

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

Form 20-F

- (Mark One)
- REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR 12(g) OF THE SECURITIES EXCHANGE ACT OF 1934
OR
- ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2019
- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____
- SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
Date of event requiring this shell company report _____

Commission file number: 001-33107

CANADIAN SOLAR INC.

(Exact name of Registrant as specified in its charter)

N/A

(Translation of Registrant's name into English)

Canada

(Jurisdiction of incorporation or organization)

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

<u>Title of Each Class</u>	<u>Trading Symbol</u>	<u>Name of Each Exchange on Which Registered</u>
Common shares with no par value	CSIQ	The NASDAQ Stock Market LLC (The NASDAQ Global Select Market)

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

None

(Title of Class)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None

(Title of Class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

59,371,684 common shares issued and outstanding, excluding 609,516 common shares as treasury stock, as of December 31, 2019.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes

No

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Yes

No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes

No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes

No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or an emerging growth company. See definition of "accelerated filer," "large accelerated filer" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer

Accelerated filer

Non-accelerated filer

Emerging growth company

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, 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 which basis of accounting the registrant has used to prepare the financial statements included in this filing: U.S. GAAP

International Financial Reporting Standards as issued by the International Accounting Standards Board

Other

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. Item 17

Item 18

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes

No

(APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PAST FIVE YEARS)

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes

No

[†] The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

Yes

No



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INTRODUCTION

Unless otherwise indicated, references in this annual report on Form 20-F to:

- “AC” and “DC” refer to alternating current and direct current, respectively;
- “AUD” and “Australian dollars” refer to the legal currency of Australia;
- “BRL” and “Brazilian reals” refer to the legal currency of Brazil;
- “China” and the “PRC” refer to the People’s Republic of China, excluding, for the purposes of this annual report on Form 20-F, Taiwan and the special administrative regions of Hong Kong and Macau;
- “COD” refers to commercial operation date;
- “CSI”, “we”, “us”, “our company” and “our” refer to Canadian Solar Inc., a Canada corporation, its predecessor entities and its consolidated subsidiaries;
- “C\$” and “Canadian dollars” refer to the legal currency of Canada;
- “EPC” refers to engineering, procurement and construction;
- “EU” refers to the European Union;
- “FIT” refers to feed-in tariff;
- “GAAP” refers to generally accepted accounting principles;
- “MSS” refers to module and system solutions;
- “O&M services” refers to operation and maintenance services;
- “PPA” refers to power purchase agreement;
- “PV” refers to photovoltaic. The photovoltaic effect is a process by which sunlight is converted into electricity;
- “RMB” and “Renminbi” refer to the legal currency of China;
- “U.S.” refers to the United States of America;
- “SEC” refers to the U.S. Securities and Exchange Commission;
- “shares” and “common shares” refer to common shares, with no par value, of Canadian Solar Inc.;
- “THB” and “Thai Bhat” refer to the legal currency of Thailand;
- - “W”, “kW”, “MW” and “GW” refer to watts, kilowatts, megawatts and gigawatts, respectively;
- “\$”, “US\$” and “U.S. dollars” refer to the legal currency of U.S.;
- “€” and “Euros” refer to the legal currency of the Economic and Monetary Union of the European Union;
- “£”, “GBP” and “British pounds” refer to the legal currency of the United Kingdom;
- “¥”, “JPY” and “Japanese yen” refer to the legal currency of Japan; and
- “ZAR” and “South African rand” refer to the legal currency of South Africa.

This annual report on Form 20-F includes our audited consolidated financial statements for the years ended December 31, 2017, 2018 and 2019 and as of December 31, 2018 and 2019.

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We use the noon buying rate in The City of New York for cable transfers in Renminbi, Euros, British pounds, Japanese yen, Canadian dollars, Australian dollars, Thai Baht, Brazilian reals and South African rand per U.S. dollars as certified for customs purposes by the Federal Reserve Bank of New York to translate Renminbi, Euros, British pounds, Japanese yen, Canadian dollars, Australian dollars, Thai Baht, Brazilian reals and South African rand to U.S. dollars not otherwise recorded in our consolidated financial statements and included elsewhere in this annual report. Unless otherwise stated, the translation of Renminbi, Euros, British pounds, Japanese yen, Canadian dollars, Australian dollars, Thai Baht, Brazilian reals and South African rand into U.S. dollars was made by the noon buying rate in effect on December 31, 2019, which was RMB6.9618 to \$1.00, €0.8907 to \$1.00, £0.7536 to \$1.00, ¥108.67 to \$1.00, C\$1.2962 to \$1.00, AUD0.7030 to \$1.00, THB29.7500 to \$1.00, BRL4.0190 to \$1.00 and ZAR13.9730 to \$1.00. We make no representation that the Renminbi, Euros, British pounds, Japanese yen, Canadian dollars, Australian dollars, Thai Baht, Brazilian reals, South African rand or U.S. dollars amounts referred to in this annual report on Form 20-F could have been or could be converted into U.S. dollars, Euros, British pounds, Japanese yen, Canadian dollars, Australian dollars, Thai Baht, Brazilian reals South African rand or Renminbi, as the case may be, at any particular rate or at all. See “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Fluctuations in exchange rates could adversely affect our business, including our financial condition and results of operations.”

