax provision; however, the outcome of tax examinations cannot be predicted with certainty. Therefore, the amounts ultimately paid upon resolution of such examinations could be materially different from the amounts previously included in our income tax provision, which could have a material impact on our results of operations and cash flows.

In addition, our future effective tax rate could be adversely affected by changes to our operating structure, losses of tax holidays, changes in the jurisdictional mix of earnings among countries with tax holidays or differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, changes in tax laws, and the discovery of new information in the course of our tax return preparation process. Any changes in our effective tax rate may materially and adversely impact our results of operations.

Cyber-attacks or other breaches of our information systems, or those of third parties with which we do business, could have a material adverse effect on our financial condition and results of operations.

Our operations rely on our computer systems, hardware, software, and networks, as well as those of the third parties with which we do business, to securely process, store, and transmit proprietary, confidential, and other information, including intellectual property. Such information systems may be compromised by cyber-attacks, computer viruses, and other events that could be materially disruptive to our business operations and could put the security of our information, and that of the third parties with which we do business, at risk of misappropriation or destruction. In recent years, such cyber incidents have become increasingly frequent and sophisticated, targeting or otherwise affecting a wide range of companies. While we have instituted security measures to minimize the likelihood and impact of a cyber incident, there is no assurance that these measures, or those of the third parties with which we do business, will be adequate in the future. If these measures fail, valuable information may be lost; our manufacturing, development,

construction, O&M, and other operations may be disrupted; and our reputation may suffer. We may also be subject to litigation, regulatory action, remedial expenses, and financial losses beyond the scope or limits of our insurance coverage. These consequences of a failure of security measures could, individually or in the aggregate, have a material adverse effect on our financial condition and results of operations.

Changes in, or any failure to comply with, privacy laws, regulations, and standards may adversely affect our business.

Personal privacy and data security have become significant issues in the United States, Europe, and in many other jurisdictions in which we operate. The regulatory framework for privacy and security issues worldwide is rapidly evolving and is likely to remain uncertain for the foreseeable future. For example, in 2015 the Court of Justice of the European Union ruled that the U.S.-EU Safe Harbor framework, which provided U.S. companies with a streamlined means of complying with the EU's Data Protection Directive regarding the treatment of customers' and employees' personal information and other privacy matters, and upon which we relied for the transfer of personal data from the EU to the U.S., was invalid. As a result of such invalidation, we have implemented data transfer agreements between certain of our U.S. and EU based entities. Furthermore, state, federal, or foreign government bodies or agencies have in the past adopted, and may in the future adopt, laws and regulations affecting data privacy, all of which may be subject to invalidation by relevant foreign judicial bodies. Industry organizations also regularly adopt and advocate for new standards in this area.

In the United States, these include rules and regulations promulgated under the authority of federal agencies and state attorneys general and legislatures and consumer protection agencies. Internationally, many jurisdictions in which we operate have established their own data security and privacy legal framework with which we or our customers must comply, including but not limited to, the Data Protection Directive established in the EU and data protection legislation of the individual member states subject to such directive. The Data Protection Directive will be replaced in May 2018 by the pending European General Data Protection Regulation, a broad-based data privacy regime that will impose additional obligations, penalties, and risk upon our business. In many jurisdictions, enforcement actions and consequences for noncompliance are also rising. In addition to government regulation, privacy advocates and industry groups may propose new and different self-regulatory standards that either legally or contractually apply to us. Any inability or perceived inability to adequately address privacy and security concerns, even if unfounded, or comply with applicable privacy and data security laws, regulations, and policies, could result in additional cost and liability to us, damage our reputation, inhibit sales, and adversely affect our business.

Our credit agreements contain covenant restrictions that may limit our ability to operate our business.

We may be unable to respond to changes in business and economic conditions, engage in transactions that might otherwise be beneficial to us, and obtain additional financing, if needed, because the senior secured credit facility made available under our amended and restated credit agreement with several financial institutions as lenders and JPMorgan Chase Bank, N.A. as administrative agent (the "Revolving Credit Facility") and certain of our project financing arrangements contain, and other future debt agreements may contain, covenant restrictions that limit our ability to, among other things:

- incur additional debt, assume obligations in connection with letters of credit, or issue guarantees;
- create liens;
- enter into certain transactions with our affiliates;
- sell certain assets; and
- declare or pay dividends, make other distributions to stockholders, or make other restricted payments.

Under our Revolving Credit Facility and certain of our project financing arrangements, we are also subject to certain financial covenants. Our ability to comply with covenants under our credit agreements is dependent on our future performance or the performance of specifically financed projects, which will be subject to many factors, some of which are beyond our control, including prevailing economic conditions. In addition, our failure to comply with these covenants could result in a default under these agreements and any of our other future debt agreements, which if not cured or waived, could permit the holders thereof to accelerate such debt and could cause cross-defaults under our other facility agreements and the possible acceleration of debt under such agreements, as well as cross-defaults under certain of our key project and operational agreements and could also result in requirements to post additional security instruments to secure future obligations. In addition, we cannot assure you that events that occur within the Company, or in the industry or the economy as a whole, will not constitute material adverse effects under these agreements. If it is determined that a material adverse effect has occurred, the lenders can, under certain circumstances, restrict future borrowings or accelerate the due date of outstanding amounts. If any of our debt is accelerated, we may not have sufficient funds available to repay such debt and may experience cross-defaults under our other debt or operational agreements, which could materially and adversely affect our business, financial condition, and results of operations.

Item 1B. ***Unresolved Staff Comments***

None.

Item 2. ***Properties***

As of December 31, 2017, our principal properties consisted of the following:

Nature	Primary Segment(s) Using Property	Location	Held
Corporate headquarters	Modules & Systems	Tempe, Arizona, United States	Lease
Manufacturing plant, R&D facility, and administrative offices	Modules	Perrysburg, Ohio, United States	Own
Administrative offices	Systems	San Francisco, California, United States	Lease
R&D facility	Modules & Systems	Santa Clara, California, United States	Lease
Manufacturing plant and administrative offices	Modules	Kulim, Kedah, Malaysia	Lease land, own buildings
Administrative offices	Modules & Systems	Georgetown, Penang, Malaysia	Lease
Manufacturing plant (1)	Modules	Ho Chi Minh City, Vietnam	Lease land, own buildings
Manufacturing plant (2)	Modules	Frankfurt/Oder, Germany	Own

(1) In July 2017, we announced our plans to utilize our manufacturing plant in Vietnam for production of our next generation Series 6 module technology.

(2) In December 2012, we ceased manufacturing at our German plant. Since its closure, we have continued to market such property for sale.

In addition, we lease small amounts of office and warehouse space in several other U.S. and international locations.

Item 3. ***Legal Proceedings***

See Note 15. "Commitments and Contingencies – Legal Proceedings" to our consolidated financial statements included in this Annual Report on Form 10-K for information regarding legal proceedings and related matters.

Item 4. ***Mine Safety Disclosures***

None.

PART II

Item 5. *Market for Registrant's Common Equity, Related Stockholder Matters, and Issuer Purchases of Equity Securities*

Price Range of Common Stock

Our common stock is listed on NASDAQ under the symbol FSLR. The following table sets forth the range of high and low closing prices per share as reported on NASDAQ for the periods indicated:

	High	Low
2017		
First quarter	$ 37.90	$ 27.10
Second quarter	40.49	26.33
Third quarter	51.41	38.67
Fourth quarter	70.63	46.91
2016		
First quarter	$ 73.21	$ 60.99
Second quarter	67.48	44.23
Third quarter	49.24	34.00
Fourth quarter	42.25	29.21

The closing price of our common stock on NASDAQ was $65.85 per share on February 16, 2018. As of February 16, 2018, there were 48 record holders of our common stock, which does not reflect the beneficial ownership of shares held in nominee names.

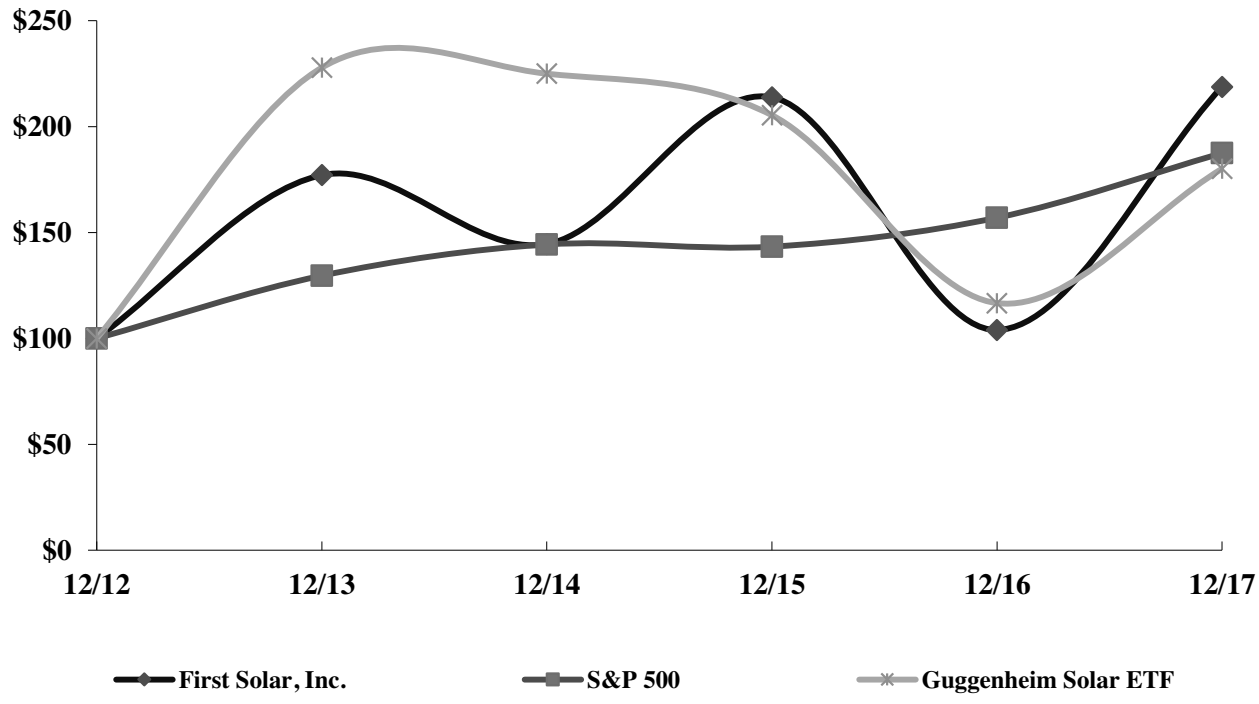
Dividend Policy

We have never paid, and it is our present intention for the foreseeable future not to pay, dividends on our common stock. Our Revolving Credit Facility imposes restrictions on our ability to declare or pay dividends. The declaration and payment of dividends is subject to the discretion of our board of directors and depends on various factors, including the continued applicability of the above-referenced restrictions under our Revolving Credit Facility, our net income, financial condition, cash requirements, future prospects, and other factors considered relevant by our board of directors. We expect to prioritize our working capital requirements, capacity expansion and other capital expenditure needs, project development and construction, and merger and acquisition opportunities prior to returning capital to our shareholders.

Stock Price Performance Graph

The following graph compares the five-year cumulative total return on our common stock relative to the cumulative total returns of the S&P 500 Index and the Guggenheim Solar ETF, which represents a peer group of solar companies. In the stock price performance graph included below, an investment of $100 (with reinvestment of all dividends) is assumed to have been made in our common stock, the S&P 500 Index, and the Guggenheim Solar ETF on December 31, 2012, and its relative performance is tracked through December 31, 2017. This performance graph is not "soliciting material," is not deemed filed with the SEC, and is not to be incorporated by reference in any filing by us under the Securities Act or the Exchange Act, whether made before or after the date hereof, and irrespective of any general incorporation language in any such filing. The stock price performance shown on the graph represents past performance and should not be considered an indication of future price performance.

COMPARISON OF FIVE-YEAR CUMULATIVE TOTAL RETURN*
Among First Solar, the S&P 500 Index,
and the Guggenheim Solar ETF



* $100 invested on December 31, 2012 in stock or index, including reinvestment of dividends. Index calculated on a month-end basis.

Recent Sales of Unregistered Securities

None.

Purchases of Equity Securities by the Issuer and Affiliate Purchases

None.

Item 6. ***Selected Financial Data***

The following tables set forth our selected financial data for the periods and at the dates indicated. The selected financial data from the consolidated statements of operations and consolidated statements of cash flows for the years ended December 31, 2017, 2016, and 2015 and the selected financial data from the consolidated balance sheets as of December 31, 2017 and 2016 have been derived from the audited consolidated financial statements included in this Annual Report on Form 10-K. The selected financial data from the consolidated statements of operations and consolidated statements of cash flows for the years ended December 31, 2014 and 2013 and the selected financial data from the consolidated balance sheets as of December 31, 2015, 2014, and 2013 have been derived from audited consolidated financial statements not included in this Annual Report on Form 10-K. The information presented below should also be read in conjunction with our consolidated financial statements and the related notes thereto and Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations."

For the years ended December 31, 2016 and 2015, we have recast certain of the following financial data as a result of the adoption of ASU 2014-09. See Note 3. "Recent Accounting Pronouncements" to our consolidated financial statements included in this Annual Report on Form 10-K for further information regarding these changes.

	Years Ended				
	December 31, 2017	December 31, 2016	December 31, 2015	December 31, 2014	December 31, 2013
	(In thousands, except per share amounts)				
Net sales	$ 2,941,324	$ 2,904,563	$ 4,112,650	$ 3,391,187	$ 3,309,616
Gross profit	548,947	638,418	1,132,762	824,941	864,632
Operating income (loss)	177,851	(568,151)	730,159	421,999	370,407
Net (loss) income	(165,615)	(416,112)	593,406	395,964	350,718
Net (loss) income per share:					
Basic	$ (1.59)	$ (4.05)	$ 5.88	$ 3.96	$ 3.74
Diluted	$ (1.59)	$ (4.05)	$ 5.83	$ 3.90	$ 3.67
Cash dividends declared per common share	$ —	$ —	$ —	$ —	$ —
Net cash provided by (used in) operating activities	$ 1,340,677	$ 206,753	$ (325,209)	$ 735,516	$ 856,126
Net cash (used in) provided by investing activities	(626,802)	144,520	(156,177)	(387,818)	(537,106)
Net cash provided by (used in) financing activities	192,045	(136,393)	101,207	(46,907)	101,164

	December 31, 2017	December 31, 2016	December 31, 2015	December 31, 2014	December 31, 2013
			(In thousands)		
Cash and cash equivalents	$ 2,268,534	$ 1,347,155	$ 1,126,826	$ 1,482,054	$ 1,325,072
Marketable securities	720,379	607,991	703,454	509,032	439,102
Total assets	6,864,501	6,824,368	7,360,392	6,720,991	6,876,586
Total long-term debt	393,540	188,388	289,415	213,473	223,323
Total liabilities	1,765,804	1,606,019	1,741,996	1,729,504	2,408,516
Total stockholders' equity	5,098,697	5,218,349	5,618,396	4,991,487	4,468,070

Item 7. *Management's Discussion and Analysis of Financial Condition and Results of Operations*

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes thereto included in this Annual Report on Form 10-K. In addition to historical consolidated financial information, the following discussion and analysis contains forward-looking statements that involve risks, uncertainties, and assumptions as described under the "Note Regarding Forward-Looking Statements" that appears earlier in this Annual Report on Form 10-K. Our actual results could differ materially from those anticipated by 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.

Executive Overview

We are a leading global provider of comprehensive PV solar energy solutions. We design, manufacture, and sell PV solar modules with an advanced thin film semiconductor technology and also develop, design, construct, and sell PV solar power systems that primarily use the modules we manufacture. Additionally, we provide O&M services to system owners. We have substantial, ongoing R&D efforts focused on module and system-level innovations. We are the world's largest thin film PV solar module manufacturer and one of the world's largest PV solar module manufacturers. Our mission is to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership, and operational excellence.

Certain highlights of our financial results and other key operational developments for the year ended December 31, 2017 include the following:

- Net sales in 2017 were $2.9 billion, which was consistent with net sales in 2016. Such results were primarily driven by the sale of the Moapa, California Flats, Switch Station, and Cuyama projects in 2017, together with an increase in third-party module sales in 2017 compared to 2016, offset by the completion of substantially all construction activities on a number of projects in 2016, including the Desert Stateline, Astoria, Taylor, East Pecos, Silver State South, Butler, and McCoy projects.

- Gross profit decreased 3.3 percentage points to 18.7% during 2017 from 22.0% during 2016 primarily due to a mix of lower gross profit projects sold and under construction during the period and reductions in the average selling price per watt of our modules sold directly to third parties, partially offset by reductions in our product warranty liability and our module collection and recycling liability.

- As of December 31, 2017, we had 18 installed production lines at our manufacturing facilities in Perrysburg, Ohio and Kulim, Malaysia. We produced 2.3 GW of solar modules during 2017, which represented a 26% decrease from 2016. The decrease in production was primarily driven by our previously announced plans to ramp down production of our Series 4 modules and transition to Series 6 module manufacturing over the next several years. We expect to produce approximately 3.1 GW of solar modules during 2018, including approximately 1 GW of Series 6 modules.

- In November 2017, we produced our initial Series 6 modules at our manufacturing facility in Perrysburg, Ohio. We continue to qualify such modules for commercial production and expect the Ohio facility to begin commercial production in early 2018. In late 2017, we also began installing Series 6 production lines at our facility in Kulim, Malaysia.

- During 2017, we ran our manufacturing facilities at approximately 99% capacity utilization, which represented a 2.0 percentage point increase from 2016.

- The average conversion efficiency of our modules produced in 2017 was 16.9%, which represented an improvement of 0.5 percentage points from our average conversion efficiency of 16.4% in 2016.

Market Overview

The solar industry continues to be characterized by intense pricing competition, both at the module and system levels. In particular, module average selling prices in the United States and several other key markets have experienced an accelerated decline in recent years, and module average selling prices are expected to continue to decline globally to some degree in the future. In the aggregate, we believe manufacturers of solar cells and modules have significant installed production capacity, relative to global demand, and the ability for additional capacity expansion. We believe the solar industry may from time to time experience periods of structural imbalance between supply and demand (i.e., where production capacity exceeds global demand), and that such periods will put pressure on pricing. Additionally, intense competition at the system level may result in an environment in which pricing falls rapidly, thereby further

increasing demand for solar energy solutions but constraining the ability for project developers, EPC companies, and vertically-integrated solar companies such as First Solar to sustain meaningful and consistent profitability. In light of such market realities, we are focusing on our strategies and points of differentiation, which include our advanced module and system technologies, our manufacturing process, our vertically-integrated business model, our financial viability, and the sustainability of our modules and systems.

Worldwide solar markets continue to develop, in part aided by demand elasticity resulting from declining industry average selling prices, both at the module and system levels, which make solar power more affordable. We are developing, constructing, and operating multiple solar projects around the world as we continue to execute on our advanced-stage utility-scale project pipeline. We expect a significant portion of our future consolidated net sales, operating income, and cash flows to be derived from such projects. We also continue to develop our early-to-mid-stage project pipeline and evaluate acquisitions of projects to further expand both our early-to-mid-stage and advanced-stage project pipelines. See the tables under "Management's Discussion and Analysis of Financial Condition and Results of Operations – Systems Project Pipeline" for additional information about projects within our advanced-stage project pipeline.

Lower industry module and system pricing, while currently challenging for certain solar manufacturers (particularly manufacturers with higher cost structures), is expected to continue to contribute to diversification in global electricity generation and further demand for solar energy solutions. Over time, we believe that solar energy generation will experience widespread adoption in those applications where it competes economically with traditional forms of energy generation. In the near term, however, declining average selling prices are expected to adversely affect our results of operations relative to prior years. If competitors reduce pricing to levels below their costs; bid aggressively low prices for module sale agreements, EPC agreements, and PPAs; or are able to operate at minimal or negative operating margins for sustained periods of time, our results of operations could be further adversely affected. In certain markets in California and elsewhere, an oversupply imbalance at the grid level may further contribute to reduce short-to-medium term demand for new solar installations relative to prior years, lower PPA pricing, and lower margins on module and system sales to such markets. We continue to mitigate these uncertainties in part by executing on our module technology improvements, including our transition to Series 6 module manufacturing, continuing the development of key markets, and implementing certain other cost reduction initiatives, including both manufacturing, BoS, and other operating costs.

We face intense competition from manufacturers of crystalline silicon solar modules and developers of solar power projects. Solar module manufacturers compete with one another on price and on several module value attributes, including conversion efficiency, energy yield, and reliability, and developers of systems compete on various factors such as net present value, return on equity, and LCOE. As noted above, competition on the basis of selling price per watt has intensified in recent years, which has contributed to declines in module average selling prices in several key markets. Many crystalline silicon cell and wafer manufacturers are transitioning from lower efficiency BSF multi-crystalline cells (the legacy technology against which we have generally competed in our markets) to higher efficiency PERC multi-crystalline and mono-crystalline cells at competitive cost structures. Additionally, while conventional solar modules, including the solar modules we produce, are monofacial, meaning their ability to produce energy is a function of direct and diffuse irradiance on their front side, certain manufacturers of mono-crystalline PERC solar modules are pursuing the commercialization of bifacial modules that also capture diffuse irradiance on the back side of a module. We believe the cost effective manufacture of bifacial PERC modules is being enabled by the expansion of inexpensive crystal growth and diamond wire saw capacity in China. Bifaciality compromises nameplate efficiency, but by converting both front and rear side irradiance, such technology can improve the overall energy production of a module relative to nameplate efficiency when applied in certain applications and BoS configurations, which could potentially lower the overall LCOE of a system when compared to systems using conventional solar modules, including the modules we produce.

We believe we are among the lowest cost PV module manufacturers in the solar industry on a module cost per watt basis, based on publicly available information. This cost competitiveness allows us to compete favorably in markets where pricing for modules and fully integrated PV solar power systems is highly competitive. Our cost competitiveness is based in large part on our module conversion efficiency, proprietary manufacturing technology (which enables us to

produce a CdTe module in less than 3.5 hours using a continuous and highly automated industrial manufacturing process, as opposed to a batch process), and our operational excellence. In addition, our CdTe modules use approximately 1-2% of the amount of semiconductor material that is used to manufacture traditional crystalline silicon solar modules. The cost of polysilicon is a significant driver of the manufacturing cost of crystalline silicon solar modules, and the timing and rate of change in the cost of silicon feedstock and polysilicon could lead to changes in solar module pricing levels. Polysilicon costs have had periods of decline over the past several years, and polysilicon consumption per cell has been reduced through various initiatives, such as the adoption of diamond wire saw technology, contributing to a decline in our relative manufacturing cost competitiveness over traditional crystalline silicon module manufacturers.

Given the smaller size (sometimes referred to as form factor) of our current Series 4 modules compared to certain types of crystalline silicon modules, we may incur higher labor and BoS costs associated with the construction of systems using our Series 4 modules. Thus, to compete effectively on an LCOE basis, our Series 4 modules may need to maintain a certain cost advantage per watt compared to crystalline silicon-based modules with larger form factors. We recently introduced our next generation Series 6 module technology, which is expected to enable the production of modules with a larger form factor along with better product attributes and a lower manufacturing cost structure. Accordingly, the larger form factor of our Series 6 modules is expected to reduce the number of electrical connections and hardware required for system installation. The resulting labor and material savings are expected to represent a significant improvement compared to current technologies and a substantial reduction in total installed system costs resulting in improved project returns as BoS costs represent a significant portion of the costs associated with the construction of a typical utility-scale system.

In terms of energy yield, in many climates, our CdTe modules provide a significant energy production advantage over most conventional crystalline silicon solar modules (including BSF and PERC technologies) of equivalent efficiency rating. For example, our CdTe solar modules provide a superior temperature coefficient, which results in stronger system performance in typical high insolation climates as the majority of a system's generation, on average, occurs when module temperatures are well above 25°C (standard test conditions). In addition, our CdTe modules provide a superior spectral response in humid environments where atmospheric moisture alters the solar spectrum relative to laboratory standards. Our CdTe solar modules also provide a better shading response than conventional crystalline silicon solar modules, which may lose up to three times as much power as CdTe solar modules when shading occurs. As a result of these and other factors, our PV solar power systems typically produce more annual energy in real world field conditions than competing systems with the same nameplate capacity.

While our modules and systems are generally competitive in cost, reliability, and performance attributes, there can be no guarantee such competitiveness will continue to exist in the future to the same extent or at all. Any declines in the competitiveness of our products could result in additional margin compression, further declines in the average selling prices of our modules and systems, erosion in our market share for modules and systems, and/or declines in overall net sales. We continue to focus on enhancing the competitiveness of our solar modules and systems by accelerating progress along our module technology and cost reduction roadmaps, continuing to make technological advances at the system level, using innovative installation techniques and know-how, and leveraging volume procurement around standardized hardware platforms.

Certain Trends and Uncertainties

We believe that our operations may be favorably or unfavorably impacted by the following trends and uncertainties that may affect our financial condition and results of operations. See Item 1A. "Risk Factors" and elsewhere in this Annual Report on Form 10-K for a discussion of other risks that may affect our financial condition and results of operations.

Our long-term strategic plans are focused on our goal to create long-term shareholder value through a balance of growth, profitability, and liquidity. In executing such plans, we are focusing on providing utility-scale PV solar energy solutions using our modules in key geographic markets that we believe have a compelling need for mass-scale PV electricity, including markets throughout the Americas, the Asia-Pacific region, and certain other strategic markets. Additionally,

we are focusing on opportunities in which our PV solar energy solutions can compete directly with traditional forms of energy generation on an LCOE or similar basis, or complement such generation offerings. Such focus on our core module and utility-scale offerings exists within a current market environment that includes rooftop and distributed generation solar, particularly in the United States. While it is unclear how rooftop and distributed generation solar might impact our core utility-scale based offerings in the next several years, we believe that utility-scale solar will continue to be a compelling solar offering for companies with technology and cost leadership and will continue to represent an increasing portion of the overall electricity generation mix. Additionally, our ability to provide utility-scale offerings on economically attractive terms depends, in part, on certain market factors outside of our control, such as interest rate fluctuations, domestic or international trade policies, and government support programs. Adverse changes in these factors could increase the cost of utility-scale systems, which could reduce demand for such systems and limit the number of potential buyers.

We are closely evaluating and managing the appropriate level of resources required as we pursue the most advantageous and cost effective projects and partnerships in our key markets. We have dedicated, and intend to continue to dedicate, significant capital and human resources to reduce the total installed cost of PV solar energy, to optimize the design and logistics around our PV solar energy solutions, and to ensure that our solutions integrate well into the overall electricity ecosystem of each specific market. We expect that, over time, the majority of our consolidated net sales, operating income, and cash flows will come from solar offerings in the key geographic markets described above. The timing, execution, and financial impacts of our long-term strategic plans are subject to risks and uncertainties, as described in Item 1A. “Risk Factors,” and elsewhere in this Annual Report on Form 10-K. We are focusing our resources in those markets and energy applications in which solar power can be a least-cost, best-fit energy solution, particularly in regions with significant current or projected electricity demand, relatively high existing electricity prices, strong demand for renewable energy generation, and high solar resources.

Creating or maintaining a market position in certain strategically targeted markets and energy applications also requires us to adapt to new and changing market conditions. For example, our offerings from time to time may need to be competitively priced at levels associated with minimal gross profit margins, which may adversely affect our results of operations. We expect the profitability associated with our various sales offerings to vary from one another over time, and possibly vary from our internal long-range profitability expectations and targets, depending on the market opportunity and the relative competitiveness of our offerings compared with other energy solutions, traditional or otherwise, that are available to potential customers. In addition, as we execute on our long-term strategic plans, we will continue to monitor and adapt to any changing dynamics in emerging technologies, such as commercially viable energy storage solutions, which are expected to further enable PV solar power systems to compete with traditional forms of energy generation by shifting the delivery of energy generated by such systems to periods of greater demand. Such storage solutions continue to evolve in terms of technology and cost, and global deployments of storage capacity are expected to exceed 100 GW by 2030, representing a significant increase in the potential market for renewable energy. We will also continue to monitor and adapt to any changing dynamics in the market set of potential buyers of solar projects. Market environments with few potential project buyers and a higher cost of capital would generally exert downward pressure on the potential revenue from the solar projects we are developing, whereas, conversely, market environments with many potential project buyers and a lower cost of capital would likely have a favorable impact on the potential revenue from such solar projects.

On occasion, we may temporarily own and operate certain systems with the intention to sell them at a later date. We may also elect to construct and temporarily retain ownership interests in partially contracted or uncontracted systems for which there is a partial or no PPA with an off-taker, such as a utility, but rather an intent to sell a portion of or all the electricity produced by the system on an open contract basis until the system is sold. Expected revenue from projects without a PPA for the full offtake of the system is subject to greater variability and uncertainty based on market factors and is typically lower than projects with a fully contracted PPA. Additionally, our joint ventures and other business arrangements with strategic partners have and may in the future result in us temporarily retaining a noncontrolling ownership interest in the underlying systems projects we develop, supply modules to, or construct, potentially for a period of up to several years. In each of the above mentioned examples, we may retain such ownership interests in a consolidated or unconsolidated separate entity.

We continually evaluate forecasted global demand, competition, and our addressable market, and seek to effectively balance manufacturing capacity with market demand and the nature and extent of our competition. In July 2017, we announced our plans to utilize our idled Vietnamese manufacturing plant for production of our next generation Series 6 module technology. This decision is expected to provide us with several operational benefits, including (i) the ability to add additional Series 6 production lines without ramping down current Series 4 production, (ii) flexibility in production capacity during our Series 6 transition period, and (iii) installing Series 6 production lines in a facility that is substantially identical to our Malaysian manufacturing plant where such lines are currently being installed, which is expected to accelerate and facilitate a cost-effective installation. Our Vietnamese plant, including the recently announced expansion of a second Series 6 production line at the facility, and any other potential investments to add or otherwise modify our manufacturing capacity in response to market demand and competition may require significant internal and possibly external sources of liquidity and may be subject to certain risks and uncertainties described in Item 1A. "Risk Factors," including those described under the headings "Our future success depends on our ability to effectively balance manufacturing production with market demand, convert existing production facilities to support new product lines, such as our transition to Series 6 module manufacturing, and, when necessary, continue to build new manufacturing plants over time in response to such demand and add production lines in a cost-effective manner, all of which are subject to risks and uncertainties" and "If any future production lines are not built in line with our committed schedules, it may impair any future growth plans. If any future production lines do not achieve operating metrics similar to our existing production lines, our solar modules could perform below expectations and cause us to lose customers."

8point3 Energy Partners LP

In June 2015, the 8point Energy Partners LP or "the Partnership" completed its IPO. As part of the offering, we contributed interests in various projects to a subsidiary of the Partnership in exchange for an ownership interest in the entity. Since the formation of the Partnership, the Sponsors have, from time to time, sold interests in solar projects to the Partnership, which owns and operates a portfolio of solar energy generation projects.

In February 2018, we entered into an agreement with CD Clean Energy and Infrastructure V JV, LLC, an equity fund managed by Capital Dynamics and certain other co-investors and certain other parties, pursuant to which such parties agreed to acquire our interests in the Partnership and its subsidiaries. In connection with the Transaction, we entered into an agreement with Capital Dynamics and certain other parties, whereby we and SunPower have agreed, among other things, to vote to approve the Merger Agreement at any meeting of shareholders of the Partnership for such purpose, as shareholders of the Partnership and holders of equity units in OpCo.

For additional information on the Partnership, see Item 1A. "Risk Factors – We may be unable to complete the sale of our interests in 8point3 Energy Partners LP on the terms and in the timeframe anticipated, or at all, and if we are unable to complete such sale, we may continue to hold the interests and may not be able to achieve the full strategic and financial benefits expected to result from the formation of the Partnership, or the sale could result in shareholder litigation" and Note 12. "Investments in Unconsolidated Affiliates and Joint Ventures – 8point3 Energy Partners LP" to our consolidated financial statements included in this Annual Report on Form 10-K.

Systems Project Pipeline

The following tables summarize, as of February 22, 2018, our approximately 2.2 GW advanced-stage project pipeline. The actual volume of modules installed in our projects will be greater than the project size in MW_{AC} as module volumes required for a project are based upon MW_{DC}, which will be greater than the MW_{AC} size pursuant to a DC-AC ratio typically ranging from 1.2 to 1.3. Such ratio varies across different projects due to various system design factors. Projects are typically removed from our advanced-stage project pipeline tables below once we substantially complete construction of the project and after substantially all of the associated project revenue is recognized. Projects, or portions of projects, may also be removed from the tables below in the event an EPC-contracted or partner-developed project does not obtain permitting or financing, a project is not able to be sold due to the changing economics of the project or other factors, or we decide to temporarily own and operate, or retain interests in, such projects based on strategic opportunities or market factors.

Projects under Sales Agreements

(Includes uncompleted sold projects, projects under sales contracts subject to conditions precedent, and EPC agreements, including partner developed projects that we will be or are constructing.)

Project/Location	Project Size in MW_{AC}	PPA Contracted Partner	EPC Contract/Partner Developed Project	Expected Year Revenue Recognition Will Be Completed	% of Revenue Recognized as of December 31, 2017
California Flats, California	280	PG&E / Apple (1)	Capital Dynamics	2018	69%
Florida (multiple locations)	206	(2)	Tampa Electric Company	2018/2019	—%
India (multiple locations)	155	(3)	(5)	2018	—%
Cuyama, California	40	PG&E	D.E. Shaw Renewable Investments	2018	98%
Japan (multiple locations)	15	(4)	(6)	2018	—%
Total	696				

Projects with Executed PPA Not under Sales Agreements

Project/Location	Project Size in MW_{AC}	PPA Contracted Partner	Fully Permitted	Expected or Actual Substantial Completion Year	% Complete as of December 31, 2017
Twiggs County Solar, Georgia	200	Georgia Power Company	No	2019/2020	5%
Rosamond, California	150	SCE	Yes	2018	15%
Sun Streams, Arizona	150	SCE	Yes	2019	10%
Southwestern U.S.	150	(6)	Yes	2020/2021	4%
Luz del Norte, Chile	141	(7)	Yes	2016	100%
American Kings Solar, California	123	SCE	No	2020	16%
Willow Springs, California	100	SCE	Yes	2018	21%
Sunshine Valley, Nevada	100	SCE	Yes	2019	3%
Sun Streams 3, Arizona	65	APS	Yes	2020	—%
Beryl, Australia	61	(6)	Yes	2019	2%
Ishikawa, Japan	59	Hokuriku Electric Power Company	Yes	2018	62%
Japan (multiple locations)	84	(8)	No	2020	18%
Manildra, Australia	49	EnergyAustralia	Yes	2018	29%
Little Bear, California	40	Marin Clean Energy (9)	No	2020	5%
Miyagi, Japan	40	Tohoku Electric Power Company	No	2020	12%
India (multiple locations)	40	(10)	Yes	2017	100%
Total	1,552				

(1) PG&E – 150 MW_{AC} and Apple Energy, LLC – 130 MW_{AC}

(2) Utility-owned generation

(3) Southern Power Distribution Company of Telangana State Ltd – 75 MW_{AC} and Andhra Pradesh Southern Power Distribution Company Ltd – 80 MW_{AC}

(4) Hokuriku Electric Power Company, Tokyo Electric Power Company, and Tohoku Electric Power Company

(5) Vector Green Energy Private Limited and India Infrastructure Fund II

(6) Contracted but not specified

(7) PPAs executed for approximately 70 MW_{AC}; remaining electricity to be sold on an open contract basis

(8) Hokuriku Electric Power Company and Tokyo Electric Power Company

(9) Expandable to 160 MW_{AC}, subject to satisfaction of certain PPA contract conditions

(10) Gulbarga Electricity Supply Co. – 20 MW_{AC} and Chamundeshwari Electricity Supply Co. – 20 MW_{AC}

Results of Operations

The following table sets forth our consolidated statements of operations as a percentage of net sales for the years ended December 31, 2017, 2016, and 2015:

	Years Ended December 31,		
	2017	2016	2015
Net sales	100.0 %	100.0 %	100.0 %
Cost of sales	81.3 %	78.0 %	72.5 %
Gross profit	18.7 %	22.0 %	27.5 %
Selling, general and administrative	6.9 %	9.0 %	6.2 %
Research and development	3.0 %	4.3 %	3.2 %
Production start-up	1.4 %	— %	0.4 %
Restructuring and asset impairments	1.3 %	25.6 %	— %
Goodwill impairment	— %	2.6 %	— %
Operating income (loss)	6.0 %	(19.6)%	17.8 %
Foreign currency loss, net	(0.3)%	(0.5)%	(0.2)%
Interest income	1.2 %	0.9 %	0.5 %
Interest expense, net	(0.9)%	(0.7)%	(0.2)%
Other income (expense), net	0.8 %	1.4 %	(0.1)%
Income tax expense	(12.6)%	(0.8)%	(0.8)%
Equity in earnings of unconsolidated affiliates, net of tax	0.1 %	5.0 %	(2.6)%
Net (loss) income	(5.6)%	(14.3)%	14.4 %

Segment Overview

We operate our business in two segments. Our modules segment involves the design, manufacture, and sale of CdTe solar modules to third parties, and our systems segment includes the development, construction, operation, maintenance, and sale of PV solar power systems, including any modules installed in such systems and any revenue from energy generated by such systems. See Note 22. "Segment and Geographical Information" to our consolidated financial statements included in this Annual Report on Form 10-K for more information on our operating segments. See also Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations – Systems Project Pipeline" for a description of the system projects in our advanced-stage project pipeline.

Beginning with the three months ended December 31, 2017, we changed the composition of our reportable segments to align with revisions to our internal reporting structure and long-term strategic plans. As a result of this change, our modules segment, which was historically referred to as our components segment, includes module sales to third parties and excludes any module sales to our systems segment. Previously, we included an allocation of net sales value for all solar modules manufactured by our modules segment and installed in projects sold or built by our systems segment in the net sales of our modules segment. Our systems segment now includes all net sales from the sale of solar power systems and related products and services, including any modules installed in such systems and any revenue from energy generated by such systems. All prior year balances were revised to conform to the current year presentation.

Net sales

Modules Business

We generally price and sell our solar modules per watt of nameplate power. During 2017, Zorlu Enerji and RCR O'Donnell Griffin Pty, Ltd each accounted for more than 10% of our modules business net sales, and the majority of our solar modules were sold to integrators and operators of systems in the United States, India, and Turkey. Substantially all of our modules business net sales during 2017 were denominated in U.S. dollars. We recognize revenue for module sales at a point in time following the transfer of control of such products to the customer, which typically occurs upon shipment or delivery depending on the terms of the underlying contracts. The revenue recognition policies for module sales are further described in Note 2. "Summary of Significant Accounting Policies" to our consolidated financial statements included in this Annual Report on Form 10-K.

Systems Business

Through our fully integrated systems business, we provide complete turn-key PV solar power systems, or solar solutions, that draw upon our capabilities, which include (i) project development, (ii) EPC services, and (iii) O&M services. Additionally within our systems segment, we may temporarily own and operate certain of our systems for a period of time based on strategic opportunities or market factors. We typically recognize revenue for sales of solar power systems using cost based input methods, which result in revenue being recognized as work is performed based on the relationship between actual costs incurred compared to the total estimated costs for a given contract. We may also recognize revenue for the sale of a system after the project has been completed due to the timing of when we enter into the associated sales contract with the customer. The revenue recognition policies for our systems business are further described in Note 2. "Summary of Significant Accounting Policies" to our consolidated financial statements included in this Annual Report on Form 10-K.

During 2017, the majority of our systems business net sales were in North America, and the principal customer of our systems business was Capital Dynamics, which accounted for more than 10% of our systems business net sales.

The following table shows net sales by reportable segment for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Modules	$ 806,398	$ 675,452	$ 227,461	$ 130,946	19 %	$ 447,991	197 %
Systems	2,134,926	2,229,111	3,885,189	(94,185)	(4)%	(1,656,078)	(43)%
Net sales	$ 2,941,324	$ 2,904,563	$ 4,112,650	$ 36,761	1 %	$ (1,208,087)	(29)%

Net sales from our modules segment increased by $130.9 million in 2017 primarily due to a 68% increase in the volume of watts sold, partially offset by a 29% decrease in the average selling price per watt. Net sales from our systems segment decreased by $94.2 million in 2017 primarily as a result of the completion of substantially all construction activities on a number of projects in 2016, including the Desert Stateline, Astoria, Taylor, East Pecos, Silver State South, Butler, and McCoy projects, partially offset by the sale of the Moapa, California Flats, Switch Station, and Cuyama projects in 2017.

Net sales from our modules segment increased by $448.0 million in 2016 primarily due to a 211% increase in the volume of watts sold, partially offset by a 5% decrease in the average selling price per watt. Net sales from our systems segment decreased by $1.7 billion in 2016 primarily from the sale of majority interests in the Desert Stateline, North Star, and Lost Hills projects in 2015, the completion of substantially all construction activities on the Imperial Solar Energy Center West and Decatur projects in 2015, the completion of substantially all construction activities on the Silver State South and McCoy projects in the first half of 2016, and lower module plus sales transactions. This decrease in revenue was partially offset by higher revenue from the commencement of construction on the Taylor and Butler projects in late 2015, the commencement of construction on the East Pecos project in early 2016, and completion of substantially all construction activities on the Astoria project.

Cost of sales

Modules Business

Our modules business cost of sales includes the cost of raw materials and components for manufacturing solar modules, such as glass, transparent conductive coatings, CdTe and other thin film semiconductors, laminate materials, connector assemblies, and edge seal materials. In addition, our cost of sales includes direct labor for the manufacturing of solar modules and manufacturing overhead, such as engineering, equipment maintenance, environmental health and safety, quality and production control, information technology, and procurement costs. Our cost of sales also includes depreciation of manufacturing plant and equipment, facility-related expenses, and costs associated with shipping, warranties, and solar module collection and recycling (excluding accretion).

Systems Business

For our systems business, project-related costs include development costs (legal, consulting, transmission upgrade, interconnection, permitting, and other similar costs), EPC costs (consisting primarily of solar modules, inverters, electrical and mounting hardware, project management and engineering costs, and construction labor costs), and site specific costs.

The following table shows cost of sales by reportable segment for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Modules	$ 694,060	$ 564,942	$ 175,530	$ 129,118	23 %	$ 389,412	222 %
Systems	1,698,317	1,701,203	2,804,358	(2,886)	— %	(1,103,155)	(39)%
Cost of sales	$ 2,392,377	$ 2,266,145	$ 2,979,888	$ 126,232	6 %	$ (713,743)	(24)%
% of net sales	81.3%	78.0%	72.5%				

Cost of sales increased $126.2 million, or 6%, and increased 3.3 percentage points as a percent of net sales when comparing 2017 with 2016. The increase in cost of sales was driven by a $129.1 million increase in our modules segment cost of sales primarily due to higher costs of $366.2 million from the increased volume of modules sold directly to third parties, partially offset by continued cost reductions in the cost per watt of our solar modules, which decreased cost of sales by $182.4 million, a reduction in our product warranty liability of $31.3 million due to lower estimated module replacement costs, a reduction in our module collection and recycling liability of $13.5 million from updates to several valuation assumptions, including a decrease in certain inflation rates, and lower inventory write-downs of $9.2 million.

Cost of sales decreased $713.7 million, or 24%, and increased 5.5 percentage points as a percentage of net sales when comparing 2016 with 2015. The decrease in cost of sales was primarily the result of a $1.1 billion decrease in our systems segment cost of sales primarily due to the volume of projects under construction and the timing of when all revenue recognition criteria were met. This net decrease was partially offset by a $389.4 million increase in our modules segment cost of sales primarily due to higher costs of $510.8 million associated with the increased volume of modules sold directly to third parties, a reduction in our module collection and recycling liability of $69.6 million in 2015 resulting from certain recycling technology advancements, which significantly increased the throughput of modules able to be recycled at a point in time, along with other material and labor cost reductions, and higher inventory write-downs of $22.3 million primarily related to our remaining crystalline silicon module inventories, partially offset by continued cost reductions in the cost per watt of our solar modules, which decreased our cost of sales by $217.3 million.

Gross profit

Gross profit may be affected by numerous factors, including the selling prices of our modules and systems, our manufacturing costs, project development costs, BoS costs, the capacity utilization of our manufacturing facilities, and foreign exchange rates. Gross profit may also be affected by the mix of net sales from our modules and systems businesses.

The following table shows gross profit for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Gross profit	$ 548,947	$ 638,418	$ 1,132,762	$ (89,471)	(14)%	$ (494,344)	(44)%
% of net sales	18.7%	22.0%	27.5%				

Gross profit decreased 3.3 percentage points to 18.7% during 2017 from 22.0% during 2016 primarily due to a mix of lower gross profit projects sold and under construction during the period and reductions in the average selling price per watt of our modules sold directly to third parties, partially offset by the reductions in our product warranty liability and our module collection and recycling liability as described above.

Gross profit decreased 5.5 percentage points to 22.0% during 2016 from 27.5% during 2015 primarily as a result of a mix of lower gross profit projects sold and under construction, the reduction in our module collection and recycling liability in 2015 as described above, and higher inventory write-downs, partially offset by continued cost reductions in the cost per watt of our solar modules.

Selling, general and administrative

Selling, general and administrative expense consists primarily of salaries and other personnel-related costs, professional fees, insurance costs, travel expenses, and other business development and selling expenses.

The following table shows selling, general and administrative expense for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Selling, general and administrative	$ 202,699	$ 261,994	$ 255,192	$ (59,295)	(23)%	$ 6,802	3%
% of net sales	6.9%	9.0%	6.2%				

Selling, general and administrative expense in 2017 decreased compared to 2016 primarily due to higher impairments of certain project assets in 2016, lower employee compensation expense due to various restructuring activities, lower professional fees, lower infrastructure related expenses, and lower business development expenses. Selling, general and administrative expense in 2016 increased compared to 2015 primarily from higher development costs for early-stage projects and impairments of certain project assets, partially offset by lower employee compensation expense due to various restructuring activities, and lower professional fees associated with the formation and IPO of the Partnership.

Research and development

Research and development expense consists primarily of salaries and other personnel-related costs; the cost of products, materials, and outside services used in our process and product R&D activities; and depreciation and amortization expense associated with R&D specific facilities and equipment. We maintain a number of programs and activities to improve our technology and processes in order to enhance the performance and reduce the costs of our solar modules and systems.

The following table shows research and development expense for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Research and development	$ 88,573	$ 124,762	$ 130,593	$ (36,189)	(29)%	$ (5,831)	(4)%
% of net sales	3.0%	4.3%	3.2%				

Research and development expense in 2017 decreased compared to 2016 primarily due to lower costs for third-party contracted services, reduced material and module testing costs, the termination of certain R&D programs for legacy module technologies, and lower employee compensation expense resulting from reductions to our R&D headcount as part of various restructuring activities. During 2017, the average conversion efficiency of our CdTe solar modules produced was 16.9% compared to 16.4% in 2016. Research and development expense in 2016 decreased compared to 2015 primarily due to reductions in our R&D headcount and employee compensation expense resulting from various restructuring activities. During 2016, the average conversion efficiency of our CdTe solar modules was 16.4% compared to 15.6% in 2015.

Production start-up

Production start-up expense consists primarily of employee compensation and other costs associated with operating a production line before it has been qualified for full production, including the cost of raw materials for solar modules run through the production line during the qualification phase and applicable facility related costs. Costs related to equipment upgrades and implementation of manufacturing process improvements are also included in production start-up expense as well as costs related to the selection of a new site, related legal and regulatory costs, and costs to maintain our plant replication program to the extent we cannot capitalize these expenditures. In general, we expect production start-up expense per production line to be higher when we build an entirely new manufacturing facility compared with the addition or replacement of production lines at an existing manufacturing facility, primarily due to the additional infrastructure investment required when building an entirely new facility.

The following table shows production start-up expense for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Production start-up	$ 42,643	$ 1,021	$ 16,818	$ 41,622	4,077%	$ (15,797)	(94)%
% of net sales	1.4%	—%	0.4%				

During 2017 and 2016, we primarily incurred production start-up expense for the transition to Series 6 module manufacturing at our facilities in Perrysburg, Ohio and Kulim, Malaysia. Production start-up expense for 2015 was primarily driven by our previous crystalline silicon module manufacturing operations, which we ended in 2016 as further described in Note 4. “Restructuring and Asset Impairments” to our consolidated financial statements included in this Annual Report on Form 10-K.

Restructuring and asset impairments

Restructuring and asset impairments consists of expenses incurred related to material restructuring initiatives and includes any associated asset impairments, costs for employee termination benefits, costs for contract terminations and penalties, and other restructuring related costs. Such restructuring initiatives are intended to align the organization with then current business conditions and to reduce costs.

The following table shows restructuring and asset impairments for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Restructuring and asset impairments	$ 37,181	$ 743,862	$ —	$ (706,681)	(95)%	$ 743,862	100%
% of net sales	1.3%	25.6%	—%				

In November 2016, our board of directors approved a set of initiatives to accelerate our transition to Series 6 module manufacturing and restructure our operations. In June 2016, we ended production of our crystalline silicon modules to focus on our core CdTe module and utility-scale systems. As a result of these decisions, we recorded restructuring and asset impairment charges of $41.8 million and $743.9 million during 2017 and 2016, respectively. In 2017, we also reversed a customs tax liability associated with a prior restructuring activity, which reduced our restructuring charges by $4.7 million during the period. See Note 4. "Restructuring and Asset Impairments" to our consolidated financial statements included in this Annual Report on Form 10-K for additional information on these matters.

Goodwill impairment

The following table shows goodwill impairments for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Goodwill impairment	$ —	$ 74,930	$ —	$ (74,930)	(100)%	$ 74,930	100%
% of net sales	—%	2.6%	—%				

As a result of our annual impairment analysis in the fourth quarter of 2016, we impaired the remaining $68.8 million of goodwill of our systems reporting unit primarily due to a strategic shift in the mix of our module and system net sales, which was approved by our board of directors in November 2016 as part of the restructuring activities described above. This shift involved an expected reduction in the annual megawatts sold through systems business projects. Other factors that contributed to the impairment included our reduced market capitalization and the challenging conditions within the solar industry as of the date of our testing. In June 2016, we also impaired the remaining $6.1 million of goodwill associated with our crystalline silicon modules reporting unit due to the decision to end the related manufacturing operations as described above. See Note 6. "Goodwill and Intangible Assets" to our consolidated financial statements included in this Annual Report on Form 10-K for additional information.

Foreign currency loss, net

Foreign currency loss, net consists of the net effect of gains and losses resulting from holding assets and liabilities and conducting transactions denominated in currencies other than our subsidiaries' functional currencies.

The following table shows foreign currency loss, net for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Foreign currency loss, net	$ (9,640)	$ (14,007)	$ (6,868)	$ 4,367	(31)%	$ (7,139)	104%

Foreign currency loss, net decreased in 2017 compared to 2016 primarily as a result of lower costs associated with hedging activities related to our subsidiaries in India, the weakening of the U.S. dollar relative to certain foreign currencies, and differences between our economic hedge positions and the underlying exposures. Foreign currency loss, net increased in 2016 compared to 2015 primarily due to higher costs for hedging activities related to our subsidiaries in India, differences between our economic hedge positions and the underlying exposures, and changes in certain foreign currency rates.

Interest income

Interest income is earned on our cash, cash equivalents, marketable securities, and restricted cash and investments. Interest income also includes interest earned from notes receivable and late customer payments.

The following table shows interest income for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Interest income	$ 35,704	$ 25,193	$ 22,516	$ 10,511	42%	$ 2,677	12%

Interest income during 2017 increased compared to 2016 primarily due to higher cash balances during the period, higher interest rates associated with such cash balances, and a promissory note with an affiliate issued in late 2016. Interest income during 2016 increased compared to 2015 primarily due to higher interest rates on our marketable securities.

Interest expense, net

Interest expense is primarily comprised of interest incurred on long-term debt, settlements of interest rate swap contracts, and changes in the fair value of interest rate swap contracts that do not qualify for hedge accounting in accordance with ASC 815. We capitalize interest expense into our project assets or property, plant and equipment when such costs qualify for interest capitalization, which reduces the amount of net interest expense reported in any given period.

The following table shows interest expense, net for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Interest expense, net	$ (25,765)	$ (20,538)	$ (6,975)	$ (5,227)	25%	$ (13,563)	194%

Interest expense, net increased in 2017 compared to 2016 primarily due to changes in the fair value of interest rate swap contracts that do not qualify for hedge accounting and higher levels of project specific debt financings, partially offset by lower interest expense associated with certain Malaysian credit facilities that were fully repaid in 2016. Interest expense, net increased in 2016 compared to 2015 primarily as a result of lower interest costs capitalized to certain projects that were substantially completed in 2016 and higher levels of project specific debt financings outstanding during the period.

Other income (expense), net

Other income (expense), net is primarily comprised of miscellaneous items and realized gains and losses on the sale of marketable securities and cost method investments.

The following table shows other income (expense), net for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	2017	2016	2015	2017 over 2016		2016 over 2015	
Other income (expense), net	$ 23,965	$ 40,252	$ (5,502)	$ (16,287)	(40)%	$ 45,754	832%

Other income (expense), net decreased in 2017 compared to 2016 primarily due to realized gains of $41.3 million in 2016 from the sale of certain restricted investments driven by an effort to align the currencies of the investments with those of the corresponding collection and recycling liabilities and a $7.4 million reversal of the outstanding contingent consideration associated with our TetraSun acquisition as the result of our crystalline silicon module manufacturing restructuring in 2016, partially offset by an incremental settlement in 2017 for the resolution of an outstanding matter with a former customer. The increase in other income (expense), net in 2016 compared to 2015 was primarily attributable to the transactions described above, partially offset by the impairment of a cost method investment in 2016.

Income tax expense

In December 2017, the U.S. President signed into law the Tax Act, which significantly revised U.S. tax law by, among other things, lowering the statutory federal corporate income tax rate from 35% to 21% for tax years beginning after December 31, 2017, eliminating certain deductions, imposing a mandatory one-time transition tax on certain accumulated earnings and profits of foreign corporate subsidiaries (the "transition tax") that may electively be paid over eight years, introducing new tax regimes, and changing how foreign earnings are subject to U.S. tax. The Tax Act also includes many new provisions, such as changes to bonus depreciation, changes to deductions for executive compensation, net operating loss deduction limitations, a tax on global intangible low-taxed income ("GILTI") earned by foreign corporate subsidiaries, a base erosion anti-abuse tax ("BEAT"), and a deduction for foreign-derived intangible income ("FDII"). Many of these provisions, including the tax on GILTI, the BEAT, and the deduction for FDII, are not applicable to us until 2018, and we continue to evaluate the impact of such provisions of the Tax Act.

During the year ended December 31, 2017, we recognized an aggregate provisional tax expense of $408.1 million, which included an amount for the transition tax of $401.5 million and a net deferred tax expense of $6.6 million for the remeasurement of deferred tax assets and liabilities taking into account the lower U.S. corporate income tax rate of 21%. The final effects of the Tax Act may differ from these provisional amounts, possibly materially, due to, among other things, changes in interpretations of the Tax Act, any legislative action to address questions that arise because of the Tax Act, any changes in accounting standards for income taxes or related interpretations in response to the Tax Act, any updates or changes to estimates utilized to calculate provisional amounts, or actions we may take as a result of the Tax Act. The associated accounting for the Tax Act is expected to be completed when our 2017 U.S. corporate income tax return is filed in 2018.

Income tax expense or benefit, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits reflect our best estimate of current and future taxes to be paid. We are subject to income taxes in both the U.S. and numerous foreign jurisdictions in which we operate, principally Australia, India, and Malaysia. Significant judgments and estimates are required in determining our consolidated income tax expense. The statutory federal corporate income tax rate in the U.S. will decrease from 35% to 21% beginning in January 2018, while the tax rates in Australia, India, and Malaysia are 30%, 34.6%, and 24%, respectively. In Malaysia, we have been granted a long-term tax holiday, scheduled to expire in 2027, pursuant to which substantially all of our income earned in Malaysia is exempt from income tax.

The following table shows income tax expense for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Income tax expense	$ (371,996)	$ (23,167)	$ (32,329)	$ (348,829)	1,506%	$ 9,162	(28)%
Effective tax rate	184.1%	(4.3)%	4.4%				

Our tax rate is affected by recurring items, such as tax rates in foreign jurisdictions and the relative amounts of income we earn in those jurisdictions. The rate is also affected by discrete items that may occur in any given period, but are not consistent from period to period. Income tax expense increased by $348.8 million during 2017 compared to 2016 primarily due to provisional tax expense of $408.1 million related to the Tax Act as described above, higher pretax income, a $35.4 million reversal of an uncertain tax position in 2016 related to the income of a foreign subsidiary, and lower excess tax benefits associated with share-based compensation, partially offset by certain U.S. taxes in 2016 on a cash distribution received from a foreign subsidiary and a $42.1 million discrete tax benefit associated with the acceptance of our election to classify certain of our German subsidiaries as disregarded entities of First Solar, Inc.

Income tax expense decreased by $9.2 million during 2016 compared to 2015 primarily as a result of lower pretax income and the $35.4 million reversal of an uncertain tax position as described above, partially offset by certain U.S. taxes on a cash distribution received from a foreign subsidiary and a $41.7 million discrete tax benefit associated with the receipt of a private letter ruling during 2015. See Note 19. "Income Taxes" to our consolidated financial statements included in this Annual Report on Form 10-K for additional information.

Equity in earnings of unconsolidated affiliates, net of tax

Equity in earnings of unconsolidated affiliates, net of tax represents our proportionate share of the earnings or losses of unconsolidated affiliates with whom we have made equity method investments as well as any gains or losses on the sale or disposal of such investments.

The following table shows equity in earnings of unconsolidated affiliates, net of tax for the years ended December 31, 2017, 2016, and 2015:

	Years Ended			Change			
(Dollars in thousands)	**2017**	**2016**	**2015**	**2017 over 2016**		**2016 over 2015**	
Equity in earnings of unconsolidated affiliates, net of tax	$ 4,266	$ 144,306	$ (107,595)	$ (140,040)	(97)%	$ 251,901	234%

Equity in earnings of unconsolidated affiliates, net of tax decreased in 2017 compared to 2016 primarily due to the recognition of a gain of $125.1 million, net of tax, in December 2016 from the sale of our residual interest in the Desert Stateline project to 8point3 Operating Company, LLC ("OpCo"), a subsidiary of the Partnership, and lower equity in earnings from our investment in OpCo. Equity in earnings of unconsolidated affiliates, net of tax increased in 2016 compared to 2015 primarily due to the gain on the sale of the Desert Stateline project in 2016 described above, the deferral of certain profit on the sale of our controlling interest in the Desert Stateline project in 2015, and higher equity in earnings from our investment in OpCo during the period.

Liquidity and Capital Resources

As of December 31, 2017, we believe that our cash, cash equivalents, marketable securities, cash flows from operating activities, advanced-stage project pipeline, availability under our senior secured revolving credit facility considering minimum liquidity covenant requirements, and access to the capital markets will be sufficient to meet our working capital, systems project investment, and capital expenditure needs for at least the next 12 months. We monitor our working capital to ensure we have adequate liquidity, both domestically and internationally.

We intend to maintain appropriate debt levels based upon cash flow expectations, our overall cost of capital, and expected cash requirements for operations, capital expenditures, and strategic discretionary spending. In the future, we may also engage in additional debt or equity financings, including project specific debt financings. We believe that when necessary, we will have adequate access to the capital markets, although our ability to raise capital on terms commercially acceptable to us could be constrained if there is insufficient lender or investor interest due to industry-wide or company-specific concerns. Such financings could result in increased debt service expenses, dilution to our existing stockholders, or restrictive covenants which require us to maintain certain financial conditions.

As of December 31, 2017, we had $3.0 billion in cash, cash equivalents, and marketable securities compared to $2.0 billion as of December 31, 2016. Cash, cash equivalents, and marketable securities as of December 31, 2017 increased primarily from the sale of the Moapa, California Flats, Switch Station, and Cuyama projects and proceeds from borrowings under project specific debt financings, partially offset by purchases of property, plant and equipment. As of December 31, 2017, $1.6 billion of our cash, cash equivalents, and marketable securities was held by our foreign subsidiaries and was primarily based in U.S. dollar, Euro, and Japanese yen denominated holdings. As of December 31, 2016, $1.2 billion of our cash, cash equivalents, and marketable securities was held by our foreign subsidiaries and was primarily based in U.S. dollar, Euro, and Malaysian ringgit denominated holdings.

We utilize a variety of tax planning and financing strategies in an effort to ensure that our worldwide cash is available in the locations in which it is needed. If certain international funds were needed for our operations in the U.S., we may be required to accrue and pay certain U.S. and foreign taxes to repatriate such funds. Although we maintain the intent and ability to permanently reinvest our accumulated earnings outside of the U.S., with the exception of our subsidiaries in Canada and Germany, we continue to evaluate how the Tax Act may affect our plans to repatriate additional amounts

to fund our domestic operations or otherwise deploy our worldwide cash. In addition, changes to foreign government banking regulations may restrict our ability to move funds among various jurisdictions under certain circumstances, which could negatively impact our access to capital, resulting in an adverse effect on our liquidity and capital resources.

Our systems business requires significant liquidity and is expected to continue to have significant liquidity requirements in the future. The net amount of our project assets and related portion of deferred revenue, which approximates our net capital investment in the development and construction of systems projects, was $0.5 billion as of December 31, 2017. Solar power project development and construction cycles, which span the time between the identification of a site location and the commercial operation of a system, vary substantially and can take many years to mature. As a result of these long project cycles and strategic decisions to finance the construction of certain projects using our working capital, we may need to make significant up-front investments of resources in advance of the receipt of any cash from the sale of such projects. Delays in construction progress or in completing the sale of our systems projects that we are self-financing may also impact our liquidity. We have historically financed these up-front systems project investments primarily using working capital. In certain circumstances, we may need to finance construction costs exclusively using working capital, if project financing becomes unavailable due to market-wide, regional, or other concerns.

From time to time, we develop projects in certain markets around the world where we may hold all or a significant portion of the equity in a project for several years. Given the duration of these investments and the currency risk relative to the U.S. dollar in some of these markets, we continue to explore local financing alternatives. Should these financing alternatives be unavailable or too cost prohibitive, we could be exposed to significant currency risk and our liquidity could be adversely impacted.

Additionally, we may elect to retain an ownership interest in certain systems projects after they become operational if we determine it would be of economic and strategic benefit to do so. If, for example, we cannot sell a systems project at economics that are attractive to us or potential customers are unwilling to assume the risks and rewards typical of PV solar power system ownership, we may instead elect to temporarily own and operate such systems until we can sell the systems on economically attractive terms. The decision to retain ownership of a system impacts liquidity depending upon the size and cost of the project. As of December 31, 2017, we had $0.4 billion of net PV solar power systems that had been placed in service, primarily in international markets. We have elected, and may in the future elect, to enter into temporary or long-term project financing to reduce the impact on our liquidity and working capital with regards to such projects and systems. We may also consider entering into tax equity or other arrangements with respect to ownership interests in certain of our projects, which could cause a portion of the economics of such projects to be realized over time.

The following additional considerations have impacted or may impact our liquidity in 2018 and beyond:

- We expect to make significant capital investments over the next several years as we transition our production to Series 6 module technology and purchase the related manufacturing equipment and infrastructure. Such investments also include the commencement and expansion of operations at our previously announced manufacturing plant in Vietnam. We expect the aggregate capital investment for currently planned Series 6 related programs to be approximately $1.4 billion, including $0.5 billion of capital expenditures already made as of December 31, 2017. Such programs are expected to provide an annual Series 6 manufacturing capacity of approximately 5 GW once completed. During 2018, we expect to spend $650 million to $750 million for capital expenditures, the majority of which is associated with the Series 6 transition. We believe these capital expenditures will increase our aggregate manufacturing capacity, increase our solar module conversion efficiencies, reduce our manufacturing costs, and reduce the overall cost of systems using our modules.

- The balance of our solar module inventories and BoS parts was $151.4 million as of December 31, 2017. As we continue to develop and construct our advanced-stage project pipeline, we must produce solar modules and procure BoS parts in the required volumes to support our planned construction schedules. As part of the construction cycle, we typically produce or procure such inventories in advance of receiving payment for such materials, which may temporarily reduce our liquidity. Once solar modules and BoS parts are installed in a

project, they are classified as either project assets, PV solar power systems, or cost of sales depending on whether the project is subject to a definitive sales contract and whether other revenue recognition criteria have been met. We also produce significant volumes of modules for sale directly to third-parties, which requires us to carry inventories at levels sufficient to satisfy the demand of our customers and the needs of their utility-scale projects, which may also temporarily reduce our liquidity.

- We may commit working capital during 2018 and beyond to acquire solar power projects in various stages of development, including advanced-stage projects with PPAs, and to continue developing those projects as necessary. Depending upon the size and stage of development, costs to acquire such solar power projects could be significant. When evaluating project acquisition opportunities, we consider both the strategic and financial benefits of any such acquisitions.

- We have initiatives in several markets to expedite our penetration of those markets and establish relationships with potential customers. Some of these arrangements may involve significant investments or other allocations of capital that could reduce our liquidity or require us to pursue additional sources of financing, assuming such sources are available to us. Additionally, we have elected and may in the future elect or be required to temporarily retain a noncontrolling ownership interest in certain underlying systems projects we develop, supply modules to, or construct. Any such retained ownership interest is expected to impact our liquidity to the extent we do not obtain new sources of capital to fund such investments.

Cash Flows

The following table summarizes key cash flow activity for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017	2016	2015
Net cash provided by (used in) operating activities	$ 1,340,677	$ 206,753	$ (325,209)
Net cash (used in) provided by investing activities	(626,802)	144,520	(156,177)
Net cash provided by (used in) financing activities	192,045	(136,393)	101,207
Effect of exchange rate changes on cash, cash equivalents and restricted cash	8,866	(6,306)	(19,272)
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 914,786	$ 208,574	$ (399,451)

Operating Activities

The increase in net cash provided by operating activities during 2017 was primarily driven by the sale of the Moapa, California Flats, Switch Station, and Cuyama projects, partially offset by expenditures for the construction of certain projects. The increase in net cash provided by operating activities during 2016 was primarily due to the lower volume of solar power projects under development and construction, which generally require significant liquidity when such projects are financed using working capital. The increase in net cash provided by operating activities during 2016 was also driven by the sale of certain other solar power projects at or near substantial completion.

Investing Activities

The increase in net cash used in investing activities during 2017 was primarily due to (i) proceeds from sales of equity and cost method investments of $291.5 million in 2016, including the sale of our remaining interest in the Desert Stateline project, (ii) an increase in purchases of property, plant and equipment driven by our transition to Series 6 module manufacturing, and (iii) net purchases of marketable securities and restricted investments of $114.7 million in 2017 compared to net proceeds from sales and maturities of marketable securities and restricted investments of $102.9 million in 2016. The increase in net cash provided by investing activities during 2016 was primarily due to (i) proceeds from sales of equity and cost method investments described above and (ii) higher net proceeds from sales and maturities of marketable securities and restricted investments also described above compared to net purchases of marketable

securities and restricted investments of $203.1 million in 2015, partially offset by the receipt of $239.0 million from the IPO of the Partnership in 2015.

Financing Activities

The increase in net cash provided by financing activities during 2017 was primarily the result of net proceeds from borrowings under long-term debt arrangements associated with the construction of certain projects in Japan, India, and Australia of $191.3 million in 2017 compared to net repayments on such debt arrangements of $110.6 million in 2016 and proceeds from commercial letters of credit for the construction of certain projects in India of $43.0 million. Cash used in financing activities during 2016 was primarily driven by the net repayments of long-term debt arrangements described above compared to net proceeds from borrowings under such debt arrangements of $98.9 million in 2015.

Contractual Obligations

The following table presents the payments due by fiscal year for our outstanding contractual obligations as of December 31, 2017 (in thousands):

		Payments Due by Year			
	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
Long-term debt obligations	$ 406,388	$ 13,062	$ 30,776	$ 69,077	$ 293,473
Interest payments (1)	211,420	19,104	37,301	33,571	121,444
Capital lease obligations	162	97	65	—	—
Operating lease obligations	262,450	13,487	22,261	20,154	206,548
Sale-leaseback payments (2)	9,115	5,161	3,954	—	—
Purchase obligations (3)	708,148	635,553	46,447	10,246	15,902
Recycling obligations	166,609	—	—	—	166,609
Contingent consideration (4)	9,315	6,162	3,153	—	—
Transition tax obligations (5)	101,340	8,107	16,214	16,214	60,805
Other obligations (6)	22,330	4,752	9,138	8,440	—
Total	$ 1,897,277	$ 705,485	$ 169,309	$ 157,702	$ 864,781

(1) Includes estimated cash interest to be paid over the remaining terms of the underlying debt. Interest payments are based on fixed and floating rates as of December 31, 2017.

(2) Sale-leaseback payments represent the fixed rent payments associated with our leaseback of the Maryland Solar project from a subsidiary of the Partnership. See Note 12. “Investments in Unconsolidated Affiliates and Joint Ventures” to our consolidated financial statements included in this Annual Report on Form 10-K for further information.

(3) Purchase obligations represent agreements to purchase goods or services, including open purchase orders and contracts with fixed volume commitments, that are noncancelable or cancelable with a significant penalty.

(4) In connection with business or project acquisitions, we may agree to pay additional amounts to the selling parties upon achievement of certain milestones. See Note 15. “Commitments and Contingencies” to our consolidated financial statements included in this Annual Report on Form 10-K for further information.

(5) Transition tax obligations represent estimated payments for U.S. federal taxes associated with accumulated earnings and profits of our foreign corporate subsidiaries. See Note 19. “Income Taxes” to our consolidated financial statements included in this Annual Report on Form 10-K for further information.

(6) Includes expected letter of credit fees and unused revolver fees.

We have excluded $84.2 million of unrecognized tax benefits from the amounts presented above as the timing of such obligations is uncertain.

Off-Balance Sheet Arrangements

As of December 31, 2017, we had no off-balance sheet debt or similar obligations, other than financial assurance related instruments and operating leases, which are not classified as debt. We do not guarantee any third-party debt. See Note 15. "Commitments and Contingencies" to our consolidated financial statements included in this Annual Report on Form 10-K for further information about our financial assurance related instruments.

Recent Accounting Pronouncements

See Note 3. "Recent Accounting Pronouncements" to our consolidated financial statements included in this Annual Report on Form 10-K for a summary of recent accounting pronouncements.

Critical Accounting Estimates

In preparing our consolidated financial statements in conformity with accounting principles generally accepted in the United States, we make estimates and assumptions that affect the amounts of reported assets, liabilities, revenues, and expenses, as well as the disclosure of contingent liabilities. Some of our accounting policies require the application of significant judgment in the selection of the appropriate assumptions for making these estimates. By their nature, these judgments are subject to an inherent degree of uncertainty. We base our judgments and estimates on our historical experience, our forecasts, and other available information as appropriate. The actual results experienced by us may differ materially and adversely from our estimates. To the extent there are material differences between our estimates and the actual results, our future results of operations will be affected. Our significant accounting policies are described in Note 2. "Summary of Significant Accounting Policies" to our consolidated financial statements included in this Annual Report on Form 10-K. The accounting policies that require the most significant judgment and estimates include the following:

Revenue Recognition – Solar Power System Sales and/or Engineering, Procurement, and Construction Services. We generally recognize revenue for sales of solar power systems and/or EPC services over time as our performance creates or enhances an energy generation asset controlled by the customer. Furthermore, the sale of a solar power system when combined with EPC services represents a single performance obligation for the development and construction of a single generation asset. For such sales arrangements, we recognize revenue using cost based input methods, which recognize revenue and gross profit as work is performed based on the relationship between actual costs incurred compared to the total estimated costs of the contract. For sales of solar power systems in which we obtain an interest in the project sold to the customer, we recognize all of the revenue for the consideration received, including the fair value of the noncontrolling interest we obtained. We may also recognize revenue for the sale of a solar power system after it has been completed due to the timing of when we enter into the associated sales contract with the customer.

Estimating the fair value of the noncontrolling interest we obtain begins with the valuation of the entire solar project (i.e., solar power system) being sold to the customer. Such valuation generally uses an income based valuation technique in which relevant cash flows are discounted to estimate the expected economic earnings capacity of the project. Typical factors considered in a project's valuation include expected energy generation, the duration and pricing of the PPA, the pricing of energy to be sold on an open contract basis following the termination of the PPA (i.e., merchant pricing curves), other offtake agreements, the useful life of the system, tax attributes such as accelerated depreciation and tax credits, sales of renewable energy certificates, interconnection rights, operating agreements, and the cost of capital. Once the overall project valuation is agreed upon with the customer, we determine the relative value related to our specific ownership interests conveyed through the transaction agreements, including the membership interest purchase and sale agreement and the limited liability company agreement (or equivalent) of the project or its holding company.

In applying cost based input methods of revenue recognition, we use the actual costs incurred relative to the total estimated costs (including solar module costs) to determine our progress towards contract completion and to calculate the corresponding amount of revenue and gross profit to recognize. Cost based input methods of revenue recognition are considered a faithful depiction of our efforts to satisfy long-term construction contracts and therefore reflect the

transfer of goods to a customer under such contracts. Costs incurred that do not contribute to satisfying our performance obligations ("inefficient costs") are excluded from our input methods of revenue recognition as the amounts are not reflective of our transferring control of the system to the customer. Costs incurred towards contract completion may include costs associated with solar modules, direct materials, labor, subcontractors, and other indirect costs related to contract performance. We recognize solar module and direct material costs as incurred when such items have been installed in a system. Cost based input methods of revenue recognition require us to make estimates of net contract revenues and costs to complete our projects. In making such estimates, significant judgment is required to evaluate assumptions related to the amount of net contract revenues, including the impact of any performance incentives, liquidated damages, and other payments to customers. Significant judgment is also required to evaluate assumptions related to the costs to complete our projects, including materials, labor, contingencies, and other system costs.