FORWARD-LOOKING INFORMATION

This annual report on Form 20-F contains forward-looking statements that relate to future events, including our future operating results, our prospects and our future financial performance and condition, results of operations, business strategy and financial needs, all of which are largely based on our current expectations and projections. These forward-looking statements are made under the “safe harbor” provisions of the U.S. Private Securities Litigation Reform Act of 1995. You can identify these statements by terminology such as “may,” “will,” “expect,” “anticipate,” “future,” “intend,” “plan,” “believe,” “estimate,” “is/are likely to” or similar expressions. Forward-looking statements involve inherent risks and uncertainties. These forward-looking statements include, among other things, statements relating to:

- our expectations regarding the worldwide demand for electricity and the market for solar power;
- our beliefs regarding the importance of environmentally friendly power generation;
- our beliefs regarding the value of and ability to monetize our portfolio of solar power projects;
- our expectations regarding governmental support for solar power;
- our beliefs regarding the rate at which solar power technologies will be adopted and the continued growth of the solar power industry;
- our beliefs regarding the competitiveness of our solar power products and services;
- our expectations with respect to increased revenue growth and improved profitability;
- our expectations regarding the benefits to be derived from our supply chain management and vertical integration manufacturing strategy;
- our ability to continue developing our in-house solar component production capability and our expectations regarding the timing of the expansion of our internal production capacity;
- our ability to secure adequate volumes of silicon, solar wafers and cells at competitive cost to support our solar module production;
- our beliefs regarding the effects of environmental regulation;
- our future business development, results of operations and financial condition;
- competition from other manufacturers of solar power products and conventional energy suppliers;
- our ability to successfully expand our range of products and services and to successfully execute plans for our energy segment;
- - our ability to develop, build and sell solar power projects in Canada, the U.S., Japan, China, Argentina, Mexico, India, Brazil, the United Kingdom, Australia, Italy, Namibia and elsewhere; and
- our beliefs with respect to the outcome of the investigations and litigation to which we are a party.

Known and unknown risks, uncertainties and other factors may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by forward-looking statements. See “Item 3. Key Information—D. Risk Factors” for a discussion of some of the risk factors that may affect our business and results of operations. These risks are not exhaustive. Other sections of this annual report may include additional factors that could adversely influence our business and financial performance. Moreover, because we operate in an emerging and evolving industry, new risk factors may emerge from time to time. We cannot predict all risk factors, nor can we assess the impact of all or any of these factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those expressed or implied in any forward-looking statement. We do not undertake any obligation to update or revise the forward-looking statements except as required under applicable law.

PART I

ITEM 1. IDENTITY OF DIRECTORS, SENIOR MANAGEMENT AND ADVISERS

Not applicable.

ITEM 2. OFFER STATISTICS AND EXPECTED TIMETABLE

Not applicable.

ITEM 3. KEY INFORMATION

A. Selected Financial Data

Selected Consolidated Financial and Operating Data

The following selected statement of operations data for the years ended December 31, 2017, 2018 and 2019 and balance sheet data as of December 31, 2018 and 2019 have been derived from our consolidated financial statements, which are included elsewhere in this annual report on Form 20-F. You should read the selected consolidated financial and operating data in conjunction with those financial statements and the related notes and “Item 5. Operating and Financial Review and Prospects” included elsewhere in this annual report on Form 20-F.

Our selected consolidated statement of operations data for the years ended December 31, 2015 and 2016 and our consolidated balance sheet data as of December 31, 2015, 2016 and 2017 were derived from our consolidated financial statements that are not included in this annual report.

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All of our financial statements are prepared and presented in accordance with U.S. generally accepted accounting principles, or U.S. GAAP. Our historical results are not necessarily indicative of results for any future periods.