If the estimated total costs on any contract, including any inefficient costs, are greater than the net contract revenues, we recognize the entire estimated loss in the period the loss becomes known. The cumulative effect of revisions to estimates related to net contract revenues or costs to complete contracts are recorded in the period in which the revisions to estimates are identified and the amounts can be reasonably estimated. The effect of the changes on future periods are recognized as if the revised estimates had been used since revenue was initially recognized under the contract. Such revisions could occur in any reporting period, and the effects may be material depending on the size of the contracts or the changes in estimates.

As part of our solar power system sales, we conduct performance testing of a system prior to substantial completion to confirm the system meets its operational and capacity expectations noted in the EPC agreement. In addition, we may provide an energy performance test during the first or second year of a system's operation to demonstrate that the actual energy generation for the applicable year meets or exceeds the modeled energy expectation, after certain adjustments. These tests are based on meteorological, energy, and equipment performance data measured at the system's location as well as certain projections of such data over the remaining measurement period. In certain instances, a bonus payment may be received at the end of the applicable test period if the system performs above a specified level. Conversely, if there is an underperformance event with regards to these tests, we may incur liquidated damages as a percentage of the EPC contract price. Such performance guarantees represent a form of variable consideration and are estimated at contract inception at their most likely amount and updated at the end of each reporting period as additional performance data becomes available and only to the extent that it is probable that a significant reversal of any incremental revenue will not occur.

Revenue Recognition – Operations and Maintenance. We recognize revenue for standard, recurring O&M services over time as customers receive and consume the benefits of such services. Costs of O&M services are expensed in the period in which they are incurred. As part of our O&M service offerings, we typically offer an effective availability guarantee, which stipulates that a system will be available to generate a certain percentage of total possible energy during a specific period after adjusting for factors outside of our control as the service provider. These tests are based on meteorological, energy, and equipment performance data measured at the system's location as well as certain projections of such data over the remaining measurement period. If system availability exceeds a contractual threshold, we may receive a bonus payment, or if system availability falls below a separate threshold, we may incur liquidated damages for certain lost energy under the PPA. Such bonuses or liquidated damages represent a form of variable consideration and are estimated and recognized over time as customers receive and consume the benefits of the O&M services.

Accrued Solar Module Collection and Recycling Liability. We recognize expense at the time of sale for the estimated cost of our obligations to collect and recycle solar modules covered by our solar module collection and recycling program. We estimate the cost of our collection and recycling obligations based on the present value of the expected probability-weighted future cost of collecting and recycling the solar modules, which includes estimates for the cost of packaging materials; the cost of freight from the solar module installation sites to a recycling center; the material, labor, capital costs; the scale of recycling centers; and an estimated third-party profit margin and return on risk for collection and recycling services. We base these estimates on (i) our experience collecting and recycling our solar modules, (ii) the expected timing of when our solar modules will be returned for recycling, and (iii) the expected

economic conditions at the time the solar modules will be collected and recycled. In the periods between the time of sale and the related settlement of the collection and recycling obligation, we accrete the carrying amount of the associated liability by applying the discount rate used for its initial measurement. We periodically review our estimates of expected future recycling costs and may adjust our liability accordingly.

As of December 31, 2017, our estimated liability for collecting and recycling solar modules covered by our collection and recycling program was $166.6 million. A 1% increase in the annualized inflation rate used in our estimated future collection and recycling cost per module would increase our liability by $33.5 million, and a 1% decrease in that rate would decrease our liability by $28.1 million.

Product Warranties. We provide a limited PV solar module warranty covering defects in materials and workmanship under normal use and service conditions for approximately 10 years. We also typically warrant that modules installed in accordance with agreed-upon specifications will produce at least 98% of their labeled power output rating during the first year, with the warranty coverage reducing by 0.5% every year thereafter throughout the approximate 25-year performance warranty period.

As an alternative form of our standard limited module power output warranty, we also offer an aggregated or system-level limited module performance warranty. This system-level limited module performance warranty is designed for utility-scale systems and provides 25-year system-level energy degradation protection. This warranty represents a practical expedient to address the challenge of identifying, from the potential millions of modules installed in a utility-scale system, individual modules that may be performing below warranty thresholds by focusing on the aggregate energy generated by the system rather than the power output of individual modules. The system-level limited module performance warranty is typically calculated as a percentage of a system's expected energy production, adjusted for certain actual site conditions, with the warranted level of performance declining each year in a linear fashion, but never falling below 80% during the term of the warranty.

In addition to our limited solar module warranties described above, for PV solar power systems we construct, we typically provide limited warranties for defects in engineering design, installation, and BoS part workmanship for a period of one to two years following the substantial completion of a system or a block within the system.

When we recognize revenue for module or system sales, we accrue liabilities for the estimated future costs of meeting our limited warranty obligations. We make and revise these estimates based primarily on the number of our solar modules under warranty installed at customer locations, our historical experience with warranty claims, our monitoring of field installation sites, our internal testing of and the expected future performance of our solar modules and BoS parts, and our estimated per-module replacement costs. As a result of such factors, we estimate our limited product warranties based on warranty return rates of approximately 1% to 3% for modules covered under warranty, depending on the series of module technology.

As of December 31, 2017, our accrued liabilities for product warranties were $224.3 million. A 1% change in estimated warranty return rates would change our module warranty liability by $71.0 million, and a 1% change in the estimated warranty return rate for BoS parts would not have a material impact on the associated warranty liability.

Income Taxes. We are subject to the income tax laws of the United States, its states and municipalities, and those of the foreign jurisdictions in which we have significant business operations. Such tax laws are complex and subject to different interpretations by the taxpayer and the relevant governmental taxing authorities. We make judgments and interpretations regarding the application of these inherently complex tax laws when determining our provision for income taxes and also make estimates about when in the future certain items are expected to affect taxable income in the various tax jurisdictions. Disputes over interpretations of tax laws may be settled with the relevant taxing authority upon examination or audit. We regularly evaluate the likelihood of assessments in each of our taxing jurisdictions resulting from current and future examinations, and we record tax liabilities as appropriate.

We establish liabilities for potential additional taxes based on our assessment of the outcome of our tax positions. Once established, we adjust these liabilities when additional information becomes available or when an event occurs requiring an adjustment. Significant judgment is required in making these estimates and the actual cost of a tax assessment, fine, or penalty may ultimately be materially different from our recorded liabilities, if any.

In preparing our consolidated financial statements, we calculate our income tax provision based on our interpretation of the tax laws and regulations in the various jurisdictions where we conduct business. This requires us to estimate our current tax obligations, assess uncertain tax positions, and assess temporary differences between the financial statement carrying amounts and the tax basis of assets and liabilities. These temporary differences result in deferred tax assets and liabilities.

We must also assess the likelihood that each of our deferred tax assets will be realized. To the extent we believe that realization of any of our deferred tax assets is not more likely than not, we establish a valuation allowance. When we establish a valuation allowance or increase this allowance in a reporting period, we generally record a corresponding tax expense. Conversely, to the extent circumstances indicate that a valuation allowance is no longer necessary, that portion of the valuation allowance is reversed, which generally reduces our overall income tax expense.

We continually explore initiatives to better align our tax and legal entity structure with the footprint of our non-U.S. operations and recognize the tax impact of these initiatives, including changes in the assessment of uncertain tax positions, indefinite reinvestment exception assertions, and the realizability of deferred tax assets, in the period when we believe all necessary internal and external approvals associated with such initiatives have been obtained, or when the initiatives are materially complete. It is possible that the completion of one or more of these initiatives may occur within the next 12 months.

Asset Impairments. We assess long-lived assets classified as "held and used," including our property, plant and equipment; project assets; PV solar power systems; and intangible assets, for impairment whenever events or changes in circumstances arise, including consideration of technological obsolescence, that may indicate that the carrying amount of such assets may not be recoverable, and these assessments require significant judgment in determining whether such events or changes have occurred. Relevant considerations may include a significant decrease in the market price of a long-lived asset; a significant adverse change in the extent or manner in which a long-lived asset is being used or in its physical condition; a significant adverse change in the business climate that could affect the value of a long-lived asset; an accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of a long-lived asset; a current-period operating or cash flow loss combined with a history of such losses or a projection of future losses associated with the use of a long-lived asset; or a current expectation that, more likely than not, a long-lived asset will be sold or otherwise disposed of significantly before the end of its previously estimated useful life. For purposes of recognition and measurement of an impairment loss, long-lived assets are grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities, and we must also exercise judgment in assessing such groupings and levels.

When impairment indicators are present, we compare undiscounted future cash flows, including the eventual disposition of the asset group at market value, to the asset group's carrying value to determine if the asset group is recoverable. If the carrying value of the asset group exceeds the undiscounted future cash flows, we measure any impairment by comparing the fair value of the asset group to its carrying value. Fair value is generally determined by considering (i) internally developed discounted cash flows for the asset group, (ii) third-party valuations, and/or (iii) information available regarding the current market value for such assets. If the fair value of an asset group is determined to be less than its carrying value, an impairment in the amount of the difference is recorded in the period that the impairment indicator occurs. Estimating future cash flows requires significant judgment, and such projections may vary from the cash flows eventually realized.

Goodwill. Goodwill represents the excess of the purchase price of acquired businesses over the estimated fair value assigned to the individual assets acquired and liabilities assumed. We do not amortize goodwill, but instead are required to test goodwill for impairment at least annually. We perform impairment tests between scheduled annual tests in the fourth quarter if facts and circumstances indicate that it is more likely than not that the fair value of a reporting unit that has goodwill is less than its carrying value.

We may first make a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying value to determine whether it is necessary to perform a quantitative goodwill impairment test. Such qualitative impairment test considers various factors, including macroeconomic conditions, industry and market considerations, cost factors, the overall financial performance of a reporting unit, and any other relevant events affecting our company or a reporting unit. If we determine through the qualitative assessment that a reporting unit's fair value is more likely than not greater than its carrying value, the quantitative impairment test is not required. If the qualitative assessment indicates it is more likely than not that a reporting unit's fair value is less than its carrying value, we perform a quantitative impairment test. We may also elect to proceed directly to the quantitative impairment test without considering qualitative factors.

The quantitative impairment test is the comparison of the fair value of a reporting unit with its carrying amount, including goodwill. Our reporting units consist of our CdTe module manufacturing (or "modules") business and our fully integrated systems business. We define the fair value of a reporting unit as the price that would be received to sell the unit as a whole in an orderly transaction between market participants at the measurement date. We primarily use an income approach to estimate the fair value of our reporting units. Significant judgment is required when estimating the fair value of a reporting unit, including the forecasting of future operating results and the selection of discount and expected future growth rates used to determine projected cash flows. If the estimated fair value of a reporting unit exceeds its carrying value, goodwill is not impaired, and no further analysis is required. Conversely, if the carrying value of a reporting unit exceeds its estimated fair value, we record an impairment loss equal to the excess, not to exceed the total amount of goodwill allocated to the reporting unit.

Item 7A. *Quantitative and Qualitative Disclosures about Market Risk*

Foreign Currency Exchange Risk

Cash Flow Exposure. We expect certain of our subsidiaries to have future cash flows that will be denominated in currencies other than the subsidiaries' functional currencies. Changes in the exchange rates between the functional currencies of our subsidiaries and the other currencies in which they transact will cause fluctuations in the cash flows we expect to receive or pay when these cash flows are realized or settled. Accordingly, we enter into foreign exchange forward contracts to hedge a portion of these forecasted cash flows. These foreign exchange forward contracts qualify for accounting as cash flow hedges in accordance with Accounting Standards Codification ("ASC") 815, *Derivatives and Hedging,* and we designated them as such. We initially report the effective portion of a derivative's unrealized gain or loss in "Accumulated other comprehensive income (loss)" and subsequently reclassify amounts into earnings when the hedged transaction occurs and impacts earnings.

For additional details on our derivative hedging instruments and activities, see Note 10. "Derivative Financial Instruments" to our consolidated financial statements included in this Annual Report on Form 10-K.

Certain of our international operations, such as our manufacturing facility in Malaysia, pay a portion of their operating expenses, including associate wages and utilities, in local currencies, which exposes us to foreign currency exchange risk for such expenses. Our manufacturing facilities are also exposed to foreign currency exchange risk for purchases of certain equipment from international vendors. As we expand into new markets worldwide, particularly emerging markets, our total foreign currency exchange risk, in terms of both size and exchange rate volatility, and the number of foreign currencies we are exposed to could increase significantly.

For the year ended December 31, 2017, our international customers accounted for 23% of our net sales, and 5% of our net sales during the period were denominated in foreign currencies, including Euros and Indian rupees. As a result, we have exposure to foreign currency exchange risk with respect to our net sales, which has historically represented one of our primary foreign currency exchange risks. A 10% change in the U.S. dollar to Euro and U.S. dollar to Indian rupee exchange rates would have had an aggregate impact on our net sales of $10.1 million, excluding the effect of our hedging activities.

Transaction Exposure. Many of our subsidiaries have assets and liabilities (primarily cash, receivables, marketable securities, deferred taxes, payables, accrued expenses, and solar module collection and recycling liabilities) that are denominated in currencies other than the subsidiaries' functional currencies. Changes in the exchange rates between the functional currencies of our subsidiaries and the other currencies in which these assets and liabilities are denominated will create fluctuations in our reported consolidated statements of operations and cash flows. We may enter into foreign exchange forward contracts or other financial instruments to economically hedge assets and liabilities against the effects of currency exchange rate fluctuations. The gains and losses on such foreign exchange forward contracts will economically offset all or part of the transaction gains and losses that we recognize in earnings on the related foreign currency denominated assets and liabilities.

For additional details on our economic hedging instruments and activities, see Note 10. "Derivative Financial Instruments" to our consolidated financial statements included in this Annual Report on Form 10-K.

For the year ended December 31, 2017, a 10% change in the U.S. dollar to Japanese yen and U.S. dollar to Vietnamese dong exchange rates would have impacted our net foreign currency loss by $2.6 million, including the effect of our hedging activities. Other than such exposures, we did not have material transaction exposure to other foreign currencies as of December 31, 2017.

Interest Rate Risk

Variable Rate Debt Exposure. We are exposed to interest rate risk as certain of our project specific debt financings have variable interest rates, exposing us to variability in interest expense and cash flows. See Note 14. "Debt" to our consolidated financial statements included in this Annual Report on Form 10-K for additional information on our long-term debt borrowing rates. An increase in relevant interest rates would increase the cost of borrowing under certain of our project specific debt financings. If such variable interest rates changed by 100 basis points, our interest expense for the year ended December 31, 2017 would have changed by $0.7 million.

Customer Financing Exposure. We are also indirectly exposed to interest rate risk because many of our customers depend on debt financings to purchase modules or systems. An increase in interest rates could make it challenging for our customers to obtain the capital necessary to make such purchases on favorable terms, or at all. Such factors could lower demand or the price we can charge for our modules and systems, thereby reducing our net sales and gross profit. In addition, we believe that a significant percentage of our customers purchase systems as an investment, funding the initial capital expenditure through a combination of equity and debt. An increase in interest rates could lower an investor's return on investment in a system or make alternative investments more attractive relative to PV solar power systems, which, in either case, could cause these end-users to seek alternative investments that promise higher returns.

Marketable Securities and Restricted Investments Exposure. We invest in various debt securities, which exposes us to interest rate risk. The primary objectives of our investment activities are to preserve principal and provide liquidity, while at the same time maximizing the return on our investments. Many of the securities in which we invest may be subject to market risk. Accordingly, a change in prevailing interest rates may cause the market value of such investments to fluctuate. For example, if we hold a security that was issued with an interest rate fixed at the then-prevailing rate and the prevailing interest rate subsequently rises, the market value of our investment may decline.

For the year ended December 31, 2017, our marketable securities earned a return of 1%, including the impact of fluctuations in the price of the underlying securities, and had a weighted-average maturity of 12 months as of the end

of the period. Based on our investment positions as of December 31, 2017, a hypothetical 100 basis point change in interest rates would have resulted in a $4.6 million change in the market value of our investment portfolio. For the year ended December 31, 2017, our restricted investments incurred a loss of 3%, including the impact of fluctuations in the price of the underlying securities, and had a weighted-average maturity of approximately 17 years as of the end of the period. Based on our restricted investment positions as of December 31, 2017, a hypothetical 100 basis point change in interest rates would have resulted in a $62.8 million change in the market value of our restricted investment portfolio.

Commodity and Component Risk

We are exposed to price risks for the raw materials, components, services, and energy costs used in the manufacturing and transportation of our solar modules and BoS parts used in our systems. Also, some of our raw materials and components are sourced from a limited number of suppliers or a single supplier. We endeavor to qualify multiple suppliers using a robust qualification process. In some cases, we also enter into long-term supply contracts for raw materials and components. As a result, we remain exposed to price changes in the raw materials and components used in our solar modules and systems. In addition, the failure of a key supplier could disrupt our supply chain, which could result in higher prices and/or a disruption in our manufacturing or construction processes. We may be unable to pass along changes in the costs of the raw materials and components for our modules and systems to our customers and may be in default of our delivery obligations if we experience a manufacturing or construction disruption.

Credit Risk

We have certain financial and derivative instruments that subject us to credit risk. These consist primarily of cash, cash equivalents, marketable securities, trade accounts receivable, restricted cash and investments, notes receivable, and foreign exchange forward contracts. We are exposed to credit losses in the event of nonperformance by the counterparties to our financial and derivative instruments. We place cash, cash equivalents, marketable securities, restricted cash and investments, and foreign exchange forward contracts with various high-quality financial institutions and limit the amount of credit risk from any one counterparty. We continuously evaluate the credit standing of our counterparty financial institutions. Our net sales are primarily concentrated among a limited number of customers. We monitor the financial condition of our customers and perform credit evaluations whenever considered necessary. Depending upon the sales arrangement, we may require some form of payment security from our customers, including advance payments, parent guarantees, bank guarantees, or commercial letters of credit.

Item 8. ***Financial Statements and Supplementary Data***

Consolidated Financial Statements

Our consolidated financial statements as required by this item are included in Item 15. “Exhibits and Financial Statement Schedules.” See Item 15(a) for a list of our consolidated financial statements.

Selected Quarterly Financial Data (Unaudited)

The following selected quarterly financial data should be read in conjunction with our consolidated financial statements and the related notes thereto and Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations.” This information has been derived from our unaudited consolidated financial statements that, in our opinion, reflect all recurring adjustments necessary to fairly present this information when read in conjunction with our consolidated financial statements. The interim periods presented below for the year ended December 31, 2016 reflect the adoption of ASU 2014-09. See Note 3. “Recent Accounting Pronouncements” to our consolidated financial statements included in this Annual Report on Form 10-K further information regarding these changes. The results of operations for any quarter are not necessarily indicative of the results to be expected for any future period.

	Quarters Ended							
	Dec 31, 2017	Sep 30, 2017	Jun 30, 2017	Mar 31, 2017	Dec 31, 2016	Sep 30, 2016	Jun 30, 2016	Mar 31, 2016
	(In thousands, except per share amounts)							
Net sales	$ 339,181	$1,087,026	$ 623,326	$ 891,791	$ 330,795	$ 681,276	$1,016,424	$ 876,068
Gross profit	62,070	291,800	110,893	84,184	7,848	170,908	182,051	277,611
Production start-up	20,488	12,624	8,381	1,150	214	752	55	—
Restructuring and asset impairments	(1,927)	791	18,286	20,031	660,113	4,314	79,435	—
Goodwill impairment	—	—	—	—	68,833	—	6,097	—
Operating (loss) income	(35,071)	206,989	13,928	(7,995)	(821,153)	73,324	(243)	179,921
Net (loss) income	(432,454)	205,747	51,963	9,129	(750,790)	150,457	(11,415)	195,636
Net (loss) income per share:								
Basic	$ (4.14)	$ 1.97	$ 0.50	$ 0.09	$ (7.22)	$ 1.46	$ (0.11)	$ 1.92
Diluted	$ (4.14)	$ 1.95	$ 0.50	$ 0.09	$ (7.22)	$ 1.45	$ (0.11)	$ 1.90

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 carried out an evaluation, under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our "disclosure controls and procedures" as defined in Exchange Act Rule 13a-15(e) and 15d-15(e). Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that as of December 31, 2017 our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in reports that we file or submit under the 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 timely decisions regarding required disclosure.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate "internal control over financial reporting," as defined in Exchange Act Rule 13a-15(f) and 15d-15(f). We also carried out an evaluation, under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our internal control over financial reporting as of December 31, 2017 based on the criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (or "COSO"). Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles in the United States of America ("U.S. GAAP"). Based on such evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2017. The effectiveness of our internal control over financial reporting as of December 31, 2017 has also been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in its report which appears herein.

Changes in Internal Control over Financial Reporting

We also carried out an evaluation, under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of our internal control over financial reporting to determine whether any changes in our internal control over financial reporting occurred during the quarter ended December 31, 2017 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Based on that evaluation, there were no such changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2017.

Limitations on the Effectiveness of Controls

Control systems, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control systems' objectives are being met. Further, the design of any system of controls must reflect the fact that there are resource constraints, and the benefits of all controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within our Company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of error or mistake. Control systems can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

Item 9B. ***Other Information***

None.

PART III

Item 10. ***Directors, Executive Officers, and Corporate Governance***

Information concerning our board of directors and audit committee will appear in our 2018 Proxy Statement, under the sections entitled "Directors" and "Corporate Governance." The information in such sections of the Proxy Statement is incorporated by reference into in this Annual Report on Form 10-K. For information with respect to our executive officers, see Item 1. "Business – Executive Officers of the Registrant."

Information concerning Section 16(a) beneficial ownership reporting compliance will appear in our 2018 Proxy Statement under the section entitled "Section 16(a) Beneficial Ownership Reporting Compliance." The information in such section of the 2018 Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

We have adopted a Code of Business Conduct and Ethics that applies to all directors, officers, and associates of First Solar. Information concerning this code will appear in our 2018 Proxy Statement under the section entitled "Corporate Governance." The information in such section of the Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

Item 11. ***Executive Compensation***

Information concerning executive compensation and related information will appear in our 2018 Proxy Statement under the section entitled "Executive Compensation," and information concerning the compensation committee will appear under "Corporate Governance" and "Compensation Committee Report." The information in such sections of the 2018 Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

Item 12. ***Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

Information concerning the security ownership of certain beneficial owners and management and related stockholder matters, including certain information regarding our equity compensation plans, will appear in our 2018 Proxy Statement under the section entitled "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters." The information in such section of the Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

Equity Compensation Plans

The following table sets forth certain information as of December 31, 2017 concerning securities authorized for issuance under our equity compensation plans:

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options and Rights (a)(1)	Weighted-Average Exercise Price of Outstanding Options and Rights (b)(2)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column (a)) (c)(3)
Equity compensation plans approved by stockholders	2,302,906	$ —	4,128,595
Equity compensation plans not approved by stockholders	—	—	—
Total	2,302,906	$ —	4,128,595

(1) Includes 2,302,906 shares issuable upon vesting of restricted stock units ("RSUs") granted under our 2010 and 2015 Omnibus Incentive Compensation Plans.

(2) The weighted-average exercise price does not take into account the shares issuable upon vesting of outstanding RSUs, which have no exercise price.

(3) Includes 645,774 shares of common stock reserved for future issuance under our stock purchase plan for employees.

See Note 18. "Share-Based Compensation" to our consolidated financial statements included in this Annual Report on Form 10-K for further discussion on our equity compensation plans.

Item 13. ***Certain Relationships and Related Transactions, and Director Independence***

Information concerning certain relationships and related party transactions will appear in our 2018 Proxy Statement under the section entitled "Certain Relationships and Related Party Transactions." The information in such section of the 2018 Proxy Statement is incorporated by reference into this Annual Report on Form 10-K. Information concerning director independence will appear in our 2018 Proxy Statement under the section entitled "Corporate Governance." The information in such section of the Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

Item 14. ***Principal Accounting Fees and Services***

Information concerning principal accounting fees and services and the audit committee's pre-approval policies and procedures for these items will appear in our 2018 Proxy Statement under the section entitled "Principal Accounting Fees and Services." The information in such section of the 2018 Proxy Statement is incorporated by reference into this Annual Report on Form 10-K.

PART IV

Item 15. ***Exhibits and Financial Statement Schedules***

(a) *Documents.* The following documents are filed as part of this Annual Report on Form 10-K:

Report of Independent Registered Public Accounting Firm
Consolidated Balance Sheets
Consolidated Statements of Operations
Consolidated Statements of Comprehensive Income
Consolidated Statements of Stockholders' Equity
Consolidated Statements of Cash Flows
Notes to Consolidated Financial Statements

(b) *Exhibits.* The exhibits listed on the accompanying Index to Exhibits are filed with or incorporated by reference into this Annual Report on Form 10-K.

(c) *Financial Statement Schedules*. All financial statement schedules have been omitted as the required information is not applicable or is not material to require presentation of the schedule, or because the information required is included in the consolidated financial statements and notes thereto of this Annual Report on Form 10-K.

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of First Solar, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of First Solar, Inc. and its subsidiaries as of December 31, 2017 and 2016, and the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the COSO.

Change in Accounting Principle

As discussed in Note 3 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2017.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Controls over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting 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 in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements 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. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP

Phoenix, Arizona
February 22, 2018

We have served as the Company's or its predecessor's auditor since 2000, which includes periods before the Company became subject to SEC reporting requirements.

FIRST SOLAR, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(In thousands, except share data)

	December 31,	
	2017	2016
ASSETS		
Current assets:		
Cash and cash equivalents	$ 2,268,534	$ 1,347,155
Marketable securities	720,379	607,991
Accounts receivable trade, net	211,797	266,687
Accounts receivable, unbilled and retainage	174,608	206,739
Inventories	172,370	363,219
Balance of systems parts	28,840	62,776
Project assets	77,931	700,800
Notes receivable, affiliate	20,411	15,000
Prepaid expenses and other current assets	157,902	217,462
Total current assets	3,832,772	3,787,829
Property, plant and equipment, net	1,154,537	629,142
PV solar power systems, net	417,108	448,601
Project assets	424,786	762,148
Deferred tax assets, net	51,417	255,152
Restricted cash and investments	424,783	371,307
Investments in unconsolidated affiliates and joint ventures	219,503	234,610
Goodwill	14,462	14,462
Intangibles assets, net	80,227	87,970
Inventories	113,277	100,512
Notes receivable, affiliates	48,370	54,737
Other assets	83,259	77,898
Total assets	$ 6,864,501	$ 6,824,368
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 120,220	$ 148,730
Income taxes payable	19,581	12,562
Accrued expenses	366,827	262,977
Current portion of long-term debt	13,075	27,966
Deferred revenue	81,816	308,704
Other current liabilities	48,757	146,942
Total current liabilities	650,276	907,881
Accrued solar module collection and recycling liability	166,609	166,277
Long-term debt	380,465	160,422
Other liabilities	568,454	371,439
Total liabilities	1,765,804	1,606,019
Commitments and contingencies		
Stockholders' equity:		
Common stock, $0.001 par value per share; 500,000,000 shares authorized; 104,468,460 and 104,034,731 shares issued and outstanding at December 31, 2017 and 2016, respectively	104	104
Additional paid-in capital	2,799,107	2,765,310
Accumulated earnings	2,297,227	2,462,842
Accumulated other comprehensive income (loss)	2,259	(9,907)
Total stockholders' equity	5,098,697	5,218,349
Total liabilities and stockholders' equity	$ 6,864,501	$ 6,824,368

See accompanying notes to these consolidated financial statements.

FIRST SOLAR, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except per share amounts)

	Years Ended December 31,		
	2017	2016	2015
Net sales	$ 2,941,324	$ 2,904,563	$ 4,112,650
Cost of sales	2,392,377	2,266,145	2,979,888
Gross profit	548,947	638,418	1,132,762
Operating expenses:			
Selling, general and administrative	202,699	261,994	255,192
Research and development	88,573	124,762	130,593
Production start-up	42,643	1,021	16,818
Restructuring and asset impairments	37,181	743,862	—
Goodwill impairment	—	74,930	—
Total operating expenses	371,096	1,206,569	402,603
Operating income (loss)	177,851	(568,151)	730,159
Foreign currency loss, net	(9,640)	(14,007)	(6,868)
Interest income	35,704	25,193	22,516
Interest expense, net	(25,765)	(20,538)	(6,975)
Other income (expense), net	23,965	40,252	(5,502)
Income (loss) before taxes and equity in earnings of unconsolidated affiliates	202,115	(537,251)	733,330
Income tax expense	(371,996)	(23,167)	(32,329)
Equity in earnings of unconsolidated affiliates, net of tax	4,266	144,306	(107,595)
Net (loss) income	$ (165,615)	$ (416,112)	$ 593,406
Net (loss) income per share:			
Basic	$ (1.59)	$ (4.05)	$ 5.88
Diluted	$ (1.59)	$ (4.05)	$ 5.83
Weighted-average number of shares used in per share calculations:			
Basic	104,328	102,866	100,886
Diluted	104,328	102,866	101,815

See accompanying notes to these consolidated financial statements.

FIRST SOLAR, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)

	Years Ended December 31,		
	2017	2016	2015
Net (loss) income	$ (165,615)	$ (416,112)	$ 593,406
Other comprehensive income (loss):			
Foreign currency translation adjustments	11,832	(7,409)	(16,432)
Unrealized gain (loss) on marketable securities and restricted investments, net of tax of $(588), $2,518, and $1,248	3,217	(21,713)	(15,415)
Unrealized (loss) gain on derivative instruments, net of tax of $1,396, $(691), and $2,071	(2,883)	3,735	(2,813)
Other comprehensive income (loss)	12,166	(25,387)	(34,660)
Comprehensive (loss) income	$ (153,449)	$ (441,499)	$ 558,746

See accompanying notes to these consolidated financial statements.

FIRST SOLAR, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)

	Common Stock		Additional Paid-In Capital	Accumulated Earnings	Accumulated Other Comprehensive (Loss) Income	Total Equity
	Shares	Amount				
Balance at December 31, 2014	100,288	$ 100	$ 2,697,558	$ 2,243,689	$ 50,140	$ 4,991,487
Cumulative-effect adjustment for the adoption of ASU 2014-09	—	—	40	16,825	—	16,865
Net income	—	—	—	593,406	—	593,406
Other comprehensive loss	—	—	—	—	(34,660)	(34,660)
Common stock issued for share-based compensation	1,782	2	5,886	—	—	5,888
Share-based compensation tax benefits	—	—	20,626	—	—	20,626
Tax withholding related to vesting of restricted stock	(303)	—	(18,189)	—	—	(18,189)
Share-based compensation expense	—	—	42,973	—	—	42,973
Balance at December 31, 2015	101,767	102	2,748,894	2,853,920	15,480	5,618,396
Cumulative-effect adjustment for the adoption of ASU 2016-09	—	—	2,420	25,034	—	27,454
Net loss	—	—	—	(416,112)	—	(416,112)
Other comprehensive loss	—	—	—	—	(25,387)	(25,387)
Common stock issued for share-based compensation	2,574	2	6,318	—	—	6,320
Tax withholding related to vesting of restricted stock	(306)	—	(20,407)	—	—	(20,407)
Share-based compensation expense	—	—	28,085	—	—	28,085
Balance at December 31, 2016	104,035	104	2,765,310	2,462,842	(9,907)	5,218,349
Net loss	—	—	—	(165,615)	—	(165,615)
Other comprehensive income	—	—	—	—	12,166	12,166
Common stock issued for share-based compensation	580	—	4,474	—	—	4,474
Tax withholding related to vesting of restricted stock	(147)	—	(5,137)	—	—	(5,137)
Share-based compensation expense	—	—	34,460	—	—	34,460
Balance at December 31, 2017	104,468	$ 104	$ 2,799,107	$ 2,297,227	$ 2,259	$ 5,098,697

See accompanying notes to these consolidated financial statements.

FIRST SOLAR, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2017	2016	2015
Cash flows from operating activities:			
Net (loss) income	$ (165,615)	$ (416,112)	$ 593,406
Adjustments to reconcile net (loss) income to cash provided by (used in) operating activities:			
Depreciation, amortization and accretion	115,313	230,940	257,825
Impairments and net losses on disposal of long-lived assets	35,364	838,467	14,593
Share-based compensation	35,121	28,712	44,899
Equity in earnings of unconsolidated affiliates, net of tax	(4,266)	(144,306)	107,595
Distributions received from equity method investments	23,042	18,562	—
Remeasurement of monetary assets and liabilities	(15,823)	5,442	(4,229)
Deferred income taxes	173,368	90,555	5,882
Gains on sales of marketable securities and restricted investments	(49)	(41,632)	—
Noncash consideration from the sale of systems	—	(20,091)	(457,596)
Liabilities assumed by customers for the sale of systems	(24,203)	—	—
Other, net	2,339	13,863	520
Changes in operating assets and liabilities:			
Accounts receivable, trade, unbilled and retainage	85,760	178,894	(427,648)
Prepaid expenses and other current assets	26,680	9,269	(38,823)
Inventories and balance of systems parts	212,758	95,785	113,537
Project assets and PV solar power systems	981,273	(571,655)	(525,551)
Other assets	(1,269)	(19,245)	(1,163)
Income tax receivable and payable	169,079	(61,383)	1,788
Accounts payable	(47,191)	(191,642)	143,872
Accrued expenses and other liabilities	(258,028)	158,693	(74,890)
Accrued solar module collection and recycling liability	(2,976)	3,637	(79,226)
Net cash provided by (used in) operating activities	1,340,677	206,753	(325,209)
Cash flows from investing activities:			
Purchases of property, plant and equipment	(514,357)	(229,452)	(166,438)
Purchases of marketable securities and restricted investments	(580,971)	(422,609)	(556,479)
Proceeds from sales and maturities of marketable securities and restricted investments	466,309	525,515	353,359
Proceeds from sales of equity and cost method investments	—	291,502	—
Distributions received from equity method investments	720	1,502	238,980
Investments in notes receivable, affiliates	—	(4,760)	(55,163)
Payments received on notes receivable, affiliates	1,740	3,053	57,866
Other investing activities	(243)	(20,231)	(28,302)
Net cash (used in) provided by investing activities	(626,802)	144,520	(156,177)
Cash flows from financing activities:			
Repayment of borrowings under revolving credit facility	—	(550,000)	—
Proceeds from borrowings under revolving credit facility	—	550,000	—
Repayment of long-term debt	(24,078)	(137,367)	(47,078)
Proceeds from borrowings under long-term debt, net of discounts and issuance costs	215,415	26,816	146,027
Repayment of sale-leaseback financing	(5,218)	(5,276)	(3,702)
Proceeds from sale-leaseback financing	—	—	44,718
Payments of tax withholdings for restricted shares	(5,137)	(20,407)	(18,189)
Proceeds from commercial letters of credit	43,025	—	11,200
Contingent consideration payments and other financing activities	(31,962)	(159)	(31,769)
Net cash provided by (used in) financing activities	192,045	(136,393)	101,207
Effect of exchange rate changes on cash, cash equivalents and restricted cash	8,866	(6,306)	(19,272)
Net increase (decrease) in cash, cash equivalents and restricted cash	914,786	208,574	(399,451)
Cash, cash equivalents and restricted cash, beginning of the period	1,415,690	1,207,116	1,606,567
Cash, cash equivalents and restricted cash, end of the period	$ 2,330,476	$ 1,415,690	$ 1,207,116
Supplemental disclosure of noncash investing and financing activities:			
Property, plant and equipment acquisitions funded by liabilities	$ 164,946	$ 28,687	$ 17,749
Acquisitions currently or previously funded by liabilities and contingent consideration	$ 9,315	$ 30,092	$ 17,988
Sale of equity method investment funded by note receivable, affiliate	$ —	$ 50,000	$ —
Accrued interest capitalized to long-term debt	$ 18,401	$ —	$ —

See accompanying notes to these consolidated financial statements.

FIRST SOLAR, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. First Solar and Its Business

We are a leading global provider of comprehensive PV solar energy solutions. We design, manufacture, and sell PV solar modules with an advanced thin film semiconductor technology and also develop, design, construct, and sell PV solar power systems that primarily use the modules we manufacture. Additionally, we provide O&M services to system owners. We have substantial, ongoing R&D efforts focused on module and system-level innovations. We are the world's largest thin film PV solar module manufacturer and one of the world's largest PV solar module manufacturers. Our mission is to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership, and operational excellence.

2. Summary of Significant Accounting Policies

Basis of Presentation. These consolidated financial statements include the accounts of First Solar, Inc. and its subsidiaries and are prepared in accordance with U.S. GAAP. We eliminated all intercompany transactions and balances during consolidation. Investments in unconsolidated affiliates in which we have less than a controlling interest are accounted for using the cost or equity method of accounting. Certain prior year balances were reclassified to conform to the current year presentation. Such reclassifications primarily related to the adoption of Accounting Standards Update ("ASU") 2014-09 as further described in Note 3. "Recent Accounting Pronouncements" to our consolidated financial statements.

Use of Estimates. The preparation of consolidated financial statements in conformity with U.S. GAAP requires us to make estimates and assumptions that affect the amounts reported in our consolidated financial statements and the accompanying notes. On an ongoing basis, we evaluate our estimates, including those related to inputs used to recognize revenue over time, accrued solar module collection and recycling liabilities, product warranties, accounting for income taxes, long-lived asset impairments, and testing goodwill. Despite our intention to establish accurate estimates and reasonable assumptions, actual results could differ materially from such estimates and assumptions.

Fair Value Measurements. We measure certain assets and liabilities at fair value, which is defined as the price that would be received from the sale of an asset or paid to transfer a liability (i.e., an exit price) on the measurement date in an orderly transaction between market participants in the principal or most advantageous market for the asset or liability. Our fair value measurements use the following hierarchy, which prioritizes valuation inputs based on the extent to which the inputs are observable in the market.

- Level 1 – Valuation techniques in which all significant inputs are unadjusted quoted prices from active markets for assets or liabilities that are identical to the assets or liabilities being measured.

- Level 2 – Valuation techniques in which significant inputs include quoted prices from active markets for assets or liabilities that are similar to the assets or liabilities being measured and/or quoted prices for assets or liabilities that are identical or similar to the assets or liabilities being measured from markets that are not active. Also, model-derived valuations in which all significant inputs are observable in active markets are Level 2 valuation techniques.

- Level 3 – Valuation techniques in which one or more significant inputs are unobservable. Such inputs reflect our estimate of assumptions that market participants would use to price an asset or liability.

Cash and Cash Equivalents. We consider all highly liquid investments with original maturities of 90 days or less at the time of purchase to be cash equivalents.

Restricted Cash. Restricted cash consists of deposits held by various banks to secure certain of our letters of credit and other deposits designated for the construction or operation of systems projects as well as the payment of amounts related to project specific debt financings. Restricted cash for our letters of credit is classified as current or noncurrent based on the maturity date of the corresponding letter of credit. Restricted cash for project construction, operation, and financing is classified as current or noncurrent based on the intended use of the restricted funds.

Marketable Securities and Restricted Investments. We determine the classification of our marketable securities and restricted investments at the time of purchase and reevaluate such designation at each balance sheet date. We classify our marketable securities and restricted investments as available-for-sale. Accordingly, we record them at fair value and account for the net unrealized gains and losses as part of "Accumulated other comprehensive income (loss)" until realized. We record realized gains and losses on the sale of our marketable securities and restricted investments in "Other income (expense), net" computed using the specific identification method.

We may sell marketable securities prior to their stated maturities after consideration of our liquidity requirements. We view unrestricted securities with maturities beyond 12 months as available to support current operations and, accordingly, classify such securities as current assets under "Marketable securities" in the consolidated balance sheets. Restricted investments consist of long-term duration marketable securities that we hold through a custodial account to fund the estimated future costs of our solar module collection and recycling obligations. Accordingly, we classify restricted investments as noncurrent assets under "Restricted cash and investments" in the consolidated balance sheets.

All of our available-for-sale marketable securities and restricted investments are subject to a periodic impairment review. We consider a marketable security or restricted investment to be impaired when it's fair value is less than its cost basis, in which case we would further review the security or investment to determine if it is other-than-temporarily impaired. In performing such an evaluation, we review factors such as the length of time and the extent to which its fair value has been below its cost basis, the financial condition of the issuer and any changes thereto, our intent to sell, and whether it is more likely than not that we will be required to sell the marketable security or restricted investment before we have recovered its cost basis. If a marketable security or restricted investment were other-than-temporarily impaired, we write it down through "Other income (expense), net" to its impaired value and establish that value as its new cost basis.

Accounts Receivable Trade and Allowance for Doubtful Accounts. We record trade accounts receivable for our unconditional rights to consideration arising from our performance under contracts with customers. The carrying value of such receivables, net of the allowance for doubtful accounts, represents their estimated net realizable value. We estimate our allowance for doubtful accounts for specific trade receivable balances based on historical collection trends, the age of outstanding trade receivables, existing economic conditions, and the financial security, if any, associated with the receivables. Past-due trade receivable balances are written off when our internal collection efforts have been unsuccessful.

Our module and other equipment sales generally include up to 45-day payment terms following the transfer of control of the products to the customer. In addition, certain module and equipment sale agreements may require a down payment for a portion of the transaction price upon or shortly after entering into the agreement or related purchase order. Payment terms for sales of our solar power systems, EPC services, and operations and maintenance services vary by contract but are generally due upon demand or within several months of satisfying the associated performance obligations. As a practical expedient, we do not adjust the promised amount of consideration for the effects of a significant financing component when we expect, at contract inception, that the period between our transfer of a promised product or service to a customer and when the customer pays for that product or service will be one year or less. We typically do not include extended payment terms in our contracts with customers.

Accounts Receivable, Unbilled. Accounts receivable, unbilled represents a contract asset for revenue that has been recognized in advance of billing the customer, which is common for long-term construction contracts. For example, we typically recognize revenue from contracts for the construction and sale of PV solar power systems over time using cost based input methods, which recognize revenue and gross profit as work is performed based on the relationship between actual costs incurred compared to the total estimated costs of the contract. Accordingly, revenue could be

recognized in advance of billing the customer, resulting in an amount recorded to "Accounts receivable, unbilled and retainage." Once we have an unconditional right to consideration under a construction contract, we typically bill our customer accordingly and reclassify the "Accounts receivable, unbilled and retainage" to "Accounts receivable trade, net." Billing requirements vary by contract but are generally structured around the completion of certain construction milestones.

Retainage. Certain of our EPC contracts for PV solar power systems we build contain retainage provisions. Retainage represents a contract asset for the portion of the contract price earned by us for work performed, but held for payment by the customer as a form of security until we reach certain construction milestones. We consider whether collectibility of such retainage is reasonably assured in connection with our overall assessment of the collectibility of amounts due or that will become due under our EPC contracts. Retainage included within "Accounts receivable, unbilled and retainage" is expected to be billed and collected within the next 12 months. After we satisfy the EPC contract requirements and have an unconditional right to consideration, we typically bill for retainage and reclassify such amounts to "Accounts receivable trade, net."

Inventories – Current and Noncurrent. We report our inventories at the lower of cost or net realizable value. We determine cost on a first-in, first-out basis and include both the costs of acquisition and the costs of manufacturing in our inventory costs. These costs include direct material, direct labor, and indirect manufacturing costs, including depreciation and amortization. Our capitalization of costs into inventory is based on the normal utilization of our plants. If our plant utilization is abnormally low, the portion of our indirect manufacturing costs related to the abnormal utilization level is expensed as incurred. Finished goods inventory is comprised exclusively of solar modules that have not yet been installed in a PV solar power plant under construction or sold to a third-party customer.

As needed, we may purchase a critical raw material that is used in our core production process in quantities that exceed anticipated consumption within our normal operating cycle (which is 12 months). We classify such raw materials that we do not expect to consume within our normal operating cycle as noncurrent.

We regularly review the cost of inventories, including noncurrent inventories, against their estimated net realizable value and record write-downs if any inventories have costs in excess of their net realizable values. We also regularly evaluate the quantities and values of our inventories, including noncurrent inventories, in light of current market conditions and trends, among other factors, and record write-downs for any quantities in excess of demand or for any obsolescence. This evaluation considers the use of modules in our systems business, expected demand, anticipated sales prices, strategic raw material requirements, new product development schedules, the effect new products might have on the sale of existing products, product obsolescence, product merchantability, and other factors. Market conditions are subject to change, and actual consumption of our inventory could differ from forecasted demand.

Balance of Systems Parts. BoS parts represent mounting, electrical, and other construction parts purchased for PV solar power systems to be constructed or currently under construction, which we hold title to and are not yet installed in a system. Such construction parts include items such as posts, tilt brackets, tables, harnesses, combiner boxes, inverters, cables, tracker equipment, and other parts that we may purchase or assemble for the systems we construct. We carry these parts at the lower of cost or net realizable value, with such value being based primarily on recoverability through installation in a system or recoverability through a sales agreement. BoS parts do not include any solar modules that we manufacture.

Property, Plant and Equipment. We report our property, plant and equipment at cost, less accumulated depreciation. Cost includes the price paid to acquire or construct the assets, required installation costs, interest capitalized during the construction period, and any expenditures that substantially add to the value of or substantially extend the useful life of the assets. We capitalize costs related to computer software obtained or developed for internal use, which generally includes enterprise-level business and finance software that we customize to meet our specific operational requirements. We expense repair and maintenance costs at the time we incur them.

We begin depreciation for our property, plant and equipment when they are placed in service. We consider such assets to be placed in service when they are both in the location and condition for their intended use. We compute depreciation expense using the straight-line method over the estimated useful lives of assets, as presented in the table below. We depreciate leasehold improvements over the shorter of their estimated useful lives or the remaining term of the lease. The estimated useful life of an asset is reassessed whenever applicable facts and circumstances indicate a change in the estimated useful life of such asset has occurred.

	Useful Lives in Years
Buildings and building improvements	25 – 40
Manufacturing machinery and equipment	5 – 10
Furniture, fixtures, computer hardware, and computer software	3 – 7
Leasehold improvements	up to 15

PV Solar Power Systems. PV solar power systems represent project assets that we may temporarily own and operate after being placed in service. We report our PV solar power systems at cost, less accumulated depreciation. When we are entitled to incentive tax credits for our systems, we reduce the related carrying value of the assets by the amount of the tax credits, which reduces future depreciation. We begin depreciation for PV solar power systems when they are placed in service. We compute depreciation expense for the systems using the straight-line method over the shortest of the term of the related PPA, the lease on the land, or 25 years. Our current PV solar power systems have estimated useful lives ranging from 15 to 25 years.

Project Assets. Project assets primarily consist of costs related to solar power projects in various stages of development that are capitalized prior to the completion of the sale of the project, including projects that may have begun commercial operation under PPAs and are actively marketed and intended to be sold. These project related costs include costs for land, development, and construction of a PV solar power system. Development costs may include legal, consulting, permitting, transmission upgrade, interconnection, and other similar costs. We typically classify project assets as noncurrent due to the nature of solar power projects (long-lived assets) and the time required to complete all activities to develop, construct, and sell projects, which is typically longer than 12 months. Once we enter into a definitive sales agreement, we classify such project assets as current until the sale is completed and we have met all of the criteria to recognize the sale as revenue. Any income generated by a project while it remains within project assets is accounted for as a reduction to our basis in the project, which at the time of sale and meeting all revenue recognition criteria will be recorded within cost of sales. If a project is completed and begins commercial operation prior to the closing of a sales arrangement, the completed project will remain in project assets until placed in service. We present all expenditures related to the development and construction of project assets, whether fully or partially owned, as a component of cash flows from operating activities.

We review project assets for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. We consider a project commercially viable or recoverable if it is anticipated to be sold for a profit once it is either fully developed or fully constructed. We consider a partially developed or partially constructed project commercially viable or recoverable if the anticipated selling price is higher than the carrying value of the related project assets. We examine a number of factors to determine if the project is expected to be recoverable, including whether there are any changes in environmental, ecological, permitting, market pricing, or regulatory conditions that may impact the project. Such changes could cause the costs of the project to increase or the selling price of the project to decrease. If a project is not considered recoverable, we impair the respective project assets and adjust the carrying value to the estimated fair value, with the resulting impairment recorded within "Selling, general and administrative" expense.

Interest Capitalization. We capitalize interest as part of the historical cost of acquiring or constructing certain assets, including property, plant and equipment; project assets; and PV solar power systems, during the period of time required to place the assets in service or, in the case of project assets, to sell the assets to customers. Interest capitalized for property, plant and equipment or PV solar power systems is depreciated over the estimated useful life of the related

assets when they are placed in service. We charge interest capitalized for project assets to cost of sales when such assets are sold and we have met all revenue recognition criteria. We capitalize interest to the extent that interest cost has been incurred and payments have been made to acquire, construct, or develop an asset. We cease capitalization of interest for assets in development or under construction if the assets are substantially complete or if we have sold such assets.

Asset Impairments. We assess long-lived assets classified as "held and used," including our property, plant and equipment; project assets; PV solar power systems; and intangible assets for impairment whenever events or changes in circumstances arise, including consideration of technological obsolescence, that may indicate that the carrying amount of such assets may not be recoverable. These events and changes in circumstances may include a significant decrease in the market price of a long-lived asset; a significant adverse change in the extent or manner in which a long-lived asset is being used or in its physical condition; a significant adverse change in the business climate that could affect the value of a long-lived asset; an accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of a long-lived asset; a current-period operating or cash flow loss combined with a history of such losses or a projection of future losses associated with the use of a long-lived asset; or a current expectation that, more likely than not, a long-lived asset will be sold or otherwise disposed of significantly before the end of its previously estimated useful life. For purposes of recognition and measurement of an impairment loss, long-lived assets are grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities.

When impairment indicators are present, we compare undiscounted future cash flows, including the eventual disposition of the asset group at market value, to the asset group's carrying value to determine if the asset group is recoverable. If the carrying value of the asset group exceeds the undiscounted future cash flows, we measure any impairment by comparing the fair value of the asset group to its carrying value. Fair value is generally determined by considering (i) internally developed discounted cash flows for the asset group, (ii) third-party valuations, and/or (iii) information available regarding the current market value for such assets. If the fair value of an asset group is determined to be less than its carrying value, an impairment in the amount of the difference is recorded in the period that the impairment indicator occurs. Estimating future cash flows requires significant judgment, and such projections may vary from the cash flows eventually realized.

We consider a long-lived asset to be abandoned after we have ceased use of such asset and we have no intent to use or repurpose the asset in the future. Abandoned long-lived assets are recorded at their salvage value, if any.

We classify long-lived assets we plan to sell, excluding project assets and PV solar power systems, as held for sale on our consolidated balance sheets only after certain criteria have been met including: (i) management has the authority and commits to a plan to sell the asset, (ii) the asset is available for immediate sale in its present condition, (iii) an active program to locate a buyer and the plan to sell the asset have been initiated, (iv) the sale of the asset is probable within 12 months, (v) the asset is being actively marketed at a reasonable sales price relative to its current fair value, and (vi) it is unlikely that the plan to sell will be withdrawn or that significant changes to the plan will be made. We record assets held for sale at the lower of their carrying value or fair value less costs to sell. If, due to unanticipated circumstances, such assets are not sold in the 12 months after being classified as held for sale, then held for sale classification will continue as long as the above criteria are still met.

Ventures and Variable Interest Entities. In the normal course of business, we establish wholly owned project companies which may be considered variable interest entities ("VIEs"). We consolidate wholly owned VIEs when we are considered the primary beneficiary of such entities. Additionally, we have, and may in the future form, joint venture type arrangements, including partnerships and partially owned limited liability companies or similar legal structures, with one or more third parties primarily to develop, construct, own, and/or sell solar power projects. We analyze all of our ventures and classify them into two groups: (i) ventures that must be consolidated because they are either not VIEs and we hold a majority voting interest, or because they are VIEs and we are the primary beneficiary and (ii) ventures that do not need to be consolidated and are accounted for under either the cost or equity method of accounting because they are either not VIEs and we hold a minority voting interest, or because they are VIEs and we are not the primary beneficiary.

Ventures are considered VIEs if (i) the total equity investment at risk is not sufficient to permit the entity to finance its activities without additional subordinated financial support; (ii) as a group, the holders of the equity investment at risk lack the ability to make certain decisions, the obligation to absorb expected losses, or the right to receive expected residual returns; or (iii) an equity investor has voting rights that are disproportionate to its economic interest and substantially all of the entity's activities are conducted on behalf of that investor. Our venture agreements typically require us to fund some form of capital for the development and construction of a project, depending upon the opportunity and the market in which our ventures are located.

We are considered the primary beneficiary of and are required to consolidate a VIE if we have the power to direct the activities that most significantly impact the VIE's economic performance and the obligation to absorb losses or the right to receive benefits of the VIE that could potentially be significant to the entity. If we determine that we do not have the power to direct the activities that most significantly impact the entity, then we are not the primary beneficiary of the VIE.

Cost and Equity Method Investments. We account for our unconsolidated ventures using either the cost or equity method of accounting depending upon whether we have the ability to exercise significant influence over the venture. As part of this evaluation, we consider our participating and protective rights in the venture as well as its legal form. We use the cost method of accounting for our investments when we do not have the ability to significantly influence the operations or financial activities of the investee. We record our cost method investments at their historical cost and subsequently record any distributions received from the net accumulated earnings of such investments as income. Distributions received from our cost method investments in excess of their earnings are considered returns of investment and are recorded as reductions in the cost of the investments. We use the equity method of accounting for our investments when we have the ability to significantly influence, but not control, the operations or financial activities of the investee. We record our equity method investments at cost and subsequently adjust their carrying amount each period for our share of the earnings or losses of the investee and other adjustments required by the equity method of accounting. Distributions received from our equity method investments are recorded as reductions in the carrying value of such investments and are classified on the consolidated statements of cash flows pursuant to the cumulative earnings approach. Under this approach, distributions received are considered returns on investment and are classified as cash inflows from operating activities unless our cumulative distributions received, less distributions received in prior periods that were determined to be returns of investment, exceed our cumulative equity in earnings recognized from the investment. When such an excess occurs, the current period distributions up to this excess are considered returns of investment and are classified as cash inflows from investing activities.

We monitor our cost and equity method investments, which are included in "Investments in unconsolidated affiliates and joint ventures" in the accompanying consolidated balance sheets, for impairment and record reductions in their carrying values if the carrying amount of an investment exceeds its fair value. An impairment charge is recorded when such impairment is deemed to be other-than-temporary. To determine whether an impairment is other-than-temporary, we consider our ability and intent to hold the investment until the carrying amount is fully recovered. Circumstances that indicate an other-than-temporary impairment may have occurred include factors such as decreases in quoted market prices or declines in the operations of the investee. The evaluation of an investment for potential impairment requires us to exercise significant judgment and to make certain assumptions. The use of different judgments and assumptions could result in different conclusions. We recorded impairment losses related to our cost and equity method investments of $2.0 million, $15.3 million, and zero during the years ended December 31, 2017, 2016, and 2015, respectively.

Goodwill. Goodwill represents the excess of the purchase price of acquired businesses over the estimated fair value assigned to the individual assets acquired and liabilities assumed. We do not amortize goodwill, but instead are required to test goodwill for impairment at least annually. We perform impairment tests between scheduled annual tests in the fourth quarter if facts and circumstances indicate that it is more likely than not that the fair value of a reporting unit that has goodwill is less than its carrying value.

We may first make a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying value to determine whether it is necessary to perform a quantitative goodwill impairment test. Such

qualitative impairment test considers various factors, including macroeconomic conditions, industry and market considerations, cost factors, the overall financial performance of a reporting unit, and any other relevant events affecting our company or a reporting unit. If we determine through the qualitative assessment that a reporting unit's fair value is more likely than not greater than its carrying value, the quantitative impairment test is not required. If the qualitative assessment indicates it is more likely than not that a reporting unit's fair value is less than its carrying value, we perform a quantitative impairment test. We may also elect to proceed directly to the quantitative impairment test without considering qualitative factors.

The quantitative impairment test is the comparison of the fair value of a reporting unit with its carrying amount, including goodwill. Our reporting units consist of our modules business, which was also historically referred to as our components business, and our fully integrated systems business. We define the fair value of a reporting unit as the price that would be received to sell the unit as a whole in an orderly transaction between market participants at the measurement date. We primarily use an income approach to estimate the fair value of our reporting units. Significant judgment is required when estimating the fair value of a reporting unit, including the forecasting of future operating results and the selection of discount and expected future growth rates used to determine projected cash flows. If the estimated fair value of a reporting unit exceeds its carrying value, goodwill is not impaired, and no further analysis is required. Conversely, if the carrying value of a reporting unit exceeds its estimated fair value, we record an impairment loss equal to the excess, not to exceed the total amount of goodwill allocated to the reporting unit.

In-Process Research and Development. In-process research and development ("IPR&D") is initially capitalized at fair value as an intangible asset with an indefinite life and assessed for impairment thereafter. When the IPR&D project is complete, it is reclassified as a definite-lived intangible asset and amortized over its estimated useful life. If an IPR&D project is abandoned, we record an impairment charge for the carrying value of the related intangible asset in the period it is abandoned.

Deferred Revenue. When we receive consideration, or such consideration is unconditionally due, from a customer prior to transferring goods or services to the customer under the terms of a sales contract, we record deferred revenue, which represents a contract liability. We recognize deferred revenue as net sales after we have transferred control of the goods or services to the customer and all revenue recognition criteria are met. As a practical expedient, we do not adjust the consideration in a contract for the effects of a significant financing component when we expect, at contract inception, that the period between a customer's down payment and our transfer of a promised product or service to the customer will be one year or less. Additionally, we do not adjust the consideration in a contract for the effects of a significant financing component when the consideration is received as a form of performance security.

Product Warranties. We provide a limited PV solar module warranty covering defects in materials and workmanship under normal use and service conditions for approximately 10 years. We also typically warrant that modules installed in accordance with agreed-upon specifications will produce at least 98% of their labeled power output rating during the first year, with the warranty coverage reducing by 0.5% every year thereafter throughout the approximate 25-year performance warranty period. In resolving claims under both the limited defect and power output warranties, we typically have the option of either repairing or replacing the covered modules or, under the limited power output warranty, providing additional modules to remedy the power shortfall. Our limited module warranties also include an option for us to remedy claims under such warranties, generally exercisable only after the second year of the warranty period, by making certain cash payments. Under the limited workmanship warranty, the optional cash payment will be equal to the original purchase price of the module, reduced by a degradation factor, and under the limited power output warranty, the cash payment will be equal to the shortfall in power output. Such limited module warranties are standard for module sales and may be transferred from the original purchasers of the solar modules to subsequent purchasers upon resale.

As an alternative form of our standard limited module power output warranty, we also offer an aggregated or system-level limited module performance warranty. This system-level limited module performance warranty is designed for utility-scale systems and provides 25-year system-level energy degradation protection. This warranty represents a practical expedient to address the challenge of identifying, from the potential millions of modules installed in a utility-scale system, individual modules that may be performing below warranty thresholds by focusing on the aggregate

energy generated by the system rather than the power output of individual modules. The system-level limited module performance warranty is typically calculated as a percentage of a system's expected energy production, adjusted for certain actual site conditions, with the warranted level of performance declining each year in a linear fashion, but never falling below 80% during the term of the warranty. In resolving claims under the system-level limited module performance warranty to restore the system to warranted performance levels, we first must validate that the root cause of the issue is due to module performance; we then have the option of either repairing or replacing the covered modules, providing supplemental modules, or making a cash payment. Consistent with our limited module power output warranty, when we elect to satisfy a warranty claim by providing replacement or supplemental modules under the system-level module performance warranty, we do not have any obligation to pay for the labor to remove or install modules.

In addition to our limited solar module warranties described above, for PV solar power systems we construct, we typically provide limited warranties for defects in engineering design, installation, and BoS part workmanship for a period of one to two years following the substantial completion of a system or a block within the system. In resolving claims under such BoS warranties, we have the option of remedying the defect through repair or replacement.

When we recognize revenue for module or system sales, we accrue liabilities for the estimated future costs of meeting our limited warranty obligations. We make and revise these estimates based primarily on the number of our solar modules under warranty installed at customer locations, our historical experience with warranty claims, our monitoring of field installation sites, our internal testing of and the expected future performance of our solar modules and BoS parts, and our estimated per-module replacement costs.

Accrued Solar Module Collection and Recycling Liability. We recognize expense at the time of sale for the estimated cost of our future obligations for collecting and recycling solar modules covered by our solar module collection and recycling program. See Note 13. "Solar Module Collection and Recycling Liability" for further information.

Asset Retirement Obligations. We develop, construct, and operate certain project assets and PV solar power systems with land lease or other agreements that include a requirement for the removal of the assets at the end of the term of the agreement. We also lease certain manufacturing facilities or administrative offices under agreements that require the removal of our leasehold improvements or other property upon termination of the lease.

We recognize such asset retirement obligations ("AROs") in the period in which they are incurred based on the present value of estimated third-party decommissioning costs, and we capitalize the associated asset retirement costs as part of the carrying amount of the related assets. Once an asset is placed in service, the asset retirement cost is subsequently depreciated on a straight-line basis over the estimated useful life of the asset. Changes in AROs resulting from the passage of time are recognized as an increase in the carrying amount of the liability and as accretion expense. Our AROs were included within "Other liabilities" at December 31, 2017 and 2016 and totaled $16.7 million and $22.4 million, respectively.

Derivative Instruments. We recognize derivative instruments on our consolidated balance sheets at their fair value. On the date that we enter into a derivative contract, we designate the derivative instrument as a fair value hedge, a cash flow hedge, a hedge of a net investment in a foreign operation, or a derivative instrument that will not be accounted for using hedge accounting methods. As of December 31, 2017 and 2016, all of our derivative instruments were designated either as cash flow hedges or as derivative instruments not accounted for using hedge accounting methods.

We record changes in the fair value of a derivative instrument that is highly effective and that is designated and qualifies as a cash flow hedge in "Other comprehensive income (loss)" until our earnings are affected by the variability of the cash flows from the underlying hedge. We record any hedge ineffectiveness and amounts excluded from effectiveness testing in current period earnings within "Other income (expense), net." We report changes in the fair value of derivative instruments that are not designated or do not qualify for hedge accounting in current period earnings. We classify cash flows from derivative instruments on the consolidated statements of cash flows in the same category as the item being hedged or on a basis consistent with the nature of the instrument.

At the inception of a hedge, we formally document all relationships between hedging instruments and the underlying hedged items as well as our risk-management objective and strategy for undertaking the hedge transaction. We also formally assess (both at inception and on an ongoing basis) whether our derivative instruments are highly effective in offsetting changes in the fair value or cash flows of the underlying hedged items and whether those derivatives are expected to remain highly effective in future periods. When we determine that a derivative instrument is not highly effective as a hedge, we discontinue hedge accounting prospectively. In all situations in which we discontinue hedge accounting and the derivative instrument remains outstanding, we carry the derivative instrument at its fair value on our consolidated balance sheets and recognize subsequent changes in its fair value in current period earnings.

Business Combinations. We account for business combinations using the acquisition method of accounting and record intangible assets separate from goodwill. Such intangible assets are recorded at fair value based on estimates as of the date of acquisition. Goodwill is recorded as the residual amount of the purchase price consideration less the fair value assigned to the individual assets acquired and liabilities assumed as of the date of acquisition. We charge acquisition related costs that are not part of the purchase price consideration to "Selling, general and administrative" as they are incurred. These costs typically include transaction and integration costs, such as legal, accounting, and other professional fees. We account for any contingent consideration, which represents an obligation of the acquirer to transfer additional assets or equity interests to the former owner as part of the exchange if specified future events occur or conditions are met, at fair value either as a liability or as equity depending on the terms of the acquisition agreement.

Revenue Recognition – Module and Other Equipment Sales. We recognize revenue for module and other equipment sales (e.g., module plus arrangements) at a point in time following the transfer of control of such products to the customer, which typically occurs upon shipment or delivery depending on the terms of the underlying contracts. For module and other equipment sales contracts that contain multiple performance obligations, such as the shipment or delivery of solar modules and other BoS parts, we allocate the transaction price to each performance obligation identified in the contract based on relative standalone selling prices, or estimates of such prices, and recognize the related revenue as control of each individual product is transferred to the customer, in satisfaction of the corresponding performance obligations.

Revenue Recognition – Solar Power System Sales and/or Engineering, Procurement, and Construction Services. We generally recognize revenue for sales of solar power systems and/or EPC services over time as our performance creates or enhances an energy generation asset controlled by the customer. Furthermore, the sale of a solar power system, including those in which we may receive consideration of a noncontrolling interest, when combined with EPC services represents a single performance obligation for the development and construction of a single generation asset. For such sales arrangements, we recognize revenue using cost based input methods, which recognize revenue and gross profit as work is performed based on the relationship between actual costs incurred compared to the total estimated costs of the contract, after consideration of our customers' commitment to perform its obligations under the contract, which is typically measured through the receipt of cash deposits or other forms of financial security issued by creditworthy financial institutions or parent entities. For sales of solar power systems in which we obtain an interest in the project sold to the customer, we recognize all of the revenue for the consideration received, including the fair value of the noncontrolling interest we obtained, and defer any profit associated with the interest obtained through "Equity in earnings of unconsolidated affiliates, net of tax." We may also recognize revenue for the sale of a solar power system after it has been completed due to the timing of when we enter into the associated sales contract with the customer.

In applying cost based input methods of revenue recognition, we use the actual costs incurred relative to the total estimated costs (including solar module costs) to determine our progress towards contract completion and to calculate the corresponding amount of revenue and gross profit to recognize. Cost based input methods of revenue recognition are considered a faithful depiction of our efforts to satisfy long-term construction contracts and therefore reflect the transfer of goods to a customer under such contracts. Costs incurred that do not contribute to satisfying our performance obligations ("inefficient costs") are excluded from our input methods of revenue recognition as the amounts are not reflective of our transferring control of the system to the customer. Costs incurred towards contract completion may include costs associated with solar modules, direct materials, labor, subcontractors, and other indirect costs related to contract performance. We recognize solar module and direct material costs as incurred when such items have been

installed in a system. Cost based input methods of revenue recognition require us to make estimates of net contract revenues and costs to complete our projects. In making such estimates, significant judgment is required to evaluate assumptions related to the amount of net contract revenues, including the impact of any performance incentives, liquidated damages, and other payments to customers. Significant judgment is also required to evaluate assumptions related to the costs to complete our projects, including materials, labor, contingencies, and other system costs.

If the estimated total costs on any contract, including any inefficient costs, are greater than the net contract revenues, we recognize the entire estimated loss in the period the loss becomes known. The cumulative effect of revisions to estimates related to net contract revenues or costs to complete contracts are recorded in the period in which the revisions to estimates are identified and the amounts can be reasonably estimated. The effect of the changes on future periods are recognized as if the revised estimates had been used since revenue was initially recognized under the contract. Such revisions could occur in any reporting period, and the effects may be material depending on the size of the contracts or the changes in estimates.

As part of our solar power system sales, we conduct performance testing of a system prior to substantial completion to confirm the system meets its operational and capacity expectations noted in the EPC agreement. In addition, we may provide an energy performance test during the first or second year of a system's operation to demonstrate that the actual energy generation for the applicable year meets or exceeds the modeled energy expectation, after certain adjustments. In certain instances, a bonus payment may be received at the end of the applicable test period if the system performs above a specified level. Conversely, if there is an underperformance event with regards to these tests, we may incur liquidated damages as a percentage of the EPC contract price. Such performance guarantees represent a form of variable consideration and are estimated at contract inception at their most likely amount and updated at the end of each reporting period as additional performance data becomes available and only to the extent that it is probable that a significant reversal of any incremental revenue will not occur.

Revenue Recognition – Operations and Maintenance. We recognize revenue for standard, recurring O&M services over time as customers receive and consume the benefits of such services, which typically include 24/7 system monitoring, certain PPA and other agreement compliance, NERC compliance, large generator interconnection agreement compliance, energy forecasting, performance engineering analysis, regular performance reporting, turn-key maintenance services including spare parts and corrective maintenance repair, warranty management, and environmental services. Other ancillary O&M services, such as equipment replacement, weed abatement, landscaping, or solar module cleaning, are recognized as revenue as the services are provided and billed to the customer. Costs of O&M services are expensed in the period in which they are incurred.

As part of our O&M service offerings, we typically offer an effective availability guarantee, which stipulates that a system will be available to generate a certain percentage of total possible energy during a specific period after adjusting for factors outside of our control as the service provider. If system availability exceeds a contractual threshold, we may receive a bonus payment, or if system availability falls below a separate threshold, we may incur liquidated damages for certain lost energy under the PPA. Such bonuses or liquidated damages represent a form of variable consideration and are estimated and recognized over time as customers receive and consume the benefits of the O&M services.

Revenue Recognition – Energy Generation. We typically recognize revenue for energy generated and sold by PV solar power systems under ASC 840, *Leases*, consistent with the classification of the associated PPAs. Accordingly, we recognize revenue each period based on the volume of energy delivered to the customer (i.e., the PPA off-taker). For energy generated and sold by PV solar power systems on an open contract basis, we recognize revenue at the point in time the energy is delivered to the grid.

Shipping and Handling Costs. We account for shipping and handling activities related to contracts with customers as costs to fulfill our promise to transfer the associated products. Accordingly, we record amounts billed for shipping and handling costs as a component of net sales, and classify such costs as a component of cost of sales.

Taxes Collected from Customers and Remitted to Governmental Authorities. We exclude from our measurement of transaction prices all taxes assessed by governmental authorities that are both (i) imposed on and concurrent with a specific revenue-producing transaction and (ii) collected from customers. Accordingly, such tax amounts are not included as a component of net sales or cost of sales.

Research and Development Expense. We incur research and development costs during the process of researching and developing new products and enhancing our existing products, technologies, and manufacturing processes. Our research and development costs consist primarily of employee compensation, materials, outside services, and depreciation. We expense these costs as incurred until the resulting product has been completed, tested, and made ready for commercial manufacturing.

Production Start-Up. Production start-up expense consists primarily of employee compensation and other costs associated with operating a production line before it has been qualified for full production, including the cost of raw materials for solar modules run through the production line during the qualification phase and applicable facility related costs. Costs related to equipment upgrades and implementation of manufacturing process improvements are also included in production start-up expense as well as costs related to the selection of a new site, related legal and regulatory costs, and costs to maintain our plant replication program to the extent we cannot capitalize these expenditures.

Restructuring and Exit Activities. We record costs associated with exit activities, such as one-time employee termination benefits, when management approves and commits to a plan of termination or over the future service period, if any. Other costs associated with exit activities may include contract termination costs, including costs related to leased facilities to be abandoned or subleased, and facility and employee relocation costs.

Share-Based Compensation. We recognize share-based compensation expense for the estimated grant-date fair value of equity awards issued as compensation to employees over the requisite service period, which is generally four years. For awards with performance conditions, we recognize share-based compensation expense if it is probable that the performance conditions will be achieved. We account for forfeitures of share-based awards as such forfeitures occur. Accordingly, when an associate's employment is terminated, all previously unvested awards granted to such associate are forfeited, which results in a benefit to share-based compensation expense in the period of such associate's termination equal to the cumulative expense recorded through the termination date for such unvested awards. We recognize share-based compensation expense for awards with graded vesting schedules on a straight-line basis over the requisite service periods for each separately vesting portion of the award as if each award was in substance multiple awards.

Foreign Currency Translation. The functional currencies of certain of our foreign subsidiaries are their local currencies. Accordingly, we apply period-end exchange rates to translate their assets and liabilities and daily transaction exchange rates to translate their revenues, expenses, gains, and losses into U.S. dollars. We include the associated translation adjustments as a separate component of "Accumulated other comprehensive income (loss)" within stockholders' equity. The functional currency of our subsidiaries in Canada, Chile, Malaysia, Singapore, and Vietnam is the U.S. dollar; therefore, we do not translate their financial statements. Gains and losses arising from the remeasurement of monetary assets and liabilities denominated in currencies other than a subsidiary's functional currency are included in "Foreign currency loss, net" in the period in which they occur.

Income Taxes. We use the asset and liability method to account for income taxes whereby we calculate deferred tax assets or liabilities using the enacted tax rates and tax law applicable to when any temporary differences are expected to be recovered or settled. We establish valuation allowances, when necessary, to reduce deferred tax assets to the extent it is more likely than not that such deferred tax assets will not be realized. We do not provide deferred taxes related to the U.S. GAAP basis in excess of the outside tax basis in the investment in our foreign subsidiaries to the extent such amounts relate to indefinitely reinvested earnings and profits of such foreign subsidiaries.

Income tax expense includes (i) deferred tax expense, which generally represents the net change in deferred tax assets or liabilities during the year plus any change in valuation allowances, and (ii) current tax expense, which represents the amount of tax currently payable to or receivable from taxing authorities. We only recognize tax benefits related to

uncertain tax positions that are more likely than not of being sustained upon examination. For those positions that satisfy such recognition criteria, the amount of tax benefit that we recognize is the largest amount of tax benefit that is more likely than not of being sustained on ultimate settlement of the uncertain tax position.

Per Share Data. Basic net income or loss per share is computed by dividing the weighted-average number of common shares outstanding for the period. Diluted net income or loss per share is computed giving effect to all potentially dilutive common shares, including restricted and performance stock units and stock purchase plan shares, unless there is a net loss for the period. In computing diluted net income per share, we utilize the treasury stock method.

Comprehensive Income. Our comprehensive income consists of our net income, the effects on our consolidated financial statements of translating the financial statements of our subsidiaries that operate in foreign currencies, the unrealized gains or losses on available-for-sale marketable securities and restricted investments, and the unrealized gains or losses on derivative instruments that qualify for and have been designated as cash flow hedges.

3. Recent Accounting Pronouncements

In February 2018, the Financial Accounting Standard Board ("FASB") issued ASU 2018-02, *Income Statement – Reporting Comprehensive Income (Topic 220) – Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income,* to allow entities to reclassify the income tax effects of the Tax Act on items within accumulated other comprehensive income to retained earnings. ASU 2018-02 is effective for fiscal years and interim periods within those years beginning after December 15, 2018, and early adoption is permitted. We are currently evaluating the impact ASU 2018-02 will have on our consolidated financial statements and associated disclosures.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815) – Targeted Improvements to Accounting for Hedging Activities*, to simplify certain aspects of hedge accounting for both non-financial and financial risks and better align the recognition and measurement of hedge results with an entity's risk management activities. ASU 2017-12 also amends certain presentation and disclosure requirements for hedging activities and changes how an entity assesses hedge effectiveness. ASU 2017-12 is effective for fiscal years and interim periods within those years beginning after December 15, 2018, and early adoption is permitted. We are currently evaluating the impact ASU 2017-12 will have on our consolidated financial statements and associated disclosures.