	For the years ended, or as of, December 31,				
	2015	2016	2017	2018	2019
(In thousands of \$, except share and per share data, and operating data and percentages)					
Statement of operations data:					
Net revenues	3,467,626	2,853,078	3,390,393	3,744,512	3,200,583
Income from operations	247,371	93,164	269,345	364,657	258,879
Net income	173,316	65,275	102,983	242,431	166,555
Net income attributable to Canadian Solar Inc.	171,861	65,249	99,572	237,070	171,585
Earnings per share, basic	3.08	1.13	1.71	4.02	2.88
Shares used in computation, basic	55,728,903	57,524,349	58,167,004	58,914,540	59,633,855
Earnings per share, diluted	2.93	1.12	1.69	3.88	2.83
Shares used in computation, diluted	60,426,056	58,059,063	61,548,158	62,291,670	60,777,696
Other financial data:					
Gross margin	16.6%	14.6%	18.8%	20.7%	22.4%
Operating margin	7.1%	3.3%	7.9%	9.7%	8.1%
Net margin	5.0%	2.3%	3.0%	6.5%	5.2%
Selected operating data:					
Solar power products sold (in MW)					
—MSS segment ⁽¹⁾	4,085.0	5,138.1	6,538.8	5,916.1	7,979.7
—Energy segment ⁽²⁾	298.8	65.7	354.3	901.1	435.2
Total	4,383.8	5,203.8	6,893.1	6,817.2	8,414.9
Average selling price (in \$ per watt)					
—Solar module	0.58	0.51	0.40	0.34	0.29
Balance Sheet Data:					
Net current assets (liabilities)	(392,231)	69,697	(22,709)	125,964	160,939
Total assets					

	4,413,928	5,406,606	5,889,627	4,892,658	5,467,207
Net assets	832,510	899,390	1,059,775	1,272,845	1,425,058
Long-term borrowings	606,577	493,455	404,341	393,614	619,477
Convertible notes	146,674	125,569	126,476	127,428	—
Common shares	677,103	701,283	702,162	702,931	703,806
Number of shares outstanding	55,965,443	57,830,149	58,496,685	59,180,624	59,371,684(3)

(1) Numbers are calculated after inter-segmentation elimination and represent solar power products sold to third parties.

(2) Numbers are calculated after inter-segmentation elimination.

(3) Excludes 609,516 common shares held as treasury stock as of December 31, 2019.

B. Capitalization and Indebtedness

Not applicable.

C. Reasons for the Offer and Use of Proceeds

Not applicable.

D. Risk Factors

Risks Related to Our Company and Our Industry

We may be adversely affected by volatile solar power market and industry conditions; in particular, the demand for our solar power products and services may decline, which may reduce our revenues and earnings.

Our business is affected by conditions in the solar power market and industry. We believe that the solar power market and industry may from time to time experience oversupply. When this occurs, many solar power project developers, solar system installers and solar power product distributors that purchase solar power products, including solar modules from manufacturers like us, may be adversely affected. Our shipments of solar modules slightly decreased in 2018 compared to 2017, and increased moderately in 2019. The average selling prices for our solar modules declined from the previous year in each of 2017, 2018 and 2019. Over the past several quarters, oversupply conditions across the value chain and foreign trade disputes have affected industry-wide demand and put pressure on average selling prices, resulting in lower revenue for many industry participants. If the supply of solar modules grows faster than demand, and if governments continue to reduce financial support for the solar industry and impose trade barriers for solar power products, demand and the average selling price for our products could be materially and adversely affected.

The solar power market is still at a relatively early stage of development and future demand for solar power products and services is uncertain. Market data for the solar power industry is not as readily available as for more established industries, where trends are more reliably assessed from data gathered over a longer period of time. In addition, demand for solar power products and services in our targeted markets, including Europe, the U.S., Japan, China, Brazil and India may not develop or may develop to a lesser extent than we anticipate. Many factors may affect the viability of solar power technology and the demand for solar power products, including:

- the cost-effectiveness, performance and reliability of solar power products and services, including our solar power projects, compared to conventional and other renewable energy sources and products and services;
- the availability of government subsidies and incentives to support the development of the solar power industry;
- the availability and cost of capital, including long-term debt and tax equity, for solar power projects;
- the success of other alternative energy technologies, such as wind power, hydroelectric power, geothermal power and biomass fuel;
- fluctuations in economic and market conditions that affect the viability of conventional and other renewable energy sources, such as increases or decreases in the prices of oil, gas and other fossil fuels;
- capital expenditures by end users of solar power products and services, which tend to decrease when the economy slows; and
- the availability of favorable regulation for solar power within the electric power industry and the broader energy industry.