In January 2017, the FASB issued ASU 2017-04, *Goodwill and Other (Topic 350) – Simplifying the Test for Goodwill Impairment.* ASU 2017-04 simplifies the subsequent measurement of goodwill by eliminating Step 2 of the goodwill impairment test. In computing the implied fair value of goodwill under Step 2, an entity had to perform procedures to determine the fair value at the impairment testing date of its assets and liabilities (including unrecognized assets and liabilities) following the procedure that would be required in determining the fair value of assets acquired and liabilities assumed in a business combination. Under ASU 2017-04, an entity should perform its goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount and then recognize an impairment charge, as necessary, for the amount by which the carrying amount exceeds the reporting unit's fair value, not to exceed the total amount of goodwill allocated to the reporting unit. As a result of our adoption of ASU 2017-04 in the first quarter of 2017, we eliminated Step 2 of our goodwill impairment tests.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes (Topic 230) – Intra-Entity Transfers of Assets Other Than Inventory*. ASU 2016-16 requires the recognition of income tax consequences of intra-entity transfers of assets, other than inventory, when the transfer occurs. Two common examples of assets included in the scope of ASU 2016-16 are intellectual property and long-lived assets. ASU 2016-16 is effective for fiscal years and interim periods within those years beginning after December 15, 2017. We are currently evaluating the impact ASU 2016-16 will have on our consolidated financial statements and associated disclosures.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments – Credit Losses (Topic 326)*, to provide financial statement users with more useful information about expected credit losses. ASU 2016-13 also changes how entities measure credit losses on financial instruments and the timing of when such losses are recorded. ASU 2016-13 is effective

for fiscal years and interim periods within those years beginning after December 15, 2019, and early adoption is permitted for periods beginning after December 15, 2018. We are currently evaluating the impact ASU 2016-13 will have on our consolidated financial statements and associated disclosures.

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*, to increase transparency and comparability among organizations by recognizing a right-of-use asset and a lease liability on the balance sheet for all leases with terms longer than 12 months. Leases will be classified as either operating or financing, with such classification affecting the pattern of expense recognition in the income statement. ASU 2016-02 is effective for fiscal years and interim periods within those years beginning after December 15, 2018, and early adoption is permitted. We are currently evaluating the impact ASU 2016-02 will have on our consolidated financial statements and associated disclosures.

In January 2016, the FASB issued ASU 2016-01, *Financial Instruments – Overall (Subtopic 825-10) – Recognition and Measurement of Financial Assets and Financial Liabilities.* ASU 2016-01 changes how entities measure certain equity investments and present changes in the fair value of financial liabilities measured under the fair value option that are attributable to their own credit. The guidance also changes certain disclosure requirements and other aspects of current U.S. GAAP. ASU 2016-01 is effective for fiscal years and interim periods within those years beginning after December 15, 2017. We do not expect the adoption of ASU 2016-01 to have a significant impact on our consolidated financial statements and associated disclosures.

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (Topic 606)*, to clarify the principles of recognizing revenue and create common revenue recognition guidance between U.S. GAAP and International Financial Reporting Standards. Under ASU 2014-09, revenue is recognized when a customer obtains control of promised goods or services and is recognized at an amount that reflects the consideration expected to be received in exchange for such goods or services. In addition, ASU 2014-09 requires disclosure of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers.

We adopted ASU 2014-09 in the first quarter of 2017 using the full retrospective method. This adoption primarily affected our systems business sales arrangements previously accounted for under ASC 360-20, which had required us to evaluate whether such arrangements had any forms of continuing involvement that may have affected the revenue or profit recognition of the transactions, including arrangements with prohibited forms of continuing involvement. When such forms of continuing involvement were present, we reduced the potential profit on the applicable project sale by our maximum exposure to loss.

Our adoption of ASU 2014-09, which supersedes the real estate sales guidance under ASC 360-20, generally requires us to recognize revenue and profit from our systems business sales arrangements earlier and in a more linear fashion than our historical practice under ASC 360-20, including the estimation of certain profits that would otherwise have been deferred. Additionally, for systems business sales arrangements in which we obtain an interest in the project sold to the customer, we recognize all of the revenue for the consideration received, including the fair value of the noncontrolling interest we obtained, and defer any profit associated with the interest obtained through "Equity in earnings of unconsolidated affiliates, net of tax." Following the adoption of ASU 2014-09, the revenue recognition for our other sales arrangements, including sales of solar modules and O&M services, remained materially consistent with our historical practice.

See Note 2. "Summary of Significant Accounting Policies" to our consolidated financial statements for further discussion of the effects of the adoption of ASU 2014-09 on our significant accounting policies. The adoption of ASU 2014-09 also affected the cumulative-effect adjustment to retained earnings for the prior year adoption of ASU 2016-09, *Compensation – Stock Compensation (Topic 718) – Improvements to Employee Share-Based Payment Accounting*, by reducing the deferred tax assets for excess tax benefits that had previously not been recognized by $6.1 million.

The following table presents the effect of the adoption of ASU 2014-09 on our consolidated balance sheet as of December 31, 2016 (in thousands):

	December 31, 2016		
	As Reported	Adoption of ASU 2014-09	As Adjusted
Accounts receivable, unbilled and retainage	$ 205,530	$ 1,209	$ 206,739
Deferred project costs	701,105	(701,105)	—
Project assets, current	—	700,800	700,800
Prepaid expenses and other current assets	217,157	305	217,462
Total current assets	3,786,620	1,209	3,787,829
Project assets and deferred project costs	800,770	(800,770)	—
Project assets, noncurrent	—	762,148	762,148
Deferred tax assets, net	252,655	2,497	255,152
Investments in unconsolidated affiliates and joint ventures	242,361	(7,751)	234,610
Other assets	78,076	(178)	77,898
Total assets	6,867,213	(42,845)	6,824,368
Income taxes payable	5,288	7,274	12,562
Billings in excess of costs and estimated earnings	115,623	(115,623)	—
Payments and billings for deferred project costs	284,440	(284,440)	—
Deferred revenue	—	308,704	308,704
Other current liabilities	54,683	92,259	146,942
Total current liabilities	899,707	8,174	907,881
Other liabilities	428,120	(56,681)	371,439
Total liabilities	1,654,526	(48,507)	1,606,019
Additional paid-in capital	2,759,211	6,099	2,765,310
Accumulated earnings	2,463,279	(437)	2,462,842
Total stockholders' equity	5,212,687	5,662	5,218,349
Total liabilities and stockholders' equity	6,867,213	(42,845)	6,824,368

The following tables present the effect of the adoption of ASU 2014-09 on our consolidated statements of operations for the years ended December 31, 2016 and 2015 (in thousands, except per share amounts):

	Year Ended December 31, 2016		
	As Reported	Adoption of ASU 2014-09	As Adjusted
Net sales	$ 2,951,328	$ (46,765)	$ 2,904,563
Cost of sales	2,247,349	18,796	2,266,145
Gross profit	703,979	(65,561)	638,418
Operating loss	(502,590)	(65,561)	(568,151)
Loss before taxes and equity in earnings of unconsolidated affiliates	(471,690)	(65,561)	(537,251)
Income tax expense	(58,219)	35,052	(23,167)
Equity in earnings of unconsolidated affiliates, net of tax	171,945	(27,639)	144,306
Net loss	(357,964)	(58,148)	(416,112)
Comprehensive loss	(383,351)	(58,148)	(441,499)
Basic net loss per share	$ (3.48)	$ (0.57)	$ (4.05)
Diluted net loss per share	$ (3.48)	$ (0.57)	$ (4.05)

	Year Ended December 31, 2015		
	As Reported	Adoption of ASU 2014-09	As Adjusted
Net sales	$ 3,578,995	$ 533,655	$ 4,112,650
Cost of sales	2,659,728	320,160	2,979,888
Gross profit	919,267	213,495	1,132,762
Operating income	516,664	213,495	730,159
Income before taxes and equity in earnings of unconsolidated affiliates	519,835	213,495	733,330
Income tax benefit (expense)	6,156	(38,485)	(32,329)
Equity in earnings of unconsolidated affiliates, net of tax	20,430	(128,025)	(107,595)
Net income	546,421	46,985	593,406
Comprehensive income	511,761	46,985	558,746
Basic net income per share	$ 5.42	$ 0.46	$ 5.88
Diluted net income per share	$ 5.37	$ 0.46	$ 5.83

The following tables present the effect of the adoption of ASU 2014-09 on our consolidated statements of cash flows for the years ended December 31, 2016 and 2015 (in thousands):

	Year Ended December 31, 2016		
	As Reported	Adoption of ASU 2014-09	As Adjusted
Net loss	$ (357,964)	$ (58,148)	$ (416,112)
Adjustments to reconcile net loss to cash provided by operating activities:			
Equity in earnings of unconsolidated affiliates, net of tax	(171,945)	27,639	(144,306)
Deferred income taxes	123,864	(33,309)	90,555
Noncash consideration from the sale of systems	—	(20,091)	(20,091)
Changes in operating assets and liabilities:			
Accounts receivable, trade, unbilled and retainage	92,747	86,147	178,894
Prepaid expenses and other current assets	9,574	(305)	9,269
Project assets and PV solar power systems	(592,204)	20,549	(571,655)
Other assets	(19,423)	178	(19,245)
Income tax receivable and payable	(59,640)	(1,743)	(61,383)
Accrued expenses and other liabilities	179,610	(20,917)	158,693

	Year Ended December 31, 2015		
	As Reported	Adoption of ASU 2014-09	As Adjusted
Net income	$ 546,421	$ 46,985	$ 593,406
Adjustments to reconcile net income to cash used in operating activities:			
Equity in earnings of unconsolidated affiliates, net of tax	(20,430)	128,025	107,595
Deferred income taxes	(17,534)	23,416	5,882
Noncash consideration from the sale of systems	—	(457,596)	(457,596)
Changes in operating assets and liabilities:			
Accounts receivable, trade, unbilled and retainage	(340,292)	(87,356)	(427,648)
Prepaid expenses and other current assets	(38,635)	(188)	(38,823)
Project assets and PV solar power systems	(857,529)	331,978	(525,551)
Other assets	(8,484)	7,321	(1,163)
Income tax receivable and payable	(13,281)	15,069	1,788
Accrued expenses and other liabilities	(67,236)	(7,654)	(74,890)

4. Restructuring and Asset Impairments

Cadmium Telluride Module Manufacturing and Corporate Restructuring

In November 2016, our board of directors approved a set of initiatives intended to accelerate our transition to Series 6 module manufacturing and restructure our operations to reduce costs and better align the organization with our long-term strategic plans. Accordingly, we expect to upgrade and replace our legacy manufacturing fleet over the next several years with Series 6 manufacturing equipment, thereby enabling the production of solar modules with a larger form factor, better product attributes, and a lower cost structure.

As part of these initiatives, we incurred net charges of $41.8 million during the year ended December 31, 2017, which included (i) $27.6 million of charges, primarily related to net losses on the disposition of previously impaired Series 4 and Series 5 manufacturing equipment, (ii) $7.6 million of severance benefits to terminated employees, and (iii) $6.7 million of net miscellaneous charges, primarily related to contract terminations, the write-off of operating supplies, and other Series 4 manufacturing exit costs.

The commencement of this operational transition in November 2016 represented an expectation that certain of our module manufacturing assets would be sold or otherwise disposed of significantly before the end of their previously estimated useful lives. As a result, we compared the undiscounted future cash flows of our module manufacturing assets to the carrying value of the asset group and determined that the group was not recoverable. Accordingly, we measured the fair value of the asset group using a combination of income and cost valuation techniques and recorded impairment losses of $640.3 million for the year ended December 31, 2016. Such impairment losses included $120.7 million of charges related to stored Series 4 manufacturing equipment originally intended for use in previously planned manufacturing capacity expansions. During the year ended December 31, 2016, we also incurred charges of $14.1 million for severance benefits to terminated employees as we substantially reduced our workforce at our domestic and international facilities, including reductions in administrative and other staff, and $8.1 million for the closure of ancillary foreign operations, the write-off of operating supplies, and other miscellaneous charges.

Substantially all amounts associated with these restructuring and asset impairment charges related to our modules segment and were classified as "Restructuring and asset impairments" on the consolidated statements of operations. The following table summarizes our CdTe module manufacturing and corporate restructuring activity for the years ended December 31, 2017 and 2016 (in thousands):

	Asset Impairments	Severance	Other	Total
Charges to income	$ 640,340	$ 14,056	$ 8,111	$ 662,507
Cash payments	—	(6,191)	(151)	(6,342)
Non-cash amounts	(640,340)	—	(7,410)	(647,750)
Ending liability balance at December 31, 2016	—	7,865	550	8,415
Charges to income	27,606	7,577	6,664	41,847
Cash payments	—	(14,986)	(6,442)	(21,428)
Non-cash amounts	(27,606)	—	(772)	(28,378)
Ending liability balance at December 31, 2017	$ —	$ 456	$ —	$ 456

Crystalline Silicon Module Manufacturing Restructuring

In June 2016, our executive management elected to reallocate our crystalline silicon module production capacity to support next generation CdTe module offerings. As a result, we ended production of our crystalline silicon modules to focus on our core CdTe module technology and utility-scale PV solar power systems. The majority of our crystalline silicon module manufacturing associates were expected to be redeployed in other manufacturing operations.

In connection with these restructuring activities, we incurred charges of $81.4 million during the year ended December 31, 2016, which included (i) $35.9 million of impairment charges related to certain crystalline silicon module manufacturing equipment considered abandoned for accounting purposes, (ii) $35.8 million of impairment charges for developed technology intangible assets associated with our crystalline silicon module technology, (iii) $8.4 million of miscellaneous charges related to certain contract manufacturing agreements and the write-off of operating supplies, and (iv) $1.3 million of charges for severance benefits to terminated employees. All amounts associated with these charges related to our modules segment and were classified as "Restructuring and asset impairments" on the consolidated statements of operations.

Other Restructuring

During the year ended December 31, 2012, we recognized a liability for the expected repayment of certain customs tax benefits as part of a prior restructuring activity. In December 2017, we reversed this liability as a result of meeting certain investment certificate criteria associated with the commencement of operations at our previously announced manufacturing plant in Vietnam and recorded a $4.7 million benefit to "Restructuring and asset impairments."

5. Business Acquisitions

Enki Technology

In October 2016, we acquired 100% of the shares of Enki Technology, Inc. ("Enki"), a developer of advanced coating materials for the PV solar industry, for cash payments of $10.3 million, net of cash acquired of $0.3 million, and a promise to pay additional consideration of up to $7.0 million contingent on the achievement of certain production and module performance milestones. In connection with applying the acquisition method of accounting, $17.3 million of the purchase price consideration was assigned to an IPR&D intangible asset to be amortized over its useful life upon successful completion of the underlying projects, $4.4 million was assigned to a deferred tax liability, and $4.4 million was assigned to goodwill. The acquired IPR&D includes patents, technical information and know-how, and other proprietary information associated with the development and production of anti-reflective coating material that we expect to use in the production of our solar modules. Such technology is expected to improve our module conversion efficiency and overall durability at a lower cost structure compared to our current production processes.

6. Goodwill and Intangible Assets

Goodwill

The changes in the carrying amount of goodwill, by reporting unit, for the years ended December 31, 2017 and 2016 were as follows (in thousands):

	Balance at December 31, 2016	Acquisitions (Impairments)	Balance at December 31, 2017
Modules	$ 407,827	$ —	$ 407,827
Accumulated impairment losses	(393,365)	—	(393,365)
Total	$ 14,462	$ —	$ 14,462

	Balance at December 31, 2015	Acquisitions (Impairments)	Balance at December 31, 2016
Modules	$ 403,420	$ 4,407	$ 407,827
Crystalline silicon modules	6,097	—	6,097
Systems	68,833	—	68,833
Accumulated impairment losses	(393,365)	(74,930)	(468,295)
Total	$ 84,985	$ (70,523)	$ 14,462

Accumulated impairment losses at December 31, 2017 were entirely for our modules reporting unit. Accumulated impairment losses at December 31, 2016 were $393.4 million for our modules, $68.8 million for our systems, and $6.1 million for our crystalline silicon modules reporting units.

2017 Goodwill Impairment Testing

We performed our annual impairment analysis in the fourth quarter of 2017. ASC 350-20 provides that prior to performing a quantitative goodwill impairment test, companies are permitted to perform a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying value to determine whether it is necessary to perform a quantitative goodwill impairment test. Such qualitative impairment test considers various factors, including macroeconomic conditions, industry and market considerations, cost factors, the overall financial performance of a reporting unit, and any other relevant events affecting our company or a reporting unit. We performed a qualitative assessment for our modules reporting unit and concluded that it was not more likely than not that the fair value of the reporting unit was less than its carrying amount. Accordingly, a quantitative goodwill impairment test for this reporting unit was not required.

2016 Goodwill Impairment Testing

As part of our annual impairment analysis in the fourth quarter of 2016, we elected to perform a quantitative goodwill impairment test instead of first performing a qualitative goodwill impairment test. Such quantitative impairment test represented the comparison of the fair value of our reporting units with their carrying amounts, including goodwill. As of the date of our testing, our reporting units were consistent with our reportable segments: modules and systems. In determining the fair value of our reporting units, we used a combination of income and market based valuation techniques.

Significant estimates used in our income based fair value calculations included: (i) future sales volumes and average selling prices per watt; (ii) cost per watt projections for module and system sales; (iii) future effective tax rates, which we estimated to be between 10% and 35%; (iii) forecasts of capital expenditures and working capital requirements; (iv) discount rates, which we estimated to range between 11.5% and 18%; and (v) future terminal values of our reporting units, which are based on their ability to exist into perpetuity. Significant estimates used in our market based fair value calculations included business enterprise values and revenue multiples of various publicly traded companies. The underlying assumptions used in the quantitative impairment test also considered our market capitalization as of the date of our testing and then-current solar industry market conditions.

As a result of our testing, we determined that the estimated fair value of our modules reporting unit exceeded its carrying value indicating no impairment was necessary for this reporting unit. However, we determined that the estimated fair value of our systems reporting unit was less than its carrying value, which required us to determine the implied fair value of goodwill for the systems reporting unit by allocating the fair value of the systems reporting unit to its individual assets and liabilities, including any unrecognized intangible assets. Based on such calculation, the implied fair value of goodwill for the systems reporting unit was zero, and we recorded an impairment loss of $68.8 million. Such impairment was primarily driven by a strategic shift in the mix of our module and system net sales, which was approved by our board of directors in November 2016. This shift involved an expected reduction in the annual megawatts sold through systems business projects from approximately two gigawatts per year over the prior several years to approximately one gigawatt per year going forward. Other factors that contributed to the impairment included our reduced market capitalization and the challenging conditions within the solar industry as of the date of our testing.

In June 2016, we impaired $6.1 million of goodwill associated with our crystalline silicon modules reporting unit as a result of the decision to end the related manufacturing operations and dispose of the reporting unit. See Note 4. "Restructuring and Asset Impairments" to our consolidated financial statements for further discussion related to this restructuring activity.

Intangible Assets, Net

Intangible assets primarily include developed technologies from prior business acquisitions, certain PPAs acquired after the associated PV solar power systems were placed in service, our internally-generated intangible assets, substantially all of which were patents on technologies related to our products and production processes, and IPR&D related to our Enki acquisition as described in Note 5. "Business Acquisitions." We record an asset for patents, after the patent has been issued, based on the legal, filing, and other costs incurred to secure them. We amortize intangible assets on a straight-line basis over their estimated useful lives once the intangible assets meet the criteria to be amortized.

The following tables summarize our intangible assets at December 31, 2017 and 2016 (in thousands):

	December 31, 2017			
	Gross Amount	Accumulated Amortization	Accumulated Impairments	Net Amount
Developed technology	$ 114,612	$ (25,578)	$ (36,215)	$ 52,819
Power purchase agreements	6,486	(324)	—	6,162
Patents	7,068	(3,077)	—	3,991
In-process research and development	17,255	—	—	17,255
Total	$ 145,421	$ (28,979)	$ (36,215)	$ 80,227

	December 31, 2016			
	Gross Amount	Accumulated Amortization	Accumulated Impairments	Net Amount
Developed technology	$ 114,612	$ (18,208)	$ (36,215)	$ 60,189
Power purchase agreements	6,486	—	—	6,486
Patents	6,538	(2,498)	—	4,040
In-process research and development	17,255	—	—	17,255
Total	$ 144,891	$ (20,706)	$ (36,215)	$ 87,970

Amortization expense for our intangible assets was $8.3 million, $10.1 million, and $9.2 million for the years ended December 31, 2017, 2016, and 2015, respectively.

Estimated future amortization expense for our definite-lived intangible assets was as follows at December 31, 2017 (in thousands):

	Amortization Expense
2018	$ 8,325
2019	8,325
2020	8,325
2021	8,323
2022	8,299
Thereafter	21,375
Total amortization expense	$ 62,972

7. Cash, Cash Equivalents, and Marketable Securities

Cash, cash equivalents, and marketable securities consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Cash and cash equivalents:		
Cash	$ 2,142,949	$ 1,347,155
Money market funds	125,585	—
Total cash and cash equivalents	2,268,534	1,347,155
Marketable securities:		
Foreign debt	238,858	296,819
Foreign government obligations	152,850	271,172
U.S. debt	73,671	—
Time deposits	255,000	40,000
Total marketable securities	720,379	607,991
Total cash, cash equivalents, and marketable securities	$ 2,988,913	$ 1,955,146

During the years ended December 31, 2017, 2016, and 2015, we sold marketable securities for proceeds of $118.3 million, $159.2 million, and $65.0 million, respectively, and realized gains of less than $0.1 million, $0.3 million, and less than $0.1 million, respectively, on such sales. See Note 11. “Fair Value Measurements” to our consolidated financial statements for information about the fair value of our marketable securities.

The following tables summarize the unrealized gains and losses related to our available-for-sale marketable securities, by major security type, as of December 31, 2017 and 2016 (in thousands):

	As of December 31, 2017			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Foreign debt	$ 240,643	$ 3	$ 1,788	$ 238,858
Foreign government obligations	153,999	—	1,149	152,850
U.S. debt	73,746	—	75	73,671
Time deposits	255,000	—	—	255,000
Total	$ 723,388	$ 3	$ 3,012	$ 720,379

	As of December 31, 2016			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Foreign debt	$ 298,085	$ 2	$ 1,268	$ 296,819
Foreign government obligations	272,357	—	1,185	271,172
Time deposits	40,000	—	—	40,000
Total	$ 610,442	$ 2	$ 2,453	$ 607,991

As of December 31, 2017, we identified 16 investments totaling $210.3 million that had been in a loss position for a period of time greater than 12 months with unrealized losses of $1.9 million. As of December 31, 2016, we identified three investments totaling $51.2 million that had been in a loss position for a period of time greater than 12 months with unrealized losses of $0.1 million. The unrealized losses were primarily due to increases in interest rates relative to rates at the time of purchase. Based on the underlying credit quality of the investments, we do not intend to sell these securities prior to the recovery of our cost basis. Therefore, we did not consider these securities to be other-than-temporarily impaired.

The following tables show unrealized losses and fair values for those marketable securities that were in an unrealized loss position as of December 31, 2017 and 2016, aggregated by major security type and the length of time the marketable securities have been in a continuous loss position (in thousands):

	As of December 31, 2017					
	In Loss Position for Less Than 12 Months		In Loss Position for 12 Months or Greater		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses
Foreign debt	$ 119,869	$ 735	$ 88,919	$ 1,053	$ 208,788	$ 1,788
Foreign government obligations	31,467	289	121,383	860	152,850	1,149
U.S. debt	73,671	75	—	—	73,671	75
Total	$ 225,007	$ 1,099	$ 210,302	$ 1,913	$ 435,309	$ 3,012

	As of December 31, 2016					
	In Loss Position for Less Than 12 Months		In Loss Position for 12 Months or Greater		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses
Foreign debt	$ 234,332	$ 1,123	$ 51,236	$ 145	$ 285,568	$ 1,268
Foreign government obligations	272,503	1,185	—	—	272,503	1,185
Total	$ 506,835	$ 2,308	$ 51,236	$ 145	$ 558,071	$ 2,453

The contractual maturities of our marketable securities as of December 31, 2017 were as follows (in thousands):

	Fair Value
One year or less	$ 430,419
One year to two years	175,095
Two years to three years	114,865
Total	$ 720,379

8. Restricted Cash and Investments

Restricted cash and investments consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Restricted cash	$ 50,822	$ 31,381
Restricted investments	373,961	339,926
Total restricted cash and investments (1)	$ 424,783	$ 371,307

(1) There was an additional $11.1 million and $37.2 million of restricted cash included within "Prepaid expenses and other current assets" at December 31, 2017 and 2016, respectively.

At December 31, 2017 and 2016, our restricted cash consisted of deposits held by various banks to secure certain of our letters of credit and other deposits designated for the construction or operation of systems projects as well as the payment of amounts related to project specific debt financings. See Note 15. "Commitments and Contingencies" to our consolidated financial statements for further discussion relating to our letters of credit.

At December 31, 2017 and 2016, our restricted investments consisted of long-term marketable securities that were held in custodial accounts to fund the estimated future costs of collecting and recycling modules covered under our solar module collection and recycling program. During the year ended December 31, 2016, we sold certain restricted investments for proceeds of $118.2 million and realized gains of $41.3 million on such sales as part of an effort to align the currencies of the investments with those of the corresponding collection and recycling liabilities. See Note 11. "Fair Value Measurements" to our consolidated financial statements for information about the fair value of our restricted investments.

As necessary, we fund any incremental amounts for our estimated collection and recycling obligations within 90 days of the end of each year. We determine the funding requirement, if any, based on estimated costs of collecting and recycling covered modules, estimated rates of return on our restricted investments, and an estimated solar module life of 25 years less amounts already funded in prior years. No incremental funding was required in 2017 as substantially all of our module sales in the prior year were not covered under our solar module collection and recycling program. We also do not expect to fund any incremental amounts in 2018. To ensure that amounts previously funded will be available in the future regardless of potential adverse changes in our financial condition (even in the case of our own insolvency), we have established a trust under which estimated funds are put into custodial accounts with an established and reputable bank, for which First Solar, Inc.; First Solar Malaysia Sdn. Bhd. ("FS Malaysia"); and First Solar Manufacturing GmbH are grantors. In October 2017, we amended the trust agreement to allow trust funds to be disbursed for qualified module collection and recycling costs (including capital and facilities related recycling costs), payments to customers for assuming collection and recycling obligations, and reimbursements of any overfunded amounts. Investments in the trust must meet certain investment quality criteria comparable to highly rated government or agency bonds.

The following tables summarize the unrealized gains and losses related to our restricted investments, by major security type, as of December 31, 2017 and 2016 (in thousands):

	As of December 31, 2017			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Foreign government obligations	$ 127,436	$ 62,483	$ —	$ 189,919
U.S. government obligations	174,624	12,944	3,526	184,042
Total	$ 302,060	$ 75,427	$ 3,526	$ 373,961

	As of December 31, 2016			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Foreign government obligations	$ 107,604	$ 62,350	$ —	$ 169,954
U.S. government obligations	169,294	10,468	9,790	169,972
Total	$ 276,898	$ 72,818	$ 9,790	$ 339,926

As of December 31, 2017, we identified six restricted investments totaling $107.7 million that had been in a loss position for a period of time greater than 12 months with unrealized losses of $3.5 million. The unrealized losses were primarily due to increases in interest rates relative to rates at the time of purchase. Based on the underlying credit quality of the investments, we do not intend to sell these securities prior to the recovery of our cost basis. Therefore, we did not consider these investments to be other-than-temporarily impaired.

As of December 31, 2017, the contractual maturities of our restricted investments were between 12 years and 19 years.

9. Consolidated Balance Sheet Details

Accounts receivable trade, net

Accounts receivable trade, net consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Accounts receivable trade, gross	$ 213,776	$ 266,687
Allowance for doubtful accounts	(1,979)	—
Accounts receivable trade, net	$ 211,797	$ 266,687

At December 31, 2017 and 2016, $16.8 million and $12.2 million, respectively, of our accounts receivable trade, net were secured by letters of credit, bank guarantees, or other forms of financial security issued by creditworthy financial institutions.

Accounts receivable, unbilled and retainage

Accounts receivable, unbilled and retainage consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Accounts receivable, unbilled	$ 172,594	$ 200,474
Retainage	2,014	6,265
Accounts receivable, unbilled and retainage	$ 174,608	$ 206,739

Inventories

Inventories consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Raw materials	$ 148,968	$ 148,222
Work in process	14,085	13,204
Finished goods	122,594	302,305
Inventories	$ 285,647	$ 463,731
Inventories – current	$ 172,370	$ 363,219
Inventories – noncurrent	$ 113,277	$ 100,512

Prepaid expenses and other current assets

Prepaid expenses and other current assets consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Prepaid expenses	$ 41,447	$ 42,007
Prepaid income taxes	31,944	35,336
Value added tax receivables	12,232	22,308
Restricted cash	11,120	37,154
Derivative instruments	4,303	6,078
Other current assets	56,856	74,579
Prepaid expenses and other current assets	$ 157,902	$ 217,462

Property, plant and equipment, net

Property, plant and equipment, net consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Land	$ 8,181	$ 7,839
Buildings and improvements	424,266	378,981
Machinery and equipment	1,059,103	1,444,442
Office equipment and furniture	157,512	147,833
Leasehold improvements	48,951	53,552
Construction in progress	641,263	93,164
Stored assets (1)	—	17,995
Property, plant and equipment, gross	2,339,276	2,143,806
Accumulated depreciation	(1,184,739)	(1,514,664)
Property, plant and equipment, net	$ 1,154,537	$ 629,142

(1) Consisted of certain machinery and equipment ("stored assets") that were originally intended for use in previously planned manufacturing capacity expansions. The majority of the stored assets remaining at December 31, 2016 were repurposed for Series 6 module manufacturing.

Depreciation of property, plant and equipment was $91.4 million, $211.2 million, and $245.7 million for the years ended December 31, 2017, 2016, and 2015, respectively.

PV solar power systems, net

PV solar power systems, net consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
PV solar power systems, gross	$ 451,045	$ 464,581
Accumulated depreciation	(33,937)	(15,980)
PV solar power systems, net	$ 417,108	$ 448,601

Depreciation of PV solar power systems was $19.8 million, $11.7 million, and $2.9 million for the years ended December 31, 2017, 2016, and 2015, respectively.

Capitalized interest

The cost of constructing facilities, equipment, and project assets includes interest costs incurred during the assets' construction period. The components of interest expense and capitalized interest were as follows during the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017	2016	2015
Interest cost incurred	$ (27,457)	$ (26,157)	$ (19,367)
Interest cost capitalized – property, plant and equipment	—	1,878	1,335
Interest cost capitalized – project assets	1,692	3,741	11,057
Interest expense, net	$ (25,765)	$ (20,538)	$ (6,975)

Project assets

Project assets consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Project assets – development costs, including project acquisition and land costs	$ 250,590	$ 444,264
Project assets – construction costs	252,127	1,018,684
Project assets	502,717	1,462,948
Project assets – current	$ 77,931	$ 700,800
Project assets – noncurrent	$ 424,786	$ 762,148

Other assets

Other assets consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Deferred rent	$ 26,760	$ 27,160
Notes receivable (1)	10,495	7,385
Income taxes receivable	4,454	4,230
Other	41,550	39,123
Other assets	$ 83,259	$ 77,898

(1) In April 2009, we entered into a credit facility agreement with a solar power project entity of one of our customers for an available amount of €17.5 million to provide financing for a PV solar power system. The credit facility bears interest at 8.0% per annum, payable quarterly, with the full amount due in December 2026. As of December 31, 2017 and 2016, the balance outstanding on the credit facility was €7.0 million ($8.4 million and $7.4 million, respectively).

Accrued expenses

Accrued expenses consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Accrued property, plant and equipment	$ 133,433	$ 14,828
Accrued compensation and benefits	73,985	47,877
Accrued project assets	55,834	71,164
Product warranty liability (1)	28,767	40,079
Accrued inventory	24,830	13,085
Other	49,978	75,944
Accrued expenses	$ 366,827	$ 262,977

(1) See Note 15. “Commitments and Contingencies” to our consolidated financial statements for discussion of our “Product warranty liability.”

Other current liabilities

Other current liabilities consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Derivative instruments	$ 27,297	$ 6,642
Contingent consideration (1)	6,162	19,620
Financing liability (2)	5,161	5,219
Indemnification liabilities (1)	2,876	100,000
Other	7,261	15,461
Other current liabilities	$ 48,757	$ 146,942

(1) See Note 15. "Commitments and Contingencies" to our consolidated financial statements for discussion of our "Contingent consideration" and "Indemnification liabilities" arrangements.

(2) See Note 12. "Investments in Unconsolidated Affiliates and Joint Ventures" to our consolidated financial statements for discussion of the financing liabilities associated with our leaseback of the Maryland Solar project.

Other liabilities

Other liabilities consisted of the following at December 31, 2017 and 2016 (in thousands):

	2017	2016
Product warranty liability (1)	$ 195,507	$ 212,329
Transition tax liability (2)	93,233	—
Other taxes payable	89,724	24,099
Deferred revenue	63,257	—
Commercial letter of credit liability (1)	43,396	26,579
Financing liability (3)	29,822	33,314
Derivative instruments	5,932	444
Contingent consideration (1)	3,153	10,472
Other	44,430	64,202
Other liabilities	$ 568,454	$ 371,439

(1) See Note 15. "Commitments and Contingencies" to our consolidated financial statements for discussion of "Product warranty liability," "Commercial letter of credit liability," and "Contingent consideration" arrangements.

(2) See Note 19. "Income Taxes" to our consolidated financial statements for discussion of the one-time transition tax on accumulated earnings of foreign subsidiaries as a result of the Tax Act.

(3) See Note 12. "Investments in Unconsolidated Affiliates and Joint Ventures" to our consolidated financial statements for discussion of the financing liabilities associated with our leaseback of the Maryland Solar project.

10. Derivative Financial Instruments

As a global company, we are exposed in the normal course of business to interest rate and foreign currency risks that could affect our financial position, results of operations, and cash flows. We use derivative instruments to hedge against these risks and only hold such instruments for hedging purposes, not for speculative or trading purposes.

Depending on the terms of the specific derivative instruments and market conditions, some of our derivative instruments may be assets and others liabilities at any particular balance sheet date. We report all of our derivative instruments at fair value and account for changes in the fair value of derivative instruments within "Accumulated other comprehensive income (loss)" if the derivative instruments qualify for hedge accounting. For those derivative instruments that do not qualify for hedge accounting ("economic hedges"), we record the changes in fair value directly to earnings. See Note 11. "Fair Value Measurements" to our consolidated financial statements for information about the techniques we use to measure the fair value of our derivative instruments.

The following tables present the fair values of derivative instruments included in our consolidated balance sheets as of December 31, 2017 and 2016 (in thousands):

	December 31, 2017		
	Prepaid Expenses and Other Current Assets	Other Current Liabilities	Other Liabilities
Derivatives designated as hedging instruments:			
Foreign exchange forward contracts	$ 252	$ 13,240	$ —
Total derivatives designated as hedging instruments	$ 252	$ 13,240	$ —
Derivatives not designated as hedging instruments:			
Foreign exchange forward contracts	$ 4,051	$ 14,057	$ —
Interest rate swap contracts	—	—	5,932
Total derivatives not designated as hedging instruments	$ 4,051	$ 14,057	$ 5,932
Total derivative instruments	$ 4,303	$ 27,297	$ 5,932

	December 31, 2016		
	Prepaid Expenses and Other Current Assets	Other Current Liabilities	Other Liabilities
Derivatives designated as hedging instruments:			
Foreign exchange forward contracts	$ 2,072	$ 387	$ 444
Total derivatives designated as hedging instruments	$ 2,072	$ 387	$ 444
Derivatives not designated as hedging instruments:			
Foreign exchange forward contracts	$ 4,006	$ 6,255	$ —
Total derivatives not designated as hedging instruments	$ 4,006	$ 6,255	$ —
Total derivative instruments	$ 6,078	$ 6,642	$ 444

The following table presents the pretax amounts related to derivative instruments designated as cash flow hedges affecting accumulated other comprehensive income or loss and our consolidated statements of operations for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	Foreign Exchange Forward Contracts	Interest Rate Swap Contract	Cross Currency Swap Contract	Total
Balance in accumulated other comprehensive income (loss) at December 31, 2014	$ 6,621	$ (210)	$ (3,399)	$ 3,012
Amounts reclassified to net sales as a result of forecasted transactions being probable of not occurring	(1,295)	—	—	(1,295)
Amounts recognized in other comprehensive income (loss)	832	23	(9,219)	(8,364)
Amounts reclassified to earnings impacting:				
Net sales	(487)	—	—	(487)
Cost of sales	(5,509)	—	—	(5,509)
Foreign currency loss, net	—	—	10,135	10,135
Interest expense, net	—	171	466	637
Balance in accumulated other comprehensive income (loss) at December 31, 2015	162	(16)	(2,017)	(1,871)
Amounts recognized in other comprehensive income (loss)	2,513	(2)	5,108	7,619
Amounts reclassified to earnings impacting:				
Foreign currency loss, net	—	—	(4,896)	(4,896)
Interest expense, net	(119)	18	1,805	1,704
Balance in accumulated other comprehensive income (loss) at December 31, 2016	2,556	—	—	2,556
Amounts recognized in other comprehensive income (loss)	(4,468)	—	—	(4,468)
Amounts reclassified to earnings impacting:				
Other income (expense), net	189	—	—	189
Balance in accumulated other comprehensive income (loss) at December 31, 2017	$ (1,723)	$ —	$ —	$ (1,723)

We recorded no amounts related to ineffective portions of our derivative instruments designated as cash flow hedges during the years ended December 31, 2017, 2016, and 2015. We recognized unrealized gains of $0.7 million and unrealized losses of $0.9 million and $0.1 million related to amounts excluded from effectiveness testing for our foreign exchange forward contracts designated as cash flow hedges within “Other income (expense), net” during the years ended December 31, 2017, 2016, and 2015, respectively.

The following table presents amounts related to derivative instruments not designated as hedges affecting our consolidated statements of operations for the years ended December 31, 2017, 2016, and 2015 (in thousands):

		Amount of Gain (Loss) Recognized in Income		
	Income Statement Line Items	2017	2016	2015
Foreign exchange forward contracts	Foreign currency loss, net	$ (33,882)	$ (14,002)	$ (3,425)
Foreign exchange forward contracts	Cost of sales	—	—	12,422
Interest rate swap contracts	Interest expense, net	(5,932)	—	—

Interest Rate Risk

We use interest rate swap and cross-currency swap contracts to mitigate our exposure to interest rate fluctuations associated with certain of our debt instruments. We do not use such swap contracts for speculative or trading purposes.

In March 2017, Manildra Finco Pty Ltd, our indirect wholly-owned subsidiary and project financing company, entered into various interest rate swap contracts to hedge a portion of the floating rate construction loan facility under the associated project's Manildra Credit Facility (as defined in Note 14. "Debt" to our consolidated financial statements). Such swaps had an initial aggregate notional value of AUD 12.8 million and entitled the project to receive a one-month or three-month floating Bank Bill Swap or "BBSW" interest rate while requiring the project to pay a fixed rate of 3.13%. The aggregate notional amount of the interest rate swap contracts proportionately adjusts with the scheduled draws and principal payments on the underlying hedged debt. As of December 31, 2017, the aggregate notional value of the interest rate swap contracts was AUD 68.1 million ($53.2 million). These derivative instruments do not qualify for accounting as cash flow hedges in accordance with ASC 815 due to our expectation to sell the associated project before the maturity of its project specific debt financing and corresponding swap contracts. Accordingly, the changes in the fair value of the swap contracts are recorded directly to "Interest expense, net."

In January 2017, FS Japan Project 12 GK, our indirect wholly-owned subsidiary and project company, entered into an interest rate swap contract to hedge a portion of the floating rate senior loan facility under the project's Ishikawa Credit Agreement (as defined in Note 14. "Debt" to our consolidated financial statements). Such swap had an initial notional value of ¥5.7 billion and entitled the project to receive a six-month floating Tokyo Interbank Offered Rate ("TIBOR") plus 0.75% interest rate while requiring the project to pay a fixed rate of 1.482%. The notional amount of the interest rate swap contract proportionately adjusts with the scheduled draws and principal payments on the underlying hedged debt. As of December 31, 2017, the notional value of the interest rate swap contract was ¥12.8 billion ($113.4 million). This derivative instrument does not qualify for accounting as a cash flow hedge in accordance with ASC 815 due to our expectation to sell the associated project before the maturity of its project specific debt financing and corresponding swap contract. Accordingly, the changes in the fair value of the swap contract are recorded directly to "Interest expense, net."

Foreign Currency Risk

Cash Flow Exposure

We expect certain of our subsidiaries to have future cash flows that will be denominated in currencies other than the subsidiaries' functional currencies. Changes in the exchange rates between the functional currencies of our subsidiaries and the other currencies in which they transact will cause fluctuations in the cash flows we expect to receive or pay when these cash flows are realized or settled. Accordingly, we enter into foreign exchange forward contracts to hedge a portion of these forecasted cash flows. As of December 31, 2017 and 2016, these foreign exchange forward contracts hedged our forecasted cash flows for periods up to 9 months and 21 months, respectively. These foreign exchange forward contracts qualify for accounting as cash flow hedges in accordance with ASC 815, and we designated them as such. We initially report the effective portion of a derivative's unrealized gain or loss in "Accumulated other comprehensive income (loss)" and subsequently reclassify amounts into earnings when the hedged transaction occurs and impacts earnings. We determined that these derivative financial instruments were highly effective as cash flow hedges as of December 31, 2017 and 2016.

As of December 31, 2017 and 2016, the notional values associated with our foreign exchange forward contracts qualifying as cash flow hedges were as follows (notional amounts and U.S. dollar equivalents in millions):

	December 31, 2017	
Currency	**Notional Amount**	**USD Equivalent**
Indian rupee	INR 4,730.0	$74.1
Euro	€15.7	$18.8

	December 31, 2016	
Currency	**Notional Amount**	**USD Equivalent**
Indian rupee	INR 860.0	$12.7
Australian dollar	AUD 55.3	$40.0

In the following 12 months, we expect to reclassify to earnings $1.7 million of net unrealized losses related to these forward contracts that are included in "Accumulated other comprehensive income (loss)" at December 31, 2017 as we realize the earnings effects of the related forecasted transactions. The amount we ultimately record to earnings will depend on the actual exchange rates when we realize the related forecasted transactions.

Transaction Exposure and Economic Hedging

Many of our subsidiaries have assets and liabilities (primarily cash, receivables, marketable securities, deferred taxes, payables, accrued expenses, and solar module collection and recycling liabilities) that are denominated in currencies other than the subsidiaries' functional currencies. Changes in the exchange rates between the functional currencies of our subsidiaries and the other currencies in which these assets and liabilities are denominated will create fluctuations in our reported consolidated statements of operations and cash flows. We may enter into foreign exchange forward contracts or other financial instruments to economically hedge assets and liabilities against the effects of currency exchange rate fluctuations. The gains and losses on such foreign exchange forward contracts will economically offset all or part of the transaction gains and losses that we recognize in earnings on the related foreign currency denominated assets and liabilities.

We also enter into foreign exchange forward contracts to economically hedge balance sheet and other exposures related to transactions between certain of our subsidiaries and transactions with third parties. Such contracts are considered economic hedges and do not qualify for hedge accounting. Accordingly, we recognize gains or losses from the fluctuations in foreign exchange rates and the fair value of these derivative contracts in "Foreign currency loss, net" on our consolidated statements of operations. These contracts mature at various dates within the next 11 months. As of December 31, 2017 and 2016, the notional values of our foreign exchange forward contracts that do not qualify for hedge accounting were as follows (notional amounts and U.S. dollar equivalents in millions):

	December 31, 2017		
Transaction	**Currency**	**Notional Amount**	**USD Equivalent**
Purchase	Euro	€151.4	$181.6
Sell	Euro	€193.2	$231.7
Purchase	Australian dollar	AUD 12.7	$9.9
Sell	Australian dollar	AUD 56.8	$44.4
Purchase	Malaysian ringgit	MYR 31.0	$7.7
Sell	Malaysian ringgit	MYR 336.5	$83.1
Sell	Canadian dollar	CAD 1.7	$1.4
Sell	Chilean peso	CLP 10,180.9	$16.6
Purchase	Chinese yuan	CNY 13.8	$2.1
Sell	Japanese yen	¥23,922.2	$212.6
Purchase	Indian rupee	INR 645.7	$10.1
Sell	Indian rupee	INR 8,376.0	$131.1
Sell	Singapore dollar	SGD 3.1	$2.3
Purchase	South African rand	ZAR 12.5	$1.0
Sell	South African rand	ZAR 61.1	$5.0

Transaction	December 31, 2016		
	Currency	Notional Amount	USD Equivalent
Purchase	Euro	€64.5	$68.0
Sell	Euro	€103.6	$109.3
Purchase	Australian dollar	AUD 1.2	$0.9
Sell	Australian dollar	AUD 19.3	$14.0
Sell	Malaysian ringgit	MYR 24.5	$5.5
Sell	Canadian dollar	CAD 17.7	$13.2
Sell	Chilean peso	CLP 13,611.6	$20.3
Purchase	Chinese yuan	CNY 24.3	$3.5
Purchase	Japanese yen	¥97.3	$0.8
Sell	Japanese yen	¥15,610.4	$133.7
Sell	British pound	£0.6	$0.7
Sell	Indian rupee	INR 12,753.2	$187.7
Sell	South African rand	ZAR 51.2	$3.7

11. Fair Value Measurements

The following is a description of the valuation techniques that we use to measure the fair value of assets and liabilities that we measure and report at fair value on a recurring basis:

- *Cash Equivalents.* At December 31, 2017, our cash equivalents consisted of money market funds. We value our money market cash equivalents using observable inputs that reflect quoted prices for securities with identical characteristics, and accordingly, we classify the valuation techniques that use these inputs as Level 1.

- *Marketable Securities and Restricted Investments.* At December 31, 2017 and 2016, our marketable securities consisted of foreign debt, foreign government obligations, and time deposits, and our restricted investments consisted of foreign and U.S. government obligations. At December 31, 2017, our marketable securities also consisted of U.S. debt. We value our marketable securities and restricted investments using observable inputs that reflect quoted prices for securities with identical characteristics or quoted prices for securities with similar characteristics and other observable inputs (such as interest rates that are observable at commonly quoted intervals). Accordingly, we classify the valuation techniques that use these inputs as either Level 1 or Level 2 depending on the inputs used. We also consider the effect of our counterparties' credit standing in these fair value measurements.

- *Derivative Assets and Liabilities*. At December 31, 2017 and 2016, our derivative assets and liabilities consisted of foreign exchange forward contracts involving major currencies. At December 31, 2017, our derivative assets and liabilities also consisted of various interest rate swap contracts involving major interest rates. Since our derivative assets and liabilities are not traded on an exchange, we value them using standard industry valuation models. As applicable, these models project future cash flows and discount the amounts to a present value using market-based observable inputs including interest rate curves, credit risk, foreign exchange rates, and forward and spot prices for currencies. These inputs are observable in active markets over the contract term of the derivative instruments we hold, and accordingly, we classify the valuation techniques as Level 2. In evaluating credit risk, we consider the effect of our counterparties' and our own credit standing in the fair value measurements of our derivative assets and liabilities, respectively.

At December 31, 2017 and 2016, the fair value measurements of our assets and liabilities measured on a recurring basis were as follows (in thousands):

	December 31, 2017			
		Fair Value Measurements at Reporting Date Using		
	Total Fair Value and Carrying Value on Balance Sheet	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	$ 125,585	$ 125,585	$ —	$ —
Marketable securities:				
Foreign debt	238,858	—	238,858	—
Foreign government obligations	152,850	—	152,850	—
U.S. debt	73,671	—	73,671	—
Time deposits	255,000	255,000	—	—
Restricted investments	373,961	—	373,961	—
Derivative assets	4,303	—	4,303	—
Total assets	$ 1,224,228	$ 380,585	$ 843,643	$ —
Liabilities:				
Derivative liabilities	$ 33,229	$ —	$ 33,229	$ —

	December 31, 2016			
		Fair Value Measurements at Reporting Date Using		
	Total Fair Value and Carrying Value on Balance Sheet	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Marketable securities:				
Foreign debt	$ 296,819	$ —	$ 296,819	$ —
Foreign government obligations	271,172	—	271,172	—
Time deposits	40,000	40,000	—	—
Restricted investments	339,926	—	339,926	—
Derivative assets	6,078	—	6,078	—
Total assets	$ 953,995	$ 40,000	$ 913,995	$ —
Liabilities:				
Derivative liabilities	$ 7,086	$ —	$ 7,086	$ —

Fair Value of Financial Instruments

At December 31, 2017 and 2016, the carrying values and fair values of our financial instruments not measured at fair value were as follows (in thousands):

	December 31, 2017		December 31, 2016	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Assets:				
Note receivable – noncurrent	$ 10,495	$ 10,516	$ 7,385	$ 7,493
Notes receivable, affiliate – current	20,411	23,317	15,000	16,946
Notes receivable, affiliates – noncurrent	48,370	47,441	54,737	53,586
Liabilities:				
Long-term debt, including current maturities (1)	$ 406,388	$ 416,486	$ 196,691	$ 195,160

(1) Excludes capital lease obligations and unamortized discounts and issuance costs.

The carrying values in our consolidated balance sheets of our cash and cash equivalents, trade accounts receivable, unbilled accounts receivable and retainage, restricted cash, accounts payable, income taxes payable, and accrued expenses approximated their fair values due to their nature and relatively short maturities; therefore, we excluded them from the foregoing table. We estimated the fair value of our notes receivable and long-term debt using a discounted cash flow approach (an income approach) based on observable market inputs. We incorporated the credit risk of our counterparty for all asset fair value measurements and our own credit risk for all liability fair value measurements. Such fair value measurements are considered Level 2 under the fair value hierarchy.

Credit Risk

We have certain financial and derivative instruments that subject us to credit risk. These consist primarily of cash, cash equivalents, marketable securities, trade accounts receivable, restricted cash and investments, notes receivable, and foreign exchange forward contracts. We are exposed to credit losses in the event of nonperformance by the counterparties to our financial and derivative instruments. We place cash, cash equivalents, marketable securities, restricted cash and investments, and foreign exchange forward contracts with various high-quality financial institutions and limit the amount of credit risk from any one counterparty. We continuously evaluate the credit standing of our counterparty financial institutions. Our net sales are primarily concentrated among a limited number of customers. We monitor the financial condition of our customers and perform credit evaluations whenever considered necessary. Depending upon the sales arrangement, we may require some form of payment security from our customers, including advance payments, parent guarantees, bank guarantees, or commercial letters of credit.

12. Investments in Unconsolidated Affiliates and Joint Ventures

We have joint ventures or other strategic arrangements with partners in several markets, which are generally used to expedite our penetration of those markets and establish relationships with potential customers. We also enter into joint ventures or strategic arrangements with customers or other entities to maximize the value of particular projects. Some of these arrangements may involve significant investments or other allocations of capital. Investments in unconsolidated entities for which we have significant influence, but not control, over the entities' operating and financial activities are accounted for under the equity method of accounting. Investments in unconsolidated entities for which we do not have the ability to exert such significant influence are accounted for under the cost method of accounting.

The following table summarizes our equity and cost method investments as of December 31, 2017 and 2016 (in thousands):

	2017	2016
Equity method investments	$ 217,230	$ 232,337
Cost method investments	2,273	2,273
Investments in unconsolidated affiliates and joint ventures	$ 219,503	$ 234,610

8point3 Energy Partners LP

In June 2015, the Partnership, a limited partnership formed by the Sponsors, completed its IPO pursuant to a Registration Statement on Form S-1, as amended. As part of the IPO, the Sponsors contributed interests in various projects to OpCo in exchange for voting and economic interests in the entity, and the Partnership acquired an economic interest in OpCo using proceeds from the IPO. Since the formation of the Partnership, the Sponsors have, from time to time, sold interests in solar projects to the Partnership, which owns and operates such portfolio of solar energy generation projects. In February 2018, we entered into an agreement with CD Clean Energy and Infrastructure V JV, LLC, an equity fund managed by Capital Dynamics and certain other co-investors and certain other parties, pursuant to which such parties have agreed to acquire our interests in the Partnership and its subsidiaries.

As of December 31, 2017, we owned an aggregate of 22,116,925 Class B shares representing a 28% voting interest in the Partnership, and an aggregate of 6,721,810 common units and 15,395,115 subordinated units in OpCo together representing a 28% limited liability company interest in the entity. Future quarterly distributions from OpCo are subject to a subordination period in which holders of the subordinated units are not entitled to receive any distributions until the common units have received their minimum quarterly distribution plus any arrearages in the payment of minimum distributions from prior quarters. The subordination period will end after OpCo has earned and paid minimum quarterly distributions for three years ending on or after August 31, 2018 and there are no outstanding arrearages on common units. Notwithstanding the foregoing, the subordination period could end early if OpCo has earned and paid 150% of minimum quarterly distributions, plus the related distributions to incentive distribution right holders, for one year and there are no outstanding arrearages on common units. At the end of the subordination period, all subordinated units will convert to common units on a one-for-one basis. During the year ended December 31, 2017, we received distributions from OpCo of $23.0 million. We also hold certain incentive distribution rights in OpCo, which represent a right to incremental distributions after certain distribution thresholds are met.

The Partnership is managed and controlled by its general partner, 8point3 General Partner, LLC ("General Partner"), and we account for our interest in OpCo, a subsidiary of the Partnership, under the equity method of accounting as we are able to exercise significant influence over the Partnership due to our representation on the board of directors of its General Partner and certain of our associates serving as officers of its General Partner. Under the equity method of accounting, we recognize equity in earnings for our proportionate share of OpCo's net income or loss, including adjustments for the amortization of a $40.6 million remaining basis difference, which resulted from the cost of our investment differing from our proportionate share of OpCo's equity. We recognized equity in earnings, net of tax, from our investment in OpCo of $9.8 million, $32.6 million, and $18.5 million for the years ended December 31, 2017, 2016, and 2015, respectively. Our equity in earnings for the year ended December 31, 2016 also included an $8.5 million gain, net of tax, following OpCo's issuance of 8,050,000 shares to the Partnership as part of its public offering of a corresponding number of shares. As of December 31, 2017 and 2016, the carrying value of our investment in OpCo was $199.5 million and $206.8 million, respectively.

In connection with the IPO, we also entered into an agreement with a subsidiary of the Partnership to lease back one of our originally contributed projects, Maryland Solar, until December 31, 2019. Under the terms of the agreement, we make fixed rent payments to the Partnership's subsidiary and are entitled to all of the energy generated by the project. Due to our continuing involvement with the project, we account for the leaseback agreement as a financing transaction. As of December 31, 2017 and 2016, our financing obligation associated with the leaseback was $35.0 million and $38.5 million, respectively.

In December 2016, we sold our remaining 34% interest in the 300 MW Desert Stateline project located in San Bernardino County, California to OpCo for aggregate consideration of $329.5 million, including a $50.0 million promissory note, and recognized a gain on the sale of $125.1 million, net of tax, in equity in earnings. The promissory note is unsecured and matures in December 2020. The promissory note bears interest at 4% per annum, which rate may increase to 6% per annum (i) upon the occurrence and during the continuation of a specified event of default and (ii) in respect of amounts accrued as payments-in-kind pursuant to the terms of such promissory note. Subject to certain conditions, OpCo may prepay the promissory note. Until OpCo has paid in full the principal and interest on the promissory note, OpCo is restricted in its ability to: (i) acquire interests in additional projects; (ii) use the net proceeds of equity issuances except as prescribed in the promissory note; (iii) incur additional indebtedness to which the promissory note would be subordinate; and (iv) extend the maturity date under OpCo's existing credit facility. As of December 31, 2017 and 2016, the balance outstanding on the promissory note was $48.4 million and $50.0 million, respectively. In May 2016, we completed the sale of our two 20 MW Kingbird projects located in Kern County, California to OpCo and a third-party investor for net revenue of $114.1 million.

We provide O&M services to certain of the Partnership's partially owned project entities, including SG2 Holdings, LLC; Lost Hills Blackwell Holdings, LLC; NS Solar Holdings, LLC; Kingbird Solar A, LLC; Kingbird Solar B, LLC; and Desert Stateline LLC. During the years ended December 31, 2017, 2016 and 2015, we recognized revenue of $11.0 million, $6.1 million and $2.6 million respectively, for such O&M services.

In June 2015, OpCo entered into a $525.0 million senior secured credit facility, consisting of a $300.0 million term loan facility, a $25.0 million delayed draw term loan facility, and a $200.0 million revolving credit facility (the "OpCo Credit Facility"). In September 2016, OpCo amended its senior secured credit facility to include an incremental $250.0 million term loan facility, which increased the maximum borrowing capacity under the OpCo Credit Facility to $775.0 million. The OpCo Credit Facility is secured, in part, by a pledge of the Sponsors' equity interests in OpCo.

Clean Energy Collective, LLC

In November 2014, we entered into various agreements to purchase a minority ownership interest in Clean Energy Collective, LLC ("CEC"). This investment provided us with additional access to the distributed generation market and a partner to develop and market community solar offerings to North American residential customers and businesses directly on behalf of client utility companies. As part of the investment, we also received a warrant, valued at $1.8 million, to purchase additional ownership interests in CEC.

In addition to our equity investment, we also entered into a term loan agreement and a convertible loan agreement with CEC in November 2014 and February 2016, respectively. In August 2017, we amended the terms of the warrant and loan agreements to (i) fix the exercise price of the warrant at our initial investment price per unit, (ii) extend the maturity of the loans to November 2018, (iii) allow for the capitalization of certain accrued and future interest on the term loan, (iv) require mandatory prepayments on the term loan under certain conditions, and (v) fix the interest rate of the term loan at 16% per annum, payable semiannually. The interest rate of the convertible loan remained at 10% per annum, payable at maturity unless converted earlier pursuant to a qualified equity financing by CEC. As of December 31, 2017 and 2016, the balance outstanding on the term loans was $15.8 million and $15.0 million, respectively, and the balance outstanding on the convertible loan was $4.6 million.

CEC is considered a variable interest entity, or VIE, and our 26% ownership interest in and loans to the company are considered variable interests. We account for our investment in CEC under the equity method of accounting as we are not the primary beneficiary of the company given that we do not have the power to make decisions over the activities that most significantly impact the company's economic performance. Under the equity method of accounting, we recognize equity in earnings for our proportionate share of CEC's net income or loss including adjustments for the amortization of a basis difference resulting from the cost of our investment differing from our proportionate share of CEC's equity. During the years ended December 31, 2017, 2016 and 2015, we recognized losses, net of tax, of $2.6 million, $3.6 million and $1.9 million, respectively, from our investment in CEC. As of December 31, 2017 and 2016, the carrying value of our investment was $6.5 million and $10.5 million, respectively.

During the year ended December 31, 2017, we sold 21 MW of solar modules to CEC and recognized revenue of $7.6 million on such transactions.

Joint Venture with Customer

In September 2013, we contributed an immaterial amount for a 50% ownership interest in a newly formed joint venture, which was established to develop solar power projects in Europe, North Africa, the United States, and the Middle East. One of our customers also contributed an immaterial amount for the remaining 50% ownership interest in the joint venture. The project development and related activities of the entity are governed by a joint venture agreement. The intent of this agreement is to outline the general parameters of the arrangement with our customer, whereby we supply solar modules for various solar power projects and our customer develops and constructs the projects. The joint venture agreement also requires each party to consent to all decisions related to the most significant activities of the entity. There are no requirements for us to make further contributions to the joint venture, and the proceeds from the sale of any projects are to be divided equally between us and our customer after the repayment of any project financing and project development related costs.

In 2014 and 2015, we subsequently entered into various loan agreements with solar power project entities of the joint venture pursuant to which the project entities borrowed funds for the construction of solar power projects in the United Kingdom. The loans bore interest at rates ranging from 6% to 8% per annum and were generally paid upon the sale of the associated project entities. As of December 31, 2016, the loans were substantially repaid.

Summarized Financial Information

The following table presents summarized financial information, in the aggregate, for our significant equity method investees, as provided to us by the investees (in thousands):

	Fiscal 2017	Fiscal 2016	Fiscal 2015
Summary statement of operations information:			
Net sales	$ 70,089	$ 125,643	$ 7,099
Operating income (loss)	24,661	55,266	(555)
Net income (1)	46,713	63,893	8,936
Net income attributable to equity method investees (1)	53,183	190,240	111,135

	As of Fiscal 2017	As of Fiscal 2016
Summary balance sheet information:		
Current assets	$ 36,744	$ 35,407
Long-term assets	1,573,115	1,299,656
Current liabilities	7,648	26,606
Long-term liabilities	706,885	398,192
Noncontrolling interests, including redeemable noncontrolling interests	72,945	58,658

(1) The difference between Net income and Net income attributable to equity method investees is due to OpCo's tax equity financing facilities with third-party investors that hold noncontrolling ownership interests in certain of its subsidiaries. Accordingly, earnings or losses are allocated to such tax equity investors using the Hypothetical Liquidation at Book Value (or "HLBV") method. During the fiscal 2017, 2016, and 2015 periods, OpCo allocated certain losses to such third-party investors under the HLBV method, which represented the difference between Net income and Net income attributable to equity method investees.

13. Solar Module Collection and Recycling Liability

We voluntarily established a module collection and recycling program to collect and recycle modules sold and covered under such program once the modules reach the end of their useful lives. For customer sales contracts that include modules covered under this program, we agree to pay the costs for the collection and recycling of qualifying solar modules, and the end-users agree to notify us, disassemble their solar power systems, package the solar modules for shipment, and revert ownership rights over the modules back to us at the end of the modules' service lives. Accordingly, we record any collection and recycling obligations within "Cost of sales" at the time of sale based on the estimated cost to collect and recycle the covered solar modules. During the years ended December 31, 2017, 2016 and 2015, substantially all of our modules sold were not covered by our collection and recycling program.

We estimate the cost of our collection and recycling obligations based on the present value of the expected probability-weighted future cost of collecting and recycling the solar modules, which includes estimates for the cost of packaging materials; the cost of freight from the solar module installation sites to a recycling center; material, labor, and capital costs; the scale of recycling centers; and an estimated third-party profit margin and return on risk for collection and recycling services. We base these estimates on (i) our experience collecting and recycling our solar modules, (ii) the expected timing of when our solar modules will be returned for recycling, and (iii) the expected economic conditions at the time the solar modules will be collected and recycled. In the periods between the time of sale and the related settlement of the collection and recycling obligation, we accrete the carrying amount of the associated liability by applying the discount rate used for its initial measurement. We classify accretion as an operating expense within "Selling, general and administrative" expense on our consolidated statements of operations.

We periodically review our estimates of expected future recycling costs and may adjust our liability accordingly. During the year ended December 31, 2017, we reduced our module collection and recycling liability by $15.8 million as a result of updates to several valuation assumptions, including a decrease in certain inflation rates. During the year ended December 31, 2015, we reduced the liability by $80.0 million based on certain recycling technology advancements at our manufacturing facility in Perrysburg, Ohio, which represented a significant improvement over previous technologies and included a continuous flow recycling process, which increased the throughput of modules able to be recycled at a point in time. Such process improvements also resulted in corresponding reductions in capital, chemical, labor, maintenance, and other general recycling costs, which further contributed to the reduction in the recycling rate per module and corresponding change in the liability for the period.

Our module collection and recycling liability was $166.6 million and $166.3 million as of December 31, 2017 and 2016, respectively. During the year ended December 31, 2017, we recognized a net benefit of $13.2 million to cost of sales primarily as a result of the reduction in our module collection and recycling liability described above and also recognized net accretion expense of $3.9 million associated with the liability. During the year ended December 31, 2016, we recognized accretion expense of $6.1 million associated with the liability. During the year ended December 31, 2015, we recognized a benefit of $67.6 million to cost of sales and a benefit of $4.4 million to accretion expense primarily as a result of the reduction in our module collection and recycling liability described above, net of the incremental costs associated with module sales and accretion expense. As of December 31, 2017, a 1% increase in the annualized inflation rate used in our estimated future collection and recycling cost per module would increase our liability by $33.5 million, and a 1% decrease in that rate would decrease our liability by $28.1 million.

See Note 8. "Restricted Cash and Investments" to our consolidated financial statements for more information about our arrangements for funding this liability.

14. Debt

Our long-term debt consisted of the following at December 31, 2017 and 2016 (in thousands):

Loan Agreement	Currency	Balance (USD) 2017	2016
Revolving Credit Facility	USD	$ —	$ —
Luz del Norte Credit Facilities	USD	185,675	180,939
Ishikawa Credit Agreement	JPY	121,446	—
Japan Credit Facility	JPY	10,710	9,477
Tochigi Credit Facility	JPY	—	—
Marikal and Mahabubnagar Credit Facilities	INR	7,384	4,067
Polepally Credit Facility	INR	—	2,208
Hindupur Credit Facility	INR	18,722	—
Manildra Credit Facility	AUD	62,451	—
Capital lease obligations	Various	156	562
Long-term debt principal		406,544	197,253
Less: unamortized discounts and issuance costs		(13,004)	(8,865)
Total long-term debt		393,540	188,388
Less: current portion		(13,075)	(27,966)
Noncurrent portion		$ 380,465	$ 160,422

Revolving Credit Facility

In July 2017, we amended and restated the Revolving Credit Facility. Such amendment and restatement extended the maturity of the prior facility to July 2022 and reduced the aggregate borrowing capacity under the facility to $500.0 million, which we may increase to $750.0 million, subject to certain conditions. Borrowings under the amended and restated facility bear interest at (i) London Interbank Offered Rate ("LIBOR"), adjusted for Eurocurrency reserve requirements, plus a margin of 2.00% or (ii) a base rate as defined in the credit agreement plus a margin of 1.00% depending on the type of borrowing requested. These margins are also subject to adjustment depending on our consolidated leverage ratio. We had no borrowings under our Revolving Credit Facility as of December 31, 2017 and 2016 and had issued $57.5 million and $125.0 million, respectively, of letters of credit using availability under the facility. Loans and letters of credit issued under the Revolving Credit Facility are jointly and severally guaranteed by First Solar, Inc.; First Solar Electric, LLC; First Solar Electric (California), Inc.; and First Solar Development, LLC and are secured by interests in substantially all of the guarantors' tangible and intangible assets other than certain excluded assets.

In addition to paying interest on outstanding principal under the Revolving Credit Facility, we are required to pay a commitment fee at a rate of 0.30% per annum, based on the average daily unused commitments under the facility, which may also be adjusted due to changes in our consolidated leverage ratio. We also pay a letter of credit fee based on the applicable margin for Eurocurrency revolving loans on the face amount of each letter of credit and a fronting fee of 0.125%.

Luz del Norte Credit Facilities

In August 2014, Parque Solar Fotovoltaico Luz del Norte SpA ("Luz del Norte"), our indirect wholly-owned subsidiary and project company, entered into credit facilities with the Overseas Private Investment Corporation ("OPIC") and the International Finance Corporation ("IFC") to provide limited-recourse senior secured debt financing for the design, development, financing, construction, testing, commissioning, operation, and maintenance of a 141 MW PV solar power plant located near Copiapó, Chile. At the same time, Luz del Norte also entered into a Chilean peso facility ("VAT facility" and together with the OPIC and IFC loans, the "Luz del Norte Credit Facilities") with Banco de Crédito

e Inversiones to fund Chilean value added tax associated with the construction of the Luz del Norte project. In March 2017, we repaid the remaining balance on the VAT facility. As of December 31, 2016, the balance outstanding on the VAT facility was $13.7 million.

In March 2017, we amended the terms of the OPIC and IFC credit facilities. Such amendments (i) allowed for the capitalization of accrued and unpaid interest through March 15, 2017, along with the capitalization of certain future interest payments as variable rate loans under the credit facilities, (ii) allowed for the conversion of certain fixed rate loans to variable rate loans upon scheduled repayment, (iii) extended the maturity of the OPIC and IFC loans until June 2037, and (iv) canceled the remaining borrowing capacity under the OPIC and IFC credit facilities with the exception of the capitalization of certain future interest payments. As of December 31, 2017 and 2016, the balance outstanding on the OPIC loans was $139.0 million and $125.1 million, respectively. As of December 31, 2017 and 2016, the balance outstanding on the IFC loans was $46.6 million and $42.2 million, respectively. The OPIC and IFC loans are secured by liens over all of Luz del Norte's assets, which had an aggregate book value of $330.5 million, including intercompany charges, as of December 31, 2017 and by a pledge of the equity interests in the entity.

Ishikawa Credit Agreement

In December 2016, FS Japan Project 12 GK ("Ishikawa"), our indirect wholly-owned subsidiary and project company, entered into a credit agreement (the "Ishikawa Credit Agreement") with Mizuho Bank, Ltd. for aggregate borrowings of up to ¥27.3 billion ($242.6 million) for the development and construction of a 59 MW PV solar power plant located in Ishikawa, Japan. The credit agreement consists of a ¥24.0 billion ($213.3 million) senior loan facility, a ¥2.1 billion ($18.7 million) consumption tax facility, and a ¥1.2 billion ($10.7 million) letter of credit facility. The senior loan facility matures in October 2036, and the consumption tax facility matures in April 2020. The credit agreement is secured by pledges of Ishikawa's assets, accounts, material project documents, and by the equity interests in the entity. As of December 31, 2017 and 2016, the balance outstanding on the credit agreement was $121.4 million and zero, respectively.

Japan Credit Facility

In September 2015, First Solar Japan GK, our wholly-owned subsidiary, entered into a construction loan facility with Mizuho Bank, Ltd. for borrowings up to ¥4.0 billion ($35.6 million) for the development and construction of utility-scale PV solar power plants in Japan (the "Japan Credit Facility"). In September 2017, First Solar Japan GK renewed the facility for an additional one-year period until September 2018. The facility is guaranteed by First Solar, Inc. and secured by pledges of certain projects' cash accounts and other rights in the projects. As of December 31, 2017 and 2016, the balance outstanding on the facility was $10.7 million and $9.5 million, respectively.

Tochigi Credit Facility

In June 2017, First Solar Japan GK, our wholly-owned subsidiary, entered into a term loan facility with Mizuho Bank, Ltd. for borrowings up to ¥7.0 billion ($62.2 million) for the development of utility-scale PV solar power plants in Japan (the "Tochigi Credit Facility"). The majority of the facility is available to be drawn by or before November 2018, and the aggregate term loan facility matures in March 2021. The facility is guaranteed by First Solar, Inc. and secured by pledges of certain of First Solar Japan GK's accounts. As of December 31, 2017, there was no balance outstanding on the term loan facility.

Marikal and Mahabubnagar Credit Facilities

In March 2015, Marikal Solar Parks Private Limited and Mahabubnagar Solar Parks Private Limited, our indirect wholly-owned subsidiaries and project companies, entered into term loan facilities (the "Marikal and Mahabubnagar Credit Facilities") with Axis Bank as administrative agent for combined aggregate borrowings up to INR 1.1 billion ($17.2 million) for the development and construction of two 10 MW PV solar power plants located in Telangana, India. The term loan facilities had a letter of credit sub-limit of INR 0.8 billion ($12.5 million), which was used to support

construction activities. In December 2017, we completed the sale of our Mahabubnagar project, and its outstanding term loan balance of $7.4 million was assumed by the customer. As of December 31, 2017 and 2016, we had issued zero and INR 0.8 billion ($11.2 million), respectively, of letters of credit under the facilities. The remaining term loan facility (the "Marikal Credit Facility") matures in December 2028 and is secured by certain assets of the borrower, which had an aggregate book value of $89.7 million, including intercompany charges, as of December 31, 2017 and by a pledge of a portion of the equity interests in the borrower. In addition, the Marikal Credit Facility is guaranteed by First Solar, Inc. until certain conditions are met, including the repayment of an intercompany loan to the project company. As of December 31, 2017 and 2016, the balance outstanding on the term loan facilities was $7.4 million and $4.1 million, respectively.

Polepally Credit Facility

In March 2016, Polepally Solar Parks Private Limited, our indirect wholly-owned subsidiary and project company, entered into a term loan facility (the "Polepally Credit Facility") with Axis Bank as administrative agent for borrowings up to INR 1.3 billion ($20.4 million) for costs related to a 25 MW PV solar power plant located in Telangana, India. The term loan facility had a letter of credit sub-limit of INR 1.1 billion ($17.2 million), which was used for project related costs. In December 2017, we completed the sale of our Polepally project, and its outstanding term loan balance of $1.5 million was assumed by the customer. As of December 31, 2016, we had issued INR 1.0 billion ($15.3 million) of letters of credit under the term loan facility. As of December 31, 2016, the balance outstanding on the term loan facility was $2.2 million.

Hindupur Credit Facility

In November 2016, Hindupur Solar Parks Private Limited, our indirect wholly-owned subsidiary and project company, entered into a term loan facility (the "Hindupur Credit Facility") with Yes Bank Limited for borrowings up to INR 4.3 billion ($67.3 million) for costs related to an 80 MW portfolio of PV solar power plants located in Andhra Pradesh, India. The term loan facility has a letter of credit sub-limit of INR 3.2 billion ($50.1 million), which may also be used for project related costs. As of December 31, 2017 and 2016, we had issued INR 2.9 billion ($45.4 million) and zero, respectively, of letters of credit under the term loan facility. The term loan facility matures in December 2030 and is secured by certain assets of the borrower, which had an aggregate book value of $101.4 million, including intercompany charges, as of December 31, 2017 and by a pledge of a portion of the equity interests in the borrower. In addition, the term loan facility is guaranteed by First Solar, Inc. until certain conditions are met, including the achievement of commercial operations by the plants and various other compliance and performance metrics. As of December 31, 2017 and 2016, the balance outstanding on the term loan facility was $18.7 million and zero, respectively. As of December 31, 2017, we were seeking a waiver for a technical noncompliance related to the Hindupur Credit Facility.

Manildra Credit Facility

In March 2017, Manildra Finco Pty Ltd, our indirect wholly-owned subsidiary and project financing company, entered into a term loan agreement (the "Manildra Credit Facility") with Société Générale S.A. and The Bank of Tokyo-Mitsubishi UFJ, Ltd. for borrowings up to AUD 81.7 million ($63.8 million) for costs related to a 49 MW PV solar power plant located in New South Wales, Australia. The credit facility consists of an AUD 75.7 million ($59.1 million) construction loan facility and an additional AUD 6.0 million ($4.7 million) goods and service tax facility ("GST facility") to fund certain taxes associated with the construction of the associated project. Upon completion of the project's construction, the construction loan facility will convert to a term loan facility, which matures in March 2022. The GST facility matures in March 2019. The credit facility is secured by pledges of the borrower's assets, accounts, material project documents, and by the equity interests in the entity. As of December 31, 2017, the balance outstanding on the term loan facility was $62.5 million.

Variable Interest Rate Risk

Certain of our long-term debt agreements bear interest at prime, LIBOR, TIBOR, Bank Bill Swap Bid Rate ("BBSY"), or equivalent variable rates. A disruption of the credit environment, as previously experienced, could negatively impact interbank lending and, therefore, negatively impact these floating rates. An increase in prime, LIBOR, TIBOR, BBSY, or equivalent variable rates would increase the cost of borrowing under our Revolving Credit Facility and certain project specific debt financings.

Our long-term debt borrowing rates as of December 31, 2017 were as follows:

Loan Agreement	December 31, 2017
Revolving Credit Facility	3.56%
Luz del Norte Credit Facilities (1)	Fixed rate loans at bank rate plus 3.50%
	Variable rate loans at 91-Day U.S. Treasury Bill Yield or LIBOR plus 3.50%
Ishikawa Credit Agreement	Senior loan facility at 6-month TIBOR plus 0.75% (2)
	Consumption tax facility at 3-month TIBOR plus 0.5%
Japan Credit Facility	1-month TIBOR plus 0.5%
Tochigi Credit Facility	3-month TIBOR plus 1.0%
Marikal Credit Facility	Bank rate plus 2.35%
Hindupur Credit Facility	Bank rate plus 1.0%
Manildra Credit Facility	Construction loan facility at 1-month BBSY plus 1.70% (2)
	GST facility at 1-month BBSY plus 1.60%
Capital lease obligations	Various

(1) Outstanding balance comprised of $165.4 million of fixed rate loans and $20.3 million of variable rate loans as of December 31, 2017.

(2) We have entered into interest rate swap contracts to hedge portions of these variable rates. See Note 10. "Derivative Financial Instruments" to our consolidated financial statements for additional information.

During the years ended December 31, 2017, 2016, and 2015, we paid $10.2 million, $4.3 million, and $15.2 million, respectively, of interest related to our long-term debt arrangements.

Future Principal Payments

At December 31, 2017, the future principal payments on our long-term debt, excluding payments related to capital leases, were due as follows (in thousands):

	Total Debt
2018	$ 13,062
2019	11,137
2020	19,639
2021	10,179
2022	58,898
Thereafter	293,473
Total long-term debt future principal payments	$ 406,388

15. Commitments and Contingencies

Commercial Commitments

During the normal course of business, we enter into commercial commitments in the form of letters of credit, bank guarantees, and surety bonds to provide financial and performance assurance to third parties. Our amended and restated Revolving Credit Facility provides us with a sub-limit of $400.0 million to issue letters of credit, subject to certain additional limits depending on the currencies of the letters of credit, at a fee based on the applicable margin for Eurocurrency revolving loans and a fronting fee. As of December 31, 2017, we had $57.5 million in letters of credit issued under our Revolving Credit Facility, leaving $342.5 million of availability for the issuance of additional letters of credit. The majority of these letters of credit supported our systems projects. As of December 31, 2017, we also had $1.8 million of bank guarantees and letters of credit under separate agreements that were posted by certain of our foreign subsidiaries, $201.0 million of letters of credit issued under two bilateral facilities, of which $2.3 million was secured with cash, and $209.4 million of surety bonds outstanding primarily for our systems projects. The available bonding capacity under our surety lines was $507.6 million as of December 31, 2017.

In addition to the commercial commitments noted above, we have also issued certain commercial letters of credit, also known as letters of undertaking, under our Marikal and Mahabubnagar Credit Facilities, Polepally Credit Facility, and Hindupur Credit Facility as discussed in Note 14. "Debt" to our consolidated financial statements. Such commercial letters of credit represent conditional commitments on the part of the issuing financial institution to provide payment on amounts drawn in accordance with the terms of the individual documents. As part of the financing of the associated systems projects, we presented these commercial letters of credit to other financial institutions, whereby we received immediate funding and the other financial institutions agreed to settle such letters at a future date. At the time of settlement, the balance of the commercial letters of credit will be included in the balance outstanding of the respective credit facility. In the periods between the receipt of cash and the subsequent settlement of the commercial letters of credit, we accrue interest on the balance or otherwise accrete any discounted value of the letters to their face value and record such amounts as "Interest expense, net" on our consolidated statements of operations. In December 2017, we completed the sale of our Polepally project, and the outstanding letters of credit of $15.3 million under the Polepally Credit Facility were assumed by the customer. As of December 31, 2017 and 2016, we accrued $43.4 million and $26.6 million, respectively, for contingent obligations associated with such commercial letters of credit. These amounts were classified as "Other liabilities" on our consolidated balance sheets to align with the timing in which we expect to settle such obligations as payments under the associated credit facilities.

Lease Commitments

We lease our corporate headquarters, administrative offices, R&D facilities, and warehouse space in the United States and international locations under noncancelable operating leases. We also hold various land leases for the development and construction of systems projects and, in international locations, for certain of our manufacturing facilities. These leases may require us to pay property taxes, common area maintenance, and certain other costs in addition to base rent. We also lease certain machinery and equipment under operating and capital leases. Future minimum payments under all of our noncancelable leases were as follows as of December 31, 2017 (in thousands):

	2018	2019	2020	2021	2022	Thereafter	Total Minimum Lease Payments
Gross operating lease obligations	$ 14,393	$ 11,263	$ 10,998	$ 10,192	$ 9,962	$ 206,548	$ 263,356
Sublease income	(906)	—	—	—	—	—	(906)
Net operating lease obligations	$ 13,487	$ 11,263	$ 10,998	$ 10,192	$ 9,962	$ 206,548	$ 262,450

Our rent expense was $22.1 million, $24.5 million, and $22.5 million for the years ended December 31, 2017, 2016, and 2015, respectively.

Purchase Commitments

We purchase raw materials, manufacturing equipment, construction materials, and various services from a variety of vendors. During the normal course of business, in order to manage manufacturing and construction lead times and help ensure an adequate supply of certain items, we enter into agreements with suppliers that either allow us to procure goods and services when we choose or that establish purchase requirements over the term of the agreement. In certain instances, our purchase agreements allow us to cancel, reschedule, or adjust our purchase requirements based on our business needs prior to firm orders being placed. Consequently, only a portion of our purchase commitments are firm and noncancelable. At December 31, 2017, our obligations under such arrangements were $708.1 million, of which $431.2 million related to capital expenditures. We expect to make $635.6 million of payments under these purchase obligations in 2018.

Product Warranties

When we recognize revenue for module or system sales, we accrue liabilities for the estimated future costs of meeting our limited warranty obligations for both modules and the balance of the systems. We make and revise these estimates based primarily on the number of solar modules under warranty installed at customer locations, our historical experience with warranty claims, our monitoring of field installation sites, our internal testing and the expected future performance of our solar modules and BoS parts, and our estimated replacement costs. From time to time, we have taken remediation actions with respect to affected modules beyond our limited warranties and may elect to do so in the future, in which case we would incur additional expenses. Such potential voluntary future remediation actions beyond our limited warranty obligations may be material to our consolidated statements of operations if we commit to any such remediation actions.

Product warranty activities during the years ended December 31, 2017, 2016, and 2015 were as follows (in thousands):

	2017	2016	2015
Product warranty liability, beginning of period	$ 252,408	$ 231,751	$ 223,057
Accruals for new warranties issued	23,313	35,256	50,040
Settlements	(11,329)	(16,266)	(13,392)
Changes in estimate of product warranty liability	(40,118)	1,667	(27,954)
Product warranty liability, end of period	$ 224,274	$ 252,408	$ 231,751
Current portion of warranty liability	$ 28,767	$ 40,079	$ 38,468
Noncurrent portion of warranty liability	$ 195,507	$ 212,329	$ 193,283

During the year ended December 31, 2017, we reduced our product warranty liability by $31.3 million as a result of a reduction in the estimated replacement cost of our modules under warranty. Such change in estimate was primarily driven by continued reductions in the manufacturing cost per watt of our solar modules.

We estimate our limited product warranty liability for power output and defects in materials and workmanship under normal use and service conditions based on warranty return rates of approximately 1% to 3% for modules covered under warranty, depending on the series of module technology. As of December 31, 2017, a 1% change in estimated warranty return rates would change our module warranty liability by $71.0 million, and a 1% change in the estimated warranty return rate for BoS parts would not have a material impact on the associated warranty liability.

Performance Guarantees

As part of our systems business, we conduct performance testing of a system prior to substantial completion to confirm the system meets its operational and capacity expectations noted in the EPC agreement. In addition, we may provide an energy performance test during the first or second year of a system's operation to demonstrate that the actual energy generation for the applicable period meets or exceeds the modeled energy expectation, after certain adjustments. If there is an underperformance event with regards to these tests, we may incur liquidated damages as a percentage of the

EPC contract price. In certain instances, a bonus payment may be received at the end of the applicable test period if the system performs above a specified level. As of December 31, 2017 and 2016, we accrued $2.1 million and $6.3 million, respectively, of estimated obligations under such arrangements, which were classified as "Other current liabilities" in our consolidated balance sheets.

As part of our O&M service offerings, we typically offer an effective availability guarantee, which stipulates that a system will be available to generate a certain percentage of total possible energy during a specific period after adjusting for factors outside of our control as the service provider, such as weather, curtailment, outages, force majeure, and other conditions that may affect system availability. Effective availability guarantees are only offered as part of our O&M services and terminate at the end of an O&M arrangement. If we fail to meet the contractual threshold for these guarantees, we may incur liquidated damages for certain lost energy under the PPA. Our O&M agreements typically contain provisions limiting our total potential losses under an agreement, including amounts paid for liquidated damages, to a percentage of O&M fees. Many of our O&M agreements also contain provisions whereby we may receive a bonus payment if system availability exceeds a separate threshold. As of December 31, 2017 and 2016, we did not accrue any estimated obligations under our effective availability guarantees.

Indemnifications

In certain limited circumstances, we have provided indemnifications to customers, including project tax equity investors, under which we are contractually obligated to compensate such parties for losses they suffer resulting from a breach of a representation, warranty, or covenant or a reduction in tax benefits received, including investment tax credits. Project related tax benefits are, in part, based on guidance provided by the Internal Revenue Service and U.S. Treasury Department, which includes assumptions regarding the fair value of qualifying PV solar power systems. For any sales contracts that have such indemnification provisions, we initially recognize a liability under ASC 460, *Guarantees*, for the estimated premium that would be required by a guarantor to issue the same indemnity in a standalone arm's-length transaction with an unrelated party. We recognize such liabilities at the greater of the fair value of the indemnity or the contingent liability required to be recognized under ASC 450, *Contingencies*, and reduce the revenue recognized in the related transaction.

As applicable, we initially estimate the fair value of any such indemnities provided based on the cost of insurance policies that cover the underlying risks being indemnified and may purchase such policies to mitigate our exposure to potential indemnification payments. After an indemnification liability is recorded, we derecognize such amount pursuant to ASC 460-10-35-2 depending on the nature of the indemnity, which derecognition typically occurs upon expiration or settlement of the arrangement, and any contingent aspects of the indemnity are accounted for in accordance with ASC 450. Changes to any such indemnification liabilities provided are recorded as adjustments to revenue. In September 2017, we paid $100.0 million to a purchaser of one of our projects pursuant to an indemnification provision following the underpayment of anticipated cash grants for the project. As of December 31, 2017 and 2016, we accrued $2.9 million and $100.0 million of current indemnification liabilities, respectively, and $4.9 million and $1.9 million of noncurrent indemnification liabilities, respectively, for tax related indemnifications. As of December 31, 2017, the maximum potential amount of future payments under our tax related indemnifications was $125.2 million, and we held insurance policies allowing us to recover up to $84.9 million of potential amounts paid under the indemnifications covered by the policies.

Contingent Consideration

As part of our Enki acquisition in October 2016, we agreed to pay additional consideration of up to $7.0 million to the selling shareholders contingent upon the achievement of certain production and module performance milestones. In December 2017, we paid $3.5 million to the selling shareholders as a result of the achievement of the first performance milestone. See Note 5. "Business Acquisitions" to our consolidated financial statements for further discussion of this acquisition. As of December 31, 2017, we accrued $1.8 million of current liabilities for our contingent obligations associated with the Enki acquisition based on their estimated fair values and the expected timing of payment. As of December 31, 2016, we accrued $7.0 million of long-term liabilities for such obligations.

We continually seek to make additions to our advanced-stage project pipeline by actively developing our early-to-mid-stage project pipeline and by pursuing opportunities to acquire projects at various stages of development. In connection with such project acquisitions, we may agree to pay additional amounts to project sellers upon the achievement of certain milestones, such as obtaining a PPA, obtaining financing, or selling the project to a new owner. We recognize a project acquisition contingent liability when we determine that such a liability is both probable and reasonably estimable, and the carrying amount of the related project asset is correspondingly increased. As of December 31, 2017 and 2016, we accrued $4.4 million and $19.6 million of current liabilities, respectively, and $3.2 million and $3.5 million of long-term liabilities, respectively, for such contingent obligations. Any future differences between the acquisition-date contingent obligation estimate and the ultimate settlement of the obligation are recognized as an adjustment to the project asset, as contingent payments are considered direct and incremental to the underlying value of the related project.

Legal Proceedings

Class Action

On March 15, 2012, a purported class action lawsuit titled Smilovits v. First Solar, Inc., et al., Case No. 2:12-cv-00555-DGC, was filed in the United States District Court for the District of Arizona (hereafter "Arizona District Court") against the Company and certain of our current and former directors and officers. The complaint was filed on behalf of persons who purchased or otherwise acquired the Company's publicly traded securities between April 30, 2008 and February 28, 2012 (the "Class Action"). The complaint generally alleges that the defendants violated Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 by making false and misleading statements regarding the Company's financial performance and prospects. The action includes claims for damages, including interest, and an award of reasonable costs and attorneys' fees to the putative class. The Company believes it has meritorious defenses and will vigorously defend this action.

On July 23, 2012, the Arizona District Court issued an order appointing as lead plaintiffs in the Class Action the Mineworkers' Pension Scheme and British Coal Staff Superannuation Scheme (collectively "Pension Schemes"). The Pension Schemes filed an amended complaint on August 17, 2012, which contains similar allegations and seeks similar relief as the original complaint. Defendants filed a motion to dismiss on September 14, 2012. On December 17, 2012, the court denied defendants' motion to dismiss. On October 8, 2013, the Arizona District Court granted the Pension Schemes' motion for class certification, and certified a class comprised of all persons who purchased or otherwise acquired publicly traded securities of the Company between April 30, 2008 and February 28, 2012 and were damaged thereby, excluding defendants and certain related parties. Merits discovery closed on February 27, 2015.

Defendants filed a motion for summary judgment on March 27, 2015. On August 11, 2015, the Arizona District Court granted defendants' motion in part and denied it in part, and certified an issue for immediate appeal to the Ninth Circuit Court of Appeals (the "Ninth Circuit"). First Solar filed a petition for interlocutory appeal with the Ninth Circuit, and that petition was granted on November 18, 2015. On May 20, 2016, the Pension Schemes moved to vacate the order granting the petition, dismiss the appeal, and stay the merits briefing schedule. On December 13, 2016, the Ninth Circuit denied the Pension Schemes' motion. On January 31, 2018, the Ninth Circuit issued an opinion affirming the Arizona District Court's order denying in part defendants' motion for summary judgment. Given the need for further expert discovery, and the uncertainties of trial, we are not in a position to assess whether any loss or adverse effect on our financial condition is probable or remote or to estimate the range of potential loss, if any.

Opt-Out Action

On June 23, 2015, a suit titled Maverick Fund, L.D.C. v. First Solar, Inc., et al., Case No. 2:15-cv-01156-ROS, was filed in Arizona District Court by putative stockholders that opted out of the Class Action. The complaint names the Company and certain of our current and former directors and officers as defendants, and alleges that the defendants violated Sections 10(b) and 20(a) of the Securities Exchange Act of 1934, and violated state law, by making false and misleading statements regarding the Company's financial performance and prospects. The action includes claims for

recessionary and actual damages, interest, punitive damages, and an award of reasonable attorneys' fees, expert fees, and costs. The Company believes it has meritorious defenses and will vigorously defend this action. First Solar and the individual defendants have not yet responded to the complaint. Accordingly, we are not in a position to assess whether any loss or adverse effect on our financial condition is probable or remote or to estimate the range of potential loss, if any.

Derivative Actions

On April 3, 2012, a derivative action titled Tsevegmid v. Ahearn, et al., Case No. 1:12-cv-00417-CJB, was filed by a putative stockholder on behalf of the Company in the United States District Court for the District of Delaware (hereafter "Delaware District Court") against certain current and former directors and officers of the Company, alleging breach of fiduciary duties and unjust enrichment. The complaint generally alleges that from June 1, 2008, to March 7, 2012, the defendants caused or allowed false and misleading statements to be made concerning the Company's financial performance and prospects. The action includes claims for, among other things, damages in favor of the Company, certain corporate actions to purportedly improve the Company's corporate governance, and an award of costs and expenses to the putative plaintiff stockholder, including attorneys' fees. On April 10, 2012, a second derivative complaint was filed in the Delaware District Court. The complaint, titled Brownlee v. Ahearn, et al., Case No. 1:12-cv-00456-CJB, contains similar allegations and seeks similar relief to the Tsevegmid action. By court order on April 30, 2012, pursuant to the parties' stipulation, the Tsevegmid action and the Brownlee action were consolidated into a single action in the Delaware District Court. On May 15, 2012, defendants filed a motion to challenge Delaware as the appropriate venue for the consolidated action. On March 4, 2013, the magistrate judge issued a Report and Recommendation recommending to the court that defendants' motion be granted and that the case be transferred to the Arizona District Court. On July 12, 2013, the court adopted the magistrate judge's Report and Recommendation and ordered the case transferred to the Arizona District Court. The transfer was completed on July 15, 2013.

On April 12, 2012, a derivative complaint was filed in the Arizona District Court, titled Tindall v. Ahearn, et al., Case No. 2:12-cv-00769-ROS. In addition to alleging claims and seeking relief similar to the claims and relief asserted in the Tsevegmid and Brownlee actions, the Tindall complaint alleges violations of Sections 14(a) and 20(b) of the Securities Exchange Act of 1934. On April 19, 2012, a second derivative complaint was filed in the Arizona District Court, titled Nederhood v. Ahearn, et al., Case No. 2:12-cv-00819-JWS. The Nederhood complaint contains similar allegations and seeks similar relief to the Tsevegmid and Brownlee actions. On May 17, 2012 and May 30, 2012, respectively, two additional derivative complaints, containing similar allegations and seeking similar relief as the Nederhood complaint, were filed in Arizona District Court: Morris v. Ahearn, et al., Case No. 2:12-cv-01031-JAT and Tan v. Ahearn, et al., 2:12-cv-01144-NVW.

On July 17, 2012, the Arizona District Court issued an order granting First Solar's motion to transfer the derivative actions to Judge David Campbell, the judge to whom the Smilovits class action is assigned. On August 8, 2012, the court consolidated the four derivative actions pending in Arizona District Court, and on August 31, 2012, plaintiffs filed an amended complaint. Defendants filed a motion to stay the action on September 14, 2012. On December 17, 2012, the Arizona District Court granted defendants' motion to stay pending resolution of the Smilovits class action. On August 13, 2013, Judge Campbell consolidated the two derivative actions transferred from the Delaware District Court with the stayed Arizona derivative actions. On February 19, 2016, the Arizona District Court issued an order lifting the stay in part. Pursuant to the February 19, 2016 order, the plaintiffs filed an amended complaint on March 11, 2016, and defendants filed a motion to dismiss the amended complaint on April 1, 2016. On June 30, 2016, the Arizona District Court granted defendants' motion to dismiss the insider trading and unjust enrichment claims with prejudice, and further granted defendants' motion to dismiss the claims for alleged breaches of fiduciary duties with leave to amend. On July 15, 2016, plaintiffs filed a motion to reconsider certain aspects of the order granting defendants' motion to dismiss. The Arizona District Court denied the plaintiffs' motion for reconsideration on August 4, 2016. On July 15, 2016, plaintiffs filed a motion to intervene, lift the stay, and unseal documents in the securities Class Action. On September 30, 2016, the Arizona District Court denied plaintiffs' motion. On October 17, 2016, plaintiffs filed a notice of appeal to the Ninth Circuit of the September 30, 2016 order (the "Intervention Appeal"). On October 27, 2016, plaintiffs filed a motion to extend the October 31, 2016 deadline to file an amended complaint. On November 29, 2016,

the Arizona District Court denied plaintiffs' request and directed the clerk to terminate the action. On January 23, 2017, the Arizona District Court entered judgment in favor of defendants and terminated the action. On January 27, 2017, plaintiffs filed a notice of appeal to the Ninth Circuit (the "Merits Appeal"). On January 22, 2018, the Ninth Circuit ruled in favor of First Solar in the Intervention Appeal, and dismissed that appeal. Briefing and oral argument on the Merits Appeal is now complete and the parties are awaiting an opinion from the Ninth Circuit.

On July 16, 2013, a derivative complaint was filed in the Superior Court of Arizona, Maricopa County, titled Bargar, et al. v. Ahearn, et al., Case No. CV2013-009938, by a putative stockholder against certain current and former directors and officers of the Company. The complaint contains similar allegations to the Delaware and Arizona derivative cases, and includes claims for, among other things, breach of fiduciary duties, insider trading, unjust enrichment, and waste of corporate assets. By court order on October 3, 2013, the Superior Court of Arizona, Maricopa County granted the parties' stipulation to defer defendants' response to the complaint pending resolution of the Smilovits class action or expiration of the stay issued in the consolidated derivative actions in the Arizona District Court. On November 5, 2013, the matter was placed on the court's inactive calendar. The parties have jointly sought and obtained multiple requests to continue the stay in this action. Most recently, on October 25, 2017, the court entered an order continuing the stay until March 31, 2018.

The Company believes that plaintiffs in the derivative actions lack standing to pursue litigation on behalf of First Solar. The derivative actions are still in the initial stages and there has been no discovery. Accordingly, we are not in a position to assess whether any loss or adverse effect on our financial condition is probable or remote or to estimate the range of potential loss, if any.

Other Matters and Claims

We are party to other legal matters and claims in the normal course of our operations. While we believe the ultimate outcome of such matters and claims will not have a material adverse effect on our financial position, results of operations, or cash flows, the outcome of such matters and claims is not determinable with certainty, and negative outcomes may adversely affect us.

16. Revenue from Contracts with Customers

The following table represents a disaggregation of revenue from contracts with customers for the years ended December 31, 2017, 2016, and 2015 along with the reportable segment for each category (in thousands):

Category	Segment	2017	2016	2015
Solar modules	Modules	$ 806,398	$ 675,453	$ 227,461
Solar power systems	Systems	1,927,122	1,131,961	2,052,076
EPC services	Systems	45,525	892,814	1,388,445
O&M services	Systems	101,024	93,476	103,827
Module plus	Systems	3,236	84,926	331,053
Energy generation (1)	Systems	58,019	25,933	9,788
Net sales		$ 2,941,324	$ 2,904,563	$ 4,112,650

(1) The majority of energy generated and sold by our PV solar power systems was accounted for under ASC 840 consistent with the classification of the associated PPAs.

We generally recognize revenue for sales of solar power systems and/or EPC services over time using cost based input methods, in which significant judgment is required to evaluate assumptions including the amount of net contract revenues and the total estimated costs to determine our progress towards contract completion and to calculate the corresponding amount of revenue to recognize. If the estimated total costs on any contract are greater than the net contract revenues, we recognize the entire estimated loss in the period the loss becomes known. The cumulative effect of revisions to

estimates related to net contract revenues or costs to complete contracts are recorded in the period in which the revisions to estimates are identified and the amounts can be reasonably estimated.

Changes in estimates for sales of systems and EPC services occur for a variety of reasons, including but not limited to (i) construction plan accelerations or delays, (ii) module cost forecast changes, (iii) cost related change orders, or (iv) changes in other information used to estimate costs. Changes in estimates may have a material effect on our consolidated statements of operations. The following table outlines the impact on revenue of net changes in estimated transaction prices and input costs for systems related sales contracts (both increases and decreases) for the years ended December 31, 2017, 2016, and 2015 as well as the number of projects that comprise such changes. For purposes of the table, we only include projects with changes in estimates that have a net impact on revenue of at least $1.0 million during the periods presented. Also included in the table is the net change in estimate as a percentage of the aggregate revenue for such projects.

	2017	2016	2015
Number of projects	5	12	10
Increase (decrease) in revenue from net changes in transaction prices (in thousands)	$ 3,579	$ (67,292)	$ 16,255
Increase in revenue from net changes in input cost estimates (in thousands)	5,047	164,920	85,409
Net increase in revenue from net changes in estimates (in thousands)	$ 8,626	$ 97,628	$ 101,664
Net change in estimate as a percentage of aggregate revenue for associated projects	0.6%	1.6%	1.9%

The following table reflects the changes in our contract assets, which we classify as "Accounts receivable, unbilled" or "Retainage," and our contract liabilities, which we classify as "Deferred revenue," for the year ended December 31, 2017 (in thousands):

	2017	2016	Change	
Accounts receivable, unbilled	$ 172,594	$ 200,474		
Retainage	2,014	6,265		
Accounts receivable, unbilled and retainage	$ 174,608	$ 206,739	$ (32,131)	(16)%
Deferred revenue (1)	$ 145,073	$ 308,704	$ (163,631)	(53)%

(1) Includes $63.3 million of long-term deferred revenue classified as "Other liabilities" on our consolidated balance sheet as of December 31, 2017.

Accounts receivable, unbilled represents a contract asset for revenue that has been recognized in advance of billing the customer, which is common for long-term construction contracts. Billing requirements vary by contract but are generally structured around the completion of certain construction milestones. Some of our EPC contracts for systems we build may also contain retainage provisions. Retainage represents a contract asset for the portion of the contract price earned by us for work performed, but held for payment by the customer as a form of security until we reach certain construction milestones.

When we receive consideration, or such consideration is unconditionally due, from a customer prior to transferring goods or services to the customer under the terms of a sales contract, we record deferred revenue, which represents a contract liability. Such deferred revenue typically results from billings in excess of costs incurred on long-term construction contracts and advance payments received on sales of solar modules.

For the year ended December 31, 2017, our contract assets decreased by $32.1 million primarily due to final billings on the East Pecos project and additional billings on the Butler and Shams Ma'an projects following the completion of

substantially all construction activities in 2016, partially offset by unbilled receivables associated with the sale of the California Flats project in 2017. For the year ended December 31, 2017, our contract liabilities decreased by $163.6 million primarily as a result of the completion of the sale of the Moapa project, on which we had received a significant portion of the proceeds in 2016, and revenue recognized from construction on the Helios project following the partial billing of such services in 2016, partially offset by advance payments received on sales of solar modules. During the years ended December 31, 2017 and 2016, we recognized revenue of $308.6 million and $98.3 million, respectively, that was included in the corresponding contract liability balance at the beginning of the periods.

The following table represents our remaining performance obligations as of December 31, 2017 for sales of solar power systems, including uncompleted sold projects, projects under sales contracts subject to conditions precedent, and EPC agreements for partner developed projects that we are constructing or expect to construct. Such table excludes remaining performance obligations for any sales arrangements that had not fully satisfied the criteria to be considered a contract with a customer pursuant to the requirements of ASC 606. We expect to recognize $0.5 billion of revenue for such contracts through the later of the substantial completion or the closing dates of the projects.

Project/Location	Project Size in MW_{AC}	Revenue Category	EPC Contract/Partner Developed Project	Expected Year Revenue Recognition Will Be Completed	% of Revenue Recognized
California Flats, California	280	Solar power systems	Capital Dynamics	2018	69%
Florida (multiple locations)	145	EPC	Tampa Electric Company	2018	—%
Cuyama, California	40	Solar power systems	D.E. Shaw Renewable Investments	2018	98%
Japan (multiple locations)	9	Solar power systems	Contracted but not specified	2018	—%
Total	474				

As of December 31, 2017, we had entered into contracts with customers for the future sale of 6.5 GW_{DC} of solar modules for an aggregate transaction price of $2.3 billion. We expect to recognize such amounts as revenue through 2020 as we transfer control of the modules to customers, which typically occurs upon shipment or delivery depending on the terms of the underlying contracts. As of December 31, 2017, we had also entered into long-term O&M contracts covering more than 7 GW_{DC} of utility-scale PV solar power systems. We expect to recognize $0.6 billion of revenue during the noncancelable term of these O&M contracts over a weighted-average period of 11.7 years.

As part of our adoption of ASU 2014-09 in the first quarter of 2017, we elected to use the practical expedient under ASC 606-10-65-1(f)(3), pursuant to which we have excluded disclosures of transaction prices allocated to remaining performance obligations and when we expect to recognize such revenue for all periods prior to the date of initial application of ASU 2014-09.

17. Stockholders' Equity

Preferred Stock

We have authorized 30,000,000 shares of undesignated preferred stock, $0.001 par value, none of which was issued and outstanding at December 31, 2017 and 2016. Our board of directors is authorized to determine the rights, preferences, and restrictions on any series of preferred stock that we may issue.

Common Stock

We have authorized 500,000,000 shares of common stock, $0.001 par value, of which 104,468,460 and 104,034,731 shares were issued and outstanding at December 31, 2017 and 2016, respectively. Each share of common stock is entitled to a single vote. We have not declared or paid any dividends through December 31, 2017.

18. Share-Based Compensation

The following table presents the share-based compensation expense recognized in our consolidated statements of operations for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017	2016	2015
Cost of sales	$ 6,809	$ 7,598	$ 10,713
Research and development	5,740	3,284	4,109
Selling, general and administrative	22,165	17,830	30,052
Production start-up	407	—	25
Total share-based compensation expense	$ 35,121	$ 28,712	$ 44,899

The following table presents share-based compensation expense by type of award for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017	2016	2015
Restricted and performance stock units	$ 32,309	$ 25,076	$ 40,393
Unrestricted stock	1,757	1,677	1,326
Stock purchase plan	394	1,332	1,254
	34,460	28,085	42,973
Net amount released from inventory	661	627	1,926
Total share-based compensation expense	$ 35,121	$ 28,712	$ 44,899

Share-based compensation expense capitalized in inventory was $2.1 million and $2.7 million as of December 31, 2017 and 2016, respectively. As of December 31, 2017, we had $37.7 million of unrecognized share-based compensation expense related to unvested restricted and performance stock units, which we expect to recognize over a weighted-average period of approximately 1.5 years. During the years ended December 31, 2017, 2016, and 2015, we recognized an income tax benefit in our statement of operations of $6.2 million, $32.9 million, and $15.3 million, respectively, related to share-based compensation expense, including any excess tax benefits or deficiencies. We authorize our transfer agent to issue new shares, net of shares withheld for taxes as appropriate, for the vesting of restricted and performance stock units or grants of unrestricted stock.

Share-Based Compensation Plans

During the year ended December 31, 2015, we adopted our 2015 Omnibus Incentive Compensation Plan ("the 2015 Omnibus Plan"), under which directors, officers, employees, and consultants of First Solar (including any of its subsidiaries) are eligible to participate in various forms of share-based compensation. The 2015 Omnibus Plan is administered by the compensation committee of our board of directors (or any other committee designated by our board of directors), which is authorized to, among other things, determine recipients of grants, exercise price and vesting schedule of the awards made under the 2015 Omnibus Plan. Our board of directors may amend, modify, or terminate the 2015 Omnibus Plan without the approval of our stockholders, except for amendments that would increase the maximum number of shares of our common stock available for awards under the 2015 Omnibus Plan, increase the maximum number of shares of our common stock that may be delivered by incentive stock options, or modify the requirements for participation in the 2015 Omnibus Plan.

The 2015 Omnibus Plan provides for the grant of incentive stock options, non-qualified stock options, stock appreciation rights, restricted shares, restricted stock units, performance units, cash incentive awards, performance compensation awards, and other equity-based and equity-related awards. In addition, the shares underlying any forfeited, expired, terminated, or canceled awards, or shares surrendered as payment for taxes required to be withheld, become available for new award grants. We may not grant awards under the 2015 Omnibus Plan after 2025, which is the tenth anniversary of the 2015 Omnibus Plan's approval by our stockholders. As of December 31, 2017, we had 3,482,821 shares available for future issuance under the 2015 Omnibus Plan.

Restricted and Performance Stock Units

We issue shares to the holders of restricted stock units on the date the restricted units vest. The majority of shares issued are net of the minimum statutory withholding requirements, which we pay on behalf of our associates. As a result, the actual number of shares issued will be less than the number of restricted stock units granted. Prior to vesting, restricted stock units do not have dividend equivalent rights or voting rights, and the shares underlying the restricted stock units are not considered issued and outstanding.

Some of our restricted stock units represent performance based restricted stock units. In February 2017, the compensation committee of our board of directors approved a new long-term incentive program for key executive officers and associates. The new program is intended to incentivize retention of our key executive talent, provide a smooth transition from our former key senior talent equity performance program (or "KSTEPP"), and align the interests of executive management and stockholders. Specifically, the new program consists of: (i) performance stock units to be earned over an approximately three-year performance period beginning in March 2017 and (ii) stub-year grants of separate performance stock units to be earned over an approximately two-year performance period also beginning in March 2017. Vesting of the performance stock units is contingent upon the achievement of certain performance objectives, including the relative attainment of target cost per watt and operating expense metrics and the continued employment of program participants through the applicable vesting dates, except in limited cases, such as death, disability, or a change-in-control of First Solar. Such performance stock units were included in the computation of diluted net income per share for the year ended December 31, 2017 based on the number of shares, if any, that would be issuable if the end of the reporting period were the end of the contingency period.

Our board of directors previously approved and adopted the KSTEPP, a performance unit program under our prior 2010 Omnibus Incentive Compensation Plan applicable to our senior executives. The KSTEPP rewarded achievement of certain performance objectives aligned to the success of our long-term strategic plans. Such performance objectives included KSTEPP adjusted operating income, sales in key geographic markets, and cash adjusted return on invested capital. The KSTEPP awards were designed so that the attainment of the performance criteria required for full or partial vesting would be attained over time. In July 2016, the compensation committee of our board of directors certified the Company's achievement of the full KSTEPP vesting conditions for the rolling annual period ended June 30, 2016. Accordingly, the remaining two-thirds of each KSTEPP award vested in 2016, and each KSTEPP participant received one share of common stock for each vested KSTEPP performance unit, net of any forfeitures.

The following is a summary of our restricted stock unit activity, including performance stock unit activity, for the year ended December 31, 2017:

	Number of Shares	Weighted-Average Grant-Date Fair Value
Unvested restricted stock units at December 31, 2016	956,120	$ 53.55
Restricted stock units granted (1)	1,829,762	32.81
Restricted stock units vested	(405,248)	46.30
Restricted stock units forfeited	(77,728)	47.45
Unvested restricted stock units at December 31, 2017	2,302,906	$ 38.54

(1) Restricted stock units granted include the maximum amount of performance stock units available for issuance under our long-term incentive program for key executive officers and associates. The actual number of shares to be issued will depend on the relative attainment of the performance metrics described above.

We estimate the fair value of our restricted stock unit awards based on our stock price at the grant date. For the years ended December 31, 2016 and 2015, the weighted-average grant-date fair value for restricted stock units granted in such years was $59.64 and $60.91, respectively. The total fair value of restricted stock units vested during 2017, 2016, and 2015 was $14.1 million, $131.0 million, and $96.4 million, respectively.

Unrestricted Stock

During the years ended December 31, 2017, 2016, and 2015, we awarded 42,773; 38,429; and 25,376, respectively, of fully vested, unrestricted shares of our common stock to the independent members of our board of directors. Accordingly, we recognized $1.8 million, $1.7 million, and $1.3 million of share-based compensation expense for these awards during the years ended December 31, 2017, 2016, and 2015, respectively.

Stock Purchase Plan

Our shareholders approved our stock purchase plan for employees in June 2010. The plan allows employees to purchase our common stock through payroll withholdings over a six-month offering period at a discount from the closing share price on the last day of the offering period. In April 2017, we amended our stock purchase plan to reduce the purchase discount from 15% to 4%, effective for the next six-month offering period. Accordingly, the plan is considered noncompensatory and no longer results in the recognition of share-based compensation expense.

19. Income Taxes

In December 2017, the U.S. President signed into law the Tax Act, which significantly revised U.S. tax law by, among other things, lowering the statutory federal corporate income tax rate from 35% to 21% for tax years beginning after December 31, 2017, eliminating certain deductions, imposing the transition tax on certain accumulated earnings and profits of foreign corporate subsidiaries that may electively be paid over eight years, introducing new tax regimes, and changing how foreign earnings are subject to U.S. tax. For the year ended December 31, 2017, the provisions of the Tax Act that most significantly affected our Company included the reduction in the corporate income tax rate and the transition tax.

In December 2017, the SEC issued Staff Accounting Bulletin No. 118 to (i) clarify certain aspects of accounting for income taxes under ASC 740 in the reporting period the Tax Act was signed into law when information is not yet available or complete and (ii) provide a measurement period up to one year to complete the accounting for the Tax Act. As of December 31, 2017, we had not completed our accounting for the Tax Act; however, in certain cases, as described below, we made reasonable estimates of the effects of the Tax Act on our existing deferred income tax balances and the transition tax and recorded an aggregate provisional tax expense of $408.1 million for the year ended December 31, 2017. In other cases, we were not able to make a reasonable estimate of such tax effects and continued to account for the affected items, including state income taxes to the extent there is uncertainty regarding conformity to the federal tax system, based on previous tax laws.

As a result of the Tax Act, we remeasured certain deferred tax assets and liabilities based on the tax rate applicable to when the temporary differences are expected to reverse, which is generally 21%. However, we continue to evaluate certain aspects of the Tax Act, which could potentially affect the remeasurement of these deferred tax balances and result in additional tax expense. For the year ended December 31, 2017, the provisional tax expense related to the remeasurement of our deferred tax assets and liabilities was $6.6 million.

The transition tax was based on our total post-1986 foreign earnings and profits, which we previously deferred from U.S. income taxes. For the year ended December 31, 2017, we recorded a provisional transition tax of $401.5 million. After the utilization of existing tax credits and current year tax losses, we expect to pay U.S. federal taxes of approximately $101.3 million for the transition tax, which we will elect to pay over an eight-year period. We have not completed our evaluation of the transition tax, and the provisional amount may change as we finalize our calculations of post-1986 foreign earnings and profits previously deferred from U.S. income taxes. The imposition of the transition tax may eliminate the need for U.S. federal deferred income taxes on unremitted earnings and profits of our foreign corporate subsidiaries. However, the transition tax does not eliminate the potential for deferred taxes related to withholding taxes, state taxes, or other income taxes that might be incurred from the reversal of a foreign entity's outside basis difference. As we finalize and complete our plans for the reinvestment or repatriation of unremitted foreign

earnings and are able to calculate the resulting tax effects, we expect to record the associated tax effects, if any, and disclose such plans within the measurement period.

Because of the complexity of the new GILTI, BEAT, and FDII provisions of the Tax Act, we continue to evaluate the associated accounting under ASC 740. Accordingly, we may elect an accounting policy to (i) record taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the "period cost method") or (ii) factor such amounts into our measurement of deferred income taxes (the "deferred method"). Our election of an accounting policy with respect to the new GILTI tax provisions will depend, in part, on analyzing our global income to determine whether we expect to have future U.S. inclusions in taxable income related to GILTI and, if so, what the effect is expected to be. Because our future U.S. inclusions in taxable income related to GILTI depend on our organizational structure, our estimates of future operating results, and also our intent and ability to modify our organizational structure and/or our operations, we are not yet able to reasonably estimate the effects of this provision of the Tax Act. As a result, we did not record any adjustments related to potential GILTI taxes for the year ended December 31, 2017 and did not make a policy election regarding whether to record deferred income taxes on GILTI.

The BEAT provisions of the Tax Act impose a minimum tax related to certain deductible payments made to related foreign persons. In addition, the Tax Act disallows certain interest and royalty deductions for payments made to related parties depending on their countries' tax treatment of the payments. The new FDII provision allows a U.S. corporation to deduct 37.5% of its foreign-derived intangible income. Our evaluation of the income tax effects of these items and the provisional amounts recorded for the year ended December 31, 2017 requires additional analysis of historical records and further interpretation of the Tax Act from yet to be issued U.S. Treasury regulations and guidance from state tax authorities about the application of these new tax laws.

The U.S. and non-U.S. components of our income or loss before income taxes for the years ended December 31, 2017, 2016, and 2015 were as follows (in thousands):

	2017	2016	2015
U.S. income	$ (22,868)	$ (426,791)	$ 227,150
Non-U.S. income	224,983	(110,460)	506,180
Income (loss) before taxes and equity in earnings of unconsolidated affiliates	$ 202,115	$ (537,251)	$ 733,330

The components of our income tax expense or benefit for the years ended December 31, 2017, 2016, and 2015 were as follows (in thousands):

	2017	2016	2015
Current expense (benefit):			
Federal	$ 116,956	$ (14,389)	$ 31,988
State	3,009	1,303	6,644
Foreign	11,099	(29,009)	23,215
Total current expense (benefit)	131,064	(42,095)	61,847
Deferred expense (benefit):			
Federal	226,570	90,319	20,731
State	5,335	(9,536)	5,904
Foreign	9,027	(15,521)	(56,153)
Total deferred expense (benefit)	240,932	65,262	(29,518)
Total income tax expense	$ 371,996	$ 23,167	$ 32,329

We use the deferral method of accounting for investment tax credits under which the credits are recognized as reductions in the carrying value of the related assets. The use of the deferral method also results in a basis difference from the recognition of a deferred tax asset and an immediate income tax benefit for the future tax depreciation of the related

assets. Such basis differences are accounted for pursuant to the income statement method. During 2015, we generated a $19.2 million investment tax credit from placing a project in service.

Our Malaysian subsidiary has been granted a long-term tax holiday that expires in 2027. The tax holiday, which generally provides for a full exemption from Malaysian income tax, is conditional upon our continued compliance with meeting certain employment and investment thresholds, which we are currently in compliance with and expect to continue to comply with through the expiration of the tax holiday in 2027.

Our income tax results differed from the amount computed by applying the relevant U.S. statutory federal corporate income tax rate of 35.0% to our income or loss before income taxes for the following reasons for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017		2016		2015	
	Tax	Percent	Tax	Percent	Tax	Percent
Statutory income tax expense (benefit)	$ 70,740	35.0 %	$ (188,038)	35.0 %	$ 256,659	35.0 %
Provisional effect of Tax Act	408,090	201.9 %	—	— %	—	— %
Changes in valuation allowance	9,534	4.7 %	2,412	(0.4)%	(7,799)	(1.1)%
Foreign tax rate differential	(22,048)	(10.9)%	6,833	(1.3)%	(20,967)	(2.8)%
State tax, net of federal benefit	4,397	2.2 %	(8,655)	1.6 %	8,855	1.2 %
Non-deductible expenses	2,703	1.3 %	324	— %	4,161	0.6 %
Share-based compensation	1,161	0.6 %	(23,283)	4.3 %	—	— %
Change in tax contingency	959	0.5 %	(34,541)	6.4 %	—	— %
Foreign dividend income	540	0.3 %	248,013	(46.2)%	—	— %
Goodwill	—	— %	22,468	(4.2)%	—	— %
Effect of private letter ruling	—	— %	—	— %	(41,694)	(5.7)%
Tax credits	(18,445)	(9.1)%	(15,435)	2.9 %	(2,566)	(0.4)%
Return to provision adjustments	(35,191)	(17.4)%	11,757	(2.2)%	6,596	0.9 %
Effect of tax holiday	(46,643)	(23.1)%	4,640	(0.9)%	(154,650)	(21.1)%
Other	(3,801)	(1.9)%	(3,328)	0.7 %	(16,266)	(2.2)%
Reported income tax expense	$ 371,996	184.1 %	$ 23,167	(4.3)%	$ 32,329	4.4 %

During the years ended December 31, 2017, 2016 and 2015, we made net tax payments of $1.2 million, $1.9 million, and $30.8 million, respectively.

In May 2017, the U.S. federal income tax authority accepted our election to classify certain of our German subsidiaries as disregarded entities of First Solar, Inc. effective as of January 1, 2017. Accordingly, we recorded an estimated benefit of $42.1 million through the tax provision to establish a deferred tax asset for excess foreign tax credits generated as a result of the associated election.

In July 2016, we received a letter from a foreign tax authority confirming our residency status in that jurisdiction. In accordance with the letter, we reversed a liability associated with an uncertain tax position related to the income of a foreign subsidiary. Accordingly, we recorded a benefit of $35.4 million through the tax provision from the reversal of such liability.

In April 2015, we received a private letter ruling in a foreign jurisdiction related to the timing of the deduction for certain of our obligations. In accordance with the private letter ruling, we will begin treating these obligations as deductible when we actually make payments on the obligations, which are expected to occur subsequent to the expiration of the tax holiday. Accordingly, we recorded a benefit of $41.7 million through the tax provision to establish a deferred tax asset associated with the future deductibility of these obligations.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities calculated for U.S. GAAP financial reporting purposes and the amounts calculated for preparing our income tax returns in accordance with tax regulations. The items that gave rise to our deferred taxes as of December 31, 2017 and 2016 were as follows (in thousands):

	2017	2016
Deferred tax assets:		
Goodwill	$ 12,140	$ 42,168
Compensation	9,442	18,289
Accrued expenses	62,345	83,349
Tax credits	954	62,254
Net operating losses	124,281	86,328
Inventory	7,601	6,830
Deferred expenses	2,057	3,276
Property, plant and equipment	35,104	64,150
Long-term contracts	4,554	47,795
Other	11,630	10,034
Deferred tax assets, gross	270,108	424,473
Valuation allowance	(143,818)	(123,936)
Deferred tax assets, net of valuation allowance	126,290	300,537
Deferred tax liabilities:		
Capitalized interest	(1,722)	(6,821)
Acquisition accounting / basis difference	(5,880)	(6,848)
Restricted investments and derivatives	(10,680)	(12,429)
Investments in foreign subsidiaries	(9,555)	(582)
Equity in earnings	(40,339)	(35,585)
Other	(7,541)	(322)
Deferred tax liabilities	(75,717)	(62,587)
Net deferred tax assets and liabilities	$ 50,573	$ 237,950

Changes in the valuation allowance against our deferred tax assets were as follows during the years ended December 31, 2017, 2016, and 2015 (in thousands):

	2017	2016	2015
Valuation allowance, beginning of year	$ 123,936	$ 121,524	$ 129,323
Additions	27,591	13,933	368
Reversals	(7,709)	(11,521)	(8,167)
Valuation allowance, end of year	$ 143,818	$ 123,936	$ 121,524

We maintained a valuation allowance of $143.8 million and $123.9 million as of December 31, 2017 and 2016, respectively, against certain of our deferred tax assets, as it is more likely than not that such amounts will not be fully realized. In 2017, the valuation allowance increased by $19.9 million primarily due to (i) current year operating losses in certain jurisdictions and (ii) an increase in deferred tax assets with a full valuation allowance due to a change in foreign exchange rates. These increases were partially offset by the partial release of valuation allowances in jurisdictions with current year operating income.

As of December 31, 2017, we had federal and aggregate state net operating loss carryforwards of $11.7 million and $20.3 million, respectively. As of December 31, 2016, we had federal and aggregate state net operating loss carryforwards of $5.8 million and $12.1 million, respectively. If not used, the federal net operating loss carryforwards will begin to expire in 2030, and the state net operating loss carryforwards will begin to expire in 2028. The utilization

of our net operating loss carryforwards is subject to an annual limitation under Section 382 of the Internal Revenue Code due to changes in ownership. Based on our analysis, we do not believe such annual limitation will impact our realization of the net operating loss carryforwards as we anticipate utilizing them prior to expiration. During the year ended December 31, 2017, we utilized substantially all of our gross federal and state R&D credit carryforwards, U.S. foreign tax credit carryforwards, and investment tax credits to reduce the liability associated with the transition tax under the Tax Act.

A reconciliation of the beginning and ending amount of liabilities associated with uncertain tax positions for the years ended December 31, 2017, 2016, and 2015 is as follows (in thousands):

	2017	2016	2015
Unrecognized tax benefits, beginning of year	$ 89,256	$ 141,755	$ 162,029
Increases related to prior year tax positions	3,827	—	484
Decreases related to prior year tax positions	—	(6,119)	(2,693)
Decreases from lapse in statute of limitations	(11,840)	(14,421)	(13,827)
Decreases relating to settlements with authorities	(2,494)	(35,416)	(20,485)
Increases related to current tax positions	5,424	3,457	16,247
Unrecognized tax benefits, end of year	$ 84,173	$ 89,256	$ 141,755

If recognized, $81.8 million of unrecognized tax benefits, excluding interest and penalties, would reduce our annual effective tax rate. Due to the uncertain and complex application of tax laws and regulations, it is possible that the ultimate resolution of uncertain tax positions may result in liabilities that could be materially different from these estimates. In such an event, we will record additional tax expense or benefit in the period in which such resolution occurs. Our policy is to recognize any interest and penalties that we may incur related to our tax positions as a component of income tax expense. During 2017, we recognized interest and penalties of $5.5 million related to unrecognized tax benefits. We did not recognize any interest or penalties related to unrecognized tax benefits during 2016 or 2015. It is reasonably possible that an additional $10.0 million of uncertain tax positions will be recognized within the next 12 months due to the expiration of the statute of limitations associated with such positions.

We are subject to audit by U.S. federal, state, local, and foreign tax authorities. During the year ended December 31, 2017, we settled certain examinations in Germany, which resulted in a discrete tax expense of $2.5 million. During the year ended December 31, 2015, we settled a tax audit in Spain, which resulted in a discrete tax expense of $3.0 million. We are currently under examination in India, Chile, Singapore, and the state of California. We believe that adequate provisions have been made for any adjustments that may result from tax examinations. However, the outcome of tax audits cannot be predicted with certainty. If any issues addressed by our tax audits are not resolved in a manner consistent with our expectations, we could be required to adjust our provision for income taxes in the period such resolution occurs.

The following table summarizes the tax years that are either currently under audit or remain open and subject to examination by the tax authorities in the most significant jurisdictions in which we operate:

	Tax Years
Australia	2012 - 2016
India	2012 - 2017
Malaysia	2012 - 2016
United States	2008 - 2009; 2012 - 2016

In certain of the jurisdictions noted above, we operate through more than one legal entity, each of which has different open years subject to examination. The table above presents the open years subject to examination for the most material of the legal entities in each jurisdiction. Additionally, tax years are not closed until the statute of limitations in each jurisdiction expires. In the jurisdictions noted above, the statute of limitations can extend beyond the open years subject to examination.

20. Net (Loss) Income per Share

Basic net (loss) income per share is computed by dividing net (loss) income by the weighted-average number of common shares outstanding for the period. Diluted net income per share is computed giving effect to all potentially dilutive common shares, including restricted and performance stock units and stock purchase plan shares, unless there is a net loss for the period. In computing diluted net income per share, we utilize the treasury stock method.

The calculation of basic and diluted net (loss) income per share for the years ended December 31, 2017, 2016, and 2015 was as follows (in thousands, except per share amounts):

	2017	2016	2015
Basic net (loss) income per share			
Numerator:			
Net (loss) income	$ (165,615)	$ (416,112)	$ 593,406
Denominator:			
Weighted-average common shares outstanding	104,328	102,866	100,886
Diluted net (loss) income per share			
Denominator:			
Weighted-average common shares outstanding	104,328	102,866	100,886
Effect of restricted and performance stock units and stock purchase plan shares	—	—	929
Weighted-average shares used in computing diluted net (loss) income per share	104,328	102,866	101,815
Net (loss) income per share:			
Basic	$ (1.59)	$ (4.05)	$ 5.88
Diluted	$ (1.59)	$ (4.05)	$ 5.83

The following table summarizes the potential shares of common stock that were excluded from the computation of diluted net income per share for the years ended December 31, 2017, 2016, and 2015 as such shares would have had an anti-dilutive effect (in thousands):

	2017	2016	2015
Anti-dilutive shares	1,021	753	48

21. Accumulated Other Comprehensive Income (Loss)

Accumulated other comprehensive income or loss includes foreign currency translation adjustments, unrealized gains and losses on available-for-sale securities, and unrealized gains and losses on derivative instruments designated and qualifying as cash flow hedges. The following table presents the changes in accumulated other comprehensive income or loss, net of tax, for the year ended December 31, 2017 (in thousands):

	Foreign Currency Translation Adjustment	Unrealized Gain (Loss) on Marketable Securities and Restricted Investments	Unrealized Gain (Loss) on Derivative Instruments	Total
Balance as of December 31, 2016	$ (77,178)	$ 65,171	$ 2,100	$ (9,907)
Other comprehensive income (loss) before reclassifications	11,832	3,854	(4,468)	11,218
Amounts reclassified from accumulated other comprehensive loss	—	(49)	189	140
Net tax effect	—	(588)	1,396	808
Net other comprehensive income (loss)	11,832	3,217	(2,883)	12,166
Balance as of December 31, 2017	$ (65,346)	$ 68,388	$ (783)	$ 2,259

The following table presents the pretax amounts reclassified from accumulated other comprehensive income into our consolidated statements of operations for the years ended December 31, 2017, 2016, and 2015 (in thousands):

		Amounts Reclassified for the Year Ended December 31,		
Comprehensive Income Components	Income Statement Line Item	2017	2016	2015
Unrealized gain on marketable securities and restricted investments	Other income (expense), net	$ 49	$ 41,633	$ 2
Unrealized (loss) gain on derivative contracts:				
Foreign exchange forward contracts	Net sales	—	—	1,782
Foreign exchange forward contracts	Cost of sales	—	—	5,509
Cross currency swap contract	Foreign currency loss, net	—	4,896	(10,135)
Foreign exchange forward, interest rate, and cross currency swap contracts	Interest expense, net	—	(1,704)	(637)
Foreign exchange forward contracts	Other income (expense), net	(189)	—	—
		(189)	3,192	(3,481)
Total amount reclassified		$ (140)	$ 44,825	$ (3,479)

22. Segment and Geographical Information

We operate our business in two segments. Our modules segment involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. Third-party customers of our modules segment include integrators and operators of PV solar power systems. Our second segment is our fully integrated systems segment, through which we provide complete turn-key PV solar power systems, or solar solutions, that draw upon our capabilities, which include (i) project development, (ii) EPC services, and (iii) O&M services. We may provide our full EPC services or any combination of individual products and services within our EPC capabilities depending upon the customer and market opportunity. All of our systems segment products and services are for PV solar power systems, which primarily use our solar modules, and we sell such products and services to utilities, independent power producers, commercial and industrial companies, and other system owners. Additionally within our systems segment, we may temporarily own and operate certain of our systems for a period of time based on strategic opportunities or market factors.

Beginning with the three months ended December 31, 2017, we changed the composition of our reportable segments to align with revisions to our internal reporting structure and long-term strategic plans. As a result of this change, our modules segment, which was historically referred to as our components segment, includes module sales to third parties and excludes any module sales to our systems segment. Previously, we included an allocation of net sales value for all solar modules manufactured by our modules segment and installed in projects sold or built by our systems segment in the net sales of our modules segment. Our systems segment now includes all net sales from the sale of solar power systems and related products and services, including any modules installed in such systems and any revenue from energy generated by such systems. All prior year balances were revised to conform to the current year presentation.

Our segments are managed by our Chief Executive Officer, who is also considered our chief operating decision maker ("CODM"). Our CODM views sales of solar modules or systems as the primary drivers of our resource allocation, profitability, and cash flows. Our modules segment contributes to our operating results by providing the fundamental technologies and solar modules that drive our business and sales opportunities, and our systems segment contributes to our operating results by using such modules as part of a range of comprehensive PV solar energy solutions, depending on the customer and market opportunity. Our CODM generally makes decisions about allocating resources to our segments and assessing their performance based on gross profit. However, information about segment assets is not reported to the CODM for purposes of making such decisions. Accordingly, we exclude such asset information from our reportable segment financial disclosures.

The following tables present certain financial information for our reportable segments for the years ended December 31, 2017, 2016, and 2015 (in thousands):

	Year Ended December 31, 2017		
	Modules	Systems	Total
Net sales	$ 806,398	$ 2,134,926	$ 2,941,324
Gross profit	112,338	436,609	548,947
Depreciation and amortization expense	67,597	24,302	91,899
Goodwill	14,462	—	14,462

	Year Ended December 31, 2016		
	Modules	Systems	Total
Net sales	$ 675,452	$ 2,229,111	$ 2,904,563
Gross profit	110,510	527,908	638,418
Depreciation and amortization expense	186,736	17,515	204,251
Goodwill	14,462	—	14,462

	Year Ended December 31, 2015		
	Modules	Systems	Total
Net sales	$ 227,461	$ 3,885,189	$ 4,112,650
Gross profit	51,931	1,080,831	1,132,762
Depreciation and amortization expense	213,609	11,617	225,226

The following table presents net sales for the years ended December 31, 2017, 2016, and 2015 by geographic region, based on the customer country of invoicing (in thousands):

	2017	2016	2015
United States	$ 2,273,774	$ 2,418,974	$ 3,634,340
India	141,491	158,182	134,462
Turkey	124,433	18,809	1,726
Australia	108,643	9,568	185,064
Jordan	2,255	103,022	17,112
Spain	379	141,319	797
All other foreign countries	290,349	54,689	139,149
Net sales	$ 2,941,324	$ 2,904,563	$ 4,112,650

The following table presents long-lived assets, which include property, plant and equipment, PV solar power systems, and project assets (current and noncurrent) as of December 31, 2017 and 2016 by geographic region, based on the physical location of the assets (in thousands):

	2017	2016
United States	$ 595,062	$ 1,567,060
Malaysia	483,884	339,230
Japan	251,559	154,398
Vietnam	252,417	16,575
Chile	251,208	260,751
All other foreign countries	240,232	202,677
Long-lived assets	$ 2,074,362	$ 2,540,691

23. Concentrations of Risks

Customer Concentration. The following customers each comprised 10% or more of our total net sales and/or 10% or more of our total accounts receivable for the years ended December 31, 2017, 2016, and 2015:

	2017		2016		2015	
	% of Net Sales	% of A/R	% of Net Sales	% of A/R	% of Net Sales	% of A/R
Customer #1	47%	*	*	*	*	*
Customer #2	*	26%	*	*	*	*
Customer #3	*	12%	*	*	*	*
Customer #4	*	*	39%	*	36%	21%
Customer #5	*	*	11%	*	25%	48%
Customer #6	*	*	10%	*	*	*
Customer #7	*	*	*	32%	*	*
Customer #8	*	*	*	12%	*	15%

* Net sales and/or accounts receivable to these customers were less than 10% of our total net sales and/or accounts receivable for the period.

Geographic Risk. During the year ended December 31, 2017, our third-party solar module and solar power system net sales were predominantly in the United States. The concentration of our net sales in a limited number of geographic regions exposes us to local economic, public policy, and regulatory risks in such regions.

Production. Our products include components that are available from a limited number of suppliers or sources. Shortages of essential components could occur due to increases in demand or interruptions of supply, thereby adversely affecting our ability to meet customer demand for our products. Our solar modules are currently produced at our facilities in Perrysburg, Ohio and Kulim, Malaysia, and we expect to begin solar module production at our facility in Ho Chi Minh City, Vietnam in 2018. Damage to or disruption of these facilities could interrupt our business and adversely affect our ability to generate net sales.

INDEX TO EXHIBITS

The following exhibits are filed with or incorporated by reference into this Annual Report on Form 10-K:

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Date of First Filing	Exhibit Number
3.1	Amended and Restated Certificate of Incorporation of First Solar, Inc.	S-1/A	333-135574	10/25/06	3.1
3.2	Amended and Restated Bylaws of First Solar, Inc.	10-Q	001-33156	5/5/17	3.1
4.1	Credit Agreement, dated as of September 4, 2009, among First Solar, Inc., First Solar Manufacturing GmbH, the lenders party thereto, JPMorgan Chase Bank, N.A., as Administrative Agent, Bank of America and The Royal Bank of Scotland plc, as Documentation Agents, and Credit Suisse, Cayman Islands Branch, as Syndication Agent	8-K	001-33156	9/10/09	10.1
4.2	Charge of Company Shares, dated as of September 4, 2009, between First Solar, Inc., as Chargor, and JPMorgan Chase Bank, N.A., as Security Agent, relating to 66% of the shares of First Solar FE Holdings Pte. Ltd. (Singapore)	8-K	001-33156	9/10/09	10.2
4.3	German Share Pledge Agreements, dated as of September 4, 2009, between First Solar, Inc., First Solar Holdings GmbH, First Solar Manufacturing GmbH, First Solar GmbH, and JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.3
4.4	Guarantee and Collateral Agreement, dated as of September 4, 2009, by First Solar, Inc. in favor of JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.4
4.5	Guarantee, dated as of September 8, 2009, between First Solar Holdings GmbH, First Solar GmbH, First Solar Manufacturing GmbH, as German Guarantors, and JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.5
4.6	Assignment Agreement, dated as of September 4, 2009, between First Solar Holdings GmbH and JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.6
4.7	Assignment Agreement, dated as of September 4, 2009, between First Solar GmbH and JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.7
4.8	Assignment Agreement, dated as of September 8, 2009, between First Solar Manufacturing GmbH and JPMorgan Chase Bank, N.A., as Administrative Agent	8-K	001-33156	9/10/09	10.8
4.9	Security Trust Agreement, dated as of September 4, 2009, between First Solar, Inc., First Solar Holdings GmbH, First Solar GmbH, First Solar Manufacturing GmbH, as Security Grantors, JPMorgan Chase Bank, N.A., as Administrative Agent, and the other Secured Parties party thereto	8-K	001-33156	9/10/09	10.9
4.10	Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the borrowing subsidiaries party thereto, the lenders party thereto, Bank of America N.A. and The Royal Bank of Scotland PLC, as documentation agents, Credit Suisse, Cayman Islands Branch, as syndication agent and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	10/20/10	10.1
4.11	First Amendment, dated as of May 6, 2011, to the Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the borrowing subsidiaries party thereto, the lenders party thereto, Bank of America, N.A. and The Royal Bank of Scotland plc, as documentation agents, Credit Suisse, Cayman Islands Branch, as syndication agent, and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	5/12/11	10.1

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Date of First Filing	Exhibit Number
4.12	Second Amendment and Waiver, dated as of June 30, 2011, to the Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the lenders party thereto, Bank of America, N.A. and The Royal Bank of Scotland plc, as documentation agents, Credit Suisse, Cayman Islands Branch, as syndication agent, and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	7/14/11	10.1
4.13	Third Amendment, dated as of October 23, 2012 to the Amended and Restated Credit Agreement dated as of October 15, 2010, among First Solar, Inc., the lenders party thereto, Bank of America, N.A. and The Royal Bank of Scotland plc, as documentation agents, Credit Suisse, Cayman Islands Branch, as syndication agent, and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	10/26/12	10.1
4.14	Fourth Amendment dated as of July 15, 2013, to the Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	7/19/13	10.1
4.15	Amended and Restated Guarantee and Collateral Agreement, dated as of July 15, 2013, by First Solar, Inc., First Solar Electric, LLC, First Solar Electric (California), Inc. and First Solar Development, LLC in favor of JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	7/19/13	10.2
4.16	Fifth Amendment, dated as of June 3, 2015, to the Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	6/5/15	10.1
4.17	Sixth Amendment, dated as of January 20, 2017, to the Amended and Restated Credit Agreement, dated as of October 15, 2010, among First Solar, Inc., the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	1/27/17	10.1
4.18	Second Amended and Restated Credit Agreement, dated as of July 10, 2017, among First Solar, Inc., the borrowing subsidiaries party thereto, the lenders party thereto, and JPMorgan Chase Bank, N.A., as administrative agent	8-K	001-33156	7/14/17	10.10
10.1	Form of Change in Control Severance Agreement	S-1/A	333-135574	10/25/06	10.15
10.2	Form of Director and Officer Indemnification Agreement	10-K	001-33156	2/27/13	10.20
10.3	First Solar, Inc. 2010 Omnibus Incentive Compensation Plan	DEF 14A	001-33156	4/20/10	App. A
10.4	First Solar, Inc. Stock Purchase Plan	DEF 14A	001-33156	4/20/10	App. B
10.5	Employment Agreement, dated March 15, 2011, and Change in Control Severance Agreement, dated April 4, 2011 between First Solar, Inc. and Mark Widmar	10-Q	001-33156	5/5/11	10.3
10.6	Employment Agreement, dated March 14, 2012, and Change in Control Severance Agreement, dated March 19, 2012 between First Solar, Inc. and James Hughes	10-Q	001-33156	5/4/12	10.1
10.7	Amendment to Employment Agreement, effective as of May 3, 2012, between First Solar, Inc. and James Hughes, and Amendment to Non-Competition and Non-Solicitation Agreement, effective as of May 3, 2012, between First Solar, Inc. and James Hughes	8-K	001-33156	5/11/12	10.1
10.8	Employment Agreement, effective July 1, 2012, and Change in Control Severance Agreement, effective July 1, 2012 between First Solar, Inc. and Georges Antoun	10-Q	001-33156	8/3/12	10.1
10.9	Non-Competition and Non-Solicitation Agreement, effective as of March 15, 2011, between First Solar, Inc. and Mark Widmar	10-Q	001-33156	5/7/13	10.2

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Date of First Filing	Exhibit Number
10.10	Change in Control Severance Agreement, effective as of July 1, 2012, between First Solar, Inc. and Georges Antoun	10-Q	001-33156	5/7/13	10.3
10.11	Amendment to Change in Control Severance Agreement	10-Q	001-33156	8/7/13	10.1
10.12	Employment Agreement, effective March 3, 2014, and Change in Control Severance Agreement, effective March 3, 2014 between First Solar, Inc. and Paul Kaleta	10-K	001-33156	2/26/14	10.1
10.13	Amended and Restated Corporate Governance Guidelines dated February 18, 2016	10-K	001-33156	2/24/16	10.17
10.14	Restricted Cash Assignment of Deposits	10-Q	001-33156	8/6/14	10.2
10.15	Master Formation Agreement by and between First Solar, Inc. and SunPower Corporation as of March 10, 2015	8-K	001-33156	3/11/15	2.1
10.16	First Solar, Inc. 2015 Omnibus Incentive Compensation Plan	DEF 14A	001-33156	4/8/15	App. A
10.17	Amended and Restated Limited Liability Company Agreement of 8Point3 Operating Company, LLC as of June 24, 2015	10-Q	001-33156	8/5/15	10.1
†10.18	Amended and Restated Limited Liability Company Agreement of 8Point3 Holding Company, LLC as of June 24, 2015	10-Q	001-33156	8/5/15	10.2
10.19	Employment Agreement, effective as of July 25, 2011, and Change in Control Severance Agreement, effective as of October 25, 2011 and amended as of August 1, 2013, between First Solar, Inc. and Philip Tymen deJong	10-K	001-33156	2/24/16	10.23
10.20	Employment Agreement, effective as of May 1, 2012, and Change in Control Severance Agreement, effective as of May 1, 2012 and amended as of August 1, 2013, between First Solar, Inc. and Raffi Garabedian	10-K	001-33156	2/24/16	10.24
10.21	Employment Agreement, effective as of February 17, 2016, and Change in Control Severance Agreement, effective as of February 17, 2016 between First Solar, Inc. and Chris Bueter	10-K	001-33156	2/24/16	10.26
10.22	Amendment to Employment Agreement, effective as of July 1, 2016, between First Solar, Inc. and Mark Widmar, and Amendment to Non-Competition and Non-Solicitation Agreement, effective as of July 1, 2016, between First Solar, Inc. and Mark Widmar, and Second Amendment to Change-in-Control Severance Agreement, effective as of July 1, 2016, between First Solar, Inc. and Mark Widmar	10-Q	001-33156	4/28/16	10.1
10.23	Second Amendment to Employment Agreement, effective as of June 30, 2016, between First Solar, Inc. and James Hughes	10-Q	001-33156	4/28/16	10.2
10.24	Employment Agreement, effective as of October 24, 2016, and Change-in-Control Severance Agreement, effective as of October 24, 2016, between First Solar, Inc. and Alexander Bradley	10-Q	001-33156	11/3/16	10.1
10.25	Form of RSU Award Agreement	10-K	001-33156	2/22/17	10.30
10.26	Form of Option Award Agreement	10-K	001-33156	2/22/17	10.31
10.27	Form of Share Award Agreement	10-K	001-33156	2/22/17	10.32
10.28	Form of Performance Unit Award Agreement	10-K	001-33156	2/22/17	10.33
10.29	Form of Cash Incentive Award Agreement	10-K	001-33156	2/22/17	10.34
10.30	Form of Grant Notice for Executive Performance Equity Plan	10-Q	001-33156	5/5/17	10.1
14.1	Code of Ethics	10-Q	001-33156	8/5/15	14.1
*21.1	List of Subsidiaries of First Solar, Inc.	—	—	—	—
*23.1	Consent of Independent Registered Public Accounting Firm	—	—	—	—
*31.01	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) and 15d-14(a), as amended	—	—	—	—
*31.02	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) and 15d-14(a), as amended	—	—	—	—

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Date of First Filing	Exhibit Number
‡*32.01	Certification 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	—	—	—	—
*101.INS	XBRL Instance Document	—	—	—	—
*101.SCH	XBRL Taxonomy Extension Schema Document	—	—	—	—
*101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	—	—	—	—
*101.DEF	XBRL Definition Linkbase Document	—	—	—	—
*101.LAB	XBRL Taxonomy Label Linkbase Document	—	—	—	—
*101.PRE	XBLR Taxonomy Extension Presentation Document	—	—	—	—

* Filed herewith.

† Confidential treatment has been requested and granted for portions of this exhibit.

‡ This exhibit shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934 or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date hereof and irrespective of any general incorporation language in any filings.

Item 16. ***Form 10-K Summary***

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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.

FIRST SOLAR, INC.

February 22, 2018	By:	/s/ BRYAN SCHUMAKER
	Name:	Bryan Schumaker
	Title:	Chief 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.

Signature	Title	Date
/s/ MARK R. WIDMAR Mark R. Widmar	Chief Executive Officer and Director	February 22, 2018
/s/ ALEXANDER R. BRADLEY Alexander R. Bradley	Chief Financial Officer	February 22, 2018
/s/ MICHAEL J. AHEARN Michael J. Ahearn	Chairman of the Board of Directors	February 22, 2018
/s/ SHARON L. ALLEN Sharon L. Allen	Director	February 22, 2018
/s/ RICHARD D. CHAPMAN Richard D. Chapman	Director	February 22, 2018
/s/ GEORGE A. HAMBRO George A. Hambro	Director	February 22, 2018
/s/ MOLLY JOSEPH Molly Joseph	Director	February 22, 2018
/s/ CRAIG KENNEDY Craig Kennedy	Director	February 22, 2018
/s/ JAMES F. NOLAN James F. Nolan	Director	February 22, 2018
/s/ WILLIAM J. POST William J. Post	Director	February 22, 2018

Signature	Title	Date
/s/ J. THOMAS PRESBY J. Thomas Presby	Director	February 22, 2018
/s/ PAUL H. STEBBINS Paul H. Stebbins	Director	February 22, 2018
/s/ MICHAEL SWEENEY Michael Sweeney	Director	February 22, 2018

Corporate Information

EXECUTIVE MANAGEMENT

Mark Widmar, Chief Executive Officer
Alexander Bradley, Chief Financial Officer
Georges Antoun, Chief Commercial Officer
Philip Tymen deJong, Chief Operating Officer
Raffi Garabedian, Chief Technology Officer
Paul Kaleta, Executive Vice President and General Counsel
Chris Bueter, Executive Vice President, Human Resources and Communications

BOARD OF DIRECTORS

Michael J. Ahearn, Chairman of the Board
Sharon L. Allen, Independent Director
Richard Chapman, Independent Director
George Hambro, Independent Director
Molly E. Joseph, Independent Director
Craig Kennedy, Independent Director
James F. Nolan, Independent Director
William J. Post, Independent Director
J. Thomas Presby, Independent Director
Paul H. Stebbins, Independent Director
Michael Sweeney, Independent Director
Mark Widmar, Director and Chief Executive Officer

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STOCK LISTING

First Solar, Inc. common stock is traded on the Nasdaq Global Select Market, listed under FSLR.

INDEPENDENT AUDITORS

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All financial numbers in this report are based on U.S. Generally Accepted Accounting Principles.

This report contains forward-looking statements within the meaning of the United States federal securities laws. These forward-looking statements do not constitute guarantees of future performance. These forward-looking statements are based on current information and expectations, are subject to uncertainties and changes in circumstances, and involve a number of factors that could cause actual results to differ materially from those anticipated by these forward-looking statements, including risks described in the Company's most recent annual report on Form 10-K, and other filings with the Securities and Exchange Commission. First Solar assumes no obligation to update any forward-looking information contained in this report or with respect to the information described herein.