If solar power technology is not suitable for widespread adoption or if sufficient demand for solar power products and services does not develop or takes longer to develop than we anticipate, our revenues may suffer and we may be unable to sustain our profitability.

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The operating results of our energy segment and the mix of revenues from our MSS and energy segments may be subject to significant fluctuation due to a number of factors, including the unpredictability of the timing of the development and sale of our solar power projects and our inability to find third party buyers for our solar power projects in a timely manner, on favorable terms and conditions, or at all.

Our energy segment develops, sells and/or operates and maintains solar power projects primarily in the U.S., Japan, China, Argentina, Mexico, India, Brazil, the United Kingdom, Australia, Italy and Namibia. Our solar project development activities have grown over the past several years through a combination of organic growth and acquisitions. After completing their development, we either sell our solar power projects to third party buyers, or operate them under PPAs or other contractual arrangements with utility companies or grid operators. Revenues from our energy segment increased by \$571.1 million, or 5.4 times, from \$106.4 million for the year ended December 31, 2016 to \$677.5 million for the year ended December 31, 2017, and then increased by \$898.1 million, or 1.3 times, to \$1,575.6 million for the year ended December 31, 2018, and then decreased by \$856.1 million, or 0.5 times, to \$719.4 million for the year ended December 31, 2019. We intend to monetize the majority of our current portfolio of solar power projects in operation with an estimated resale value of approximately \$1.0 billion as of January 31, 2020. We also intend to monetize certain of our projects before they reach COD. However, there is no assurance whether or when we will be able to realize their estimated resale value.

The operating results of our energy segment may be subject to significant period-over-period fluctuations for a variety of reasons, including but not limited to the unpredictability of the timing of the development and sale of our solar power projects, changes in market conditions after we have committed to projects, availability of project financing and changes in government regulations and policies, all of which may result in the cancellation of or delays in the development of projects, inability to monetize or delays in monetizing projects or changes in amounts realized on monetization of projects. If a project is canceled, abandoned or deemed unlikely to occur, we will charge all prior capital costs as an operating expense in the quarter in which such determination is made, which could materially adversely affect operating results.

Further, the mix of revenues from our MSS and energy segments can fluctuate dramatically from quarter to quarter, which may adversely affect our margins and financial results in any given period.

Any of the foregoing may cause us to miss our financial guidance for a given period, which could adversely impact the market price for our common stock and our liquidity.

The execution of our growth strategy depends upon the continued availability of third-party financing arrangements for our customers, which is affected by general economic conditions. Tight credit markets could depress demand or prices for solar power products and services, hamper our expansion and materially affect our results of operations.

Most solar power projects, including our own, require financing for development and construction with a mixture of equity and third-party funding. The cost of capital affects both the demand and price of solar power systems. A high cost of capital may materially reduce the internal rate of return for solar power projects and therefore put downward pressure on the prices of both solar systems and solar modules, which typically comprise a major part of the cost of solar power projects.

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Furthermore, solar power projects compete for capital with other forms of fixed income investments such as government and corporate bonds. Some classes of investors compare the returns of solar power projects with bond yields and expect a similar or higher internal rate of return, adjusted for risk and liquidity. Higher interest rates could increase the cost of existing funding and present an obstacle for future funding that would otherwise spur the growth of the solar power industry. In addition, higher bond yields could result in increased yield expectations for solar power projects, which would result in lower system prices. In the event that suitable funding is unavailable, our customers may be unable to pay for products they have agreed to purchase. It may also be difficult to collect payments from customers facing liquidity challenges due to either customer defaults or financial institution defaults on project loans. Constricted credit markets may impede our expansion plans and materially and adversely affect our results of operations. The cash flow of a solar power project is often derived from government-funded or government-backed FITs. Consequently, the availability and cost of funding solar power projects is determined in part based on the perceived sovereign credit risk of the country where a particular project is located.

In light of the uncertainty in the global credit and lending environment, we cannot make assurances that financial institutions will continue to offer funding to solar power project developers at reasonable costs. An increase in interest rates or a decrease in funding of capital projects within the global financial market could make it difficult to fund solar power systems and potentially reduce the demand for solar modules and/or reduce the average selling prices for solar modules, which may materially and adversely affect our business, results of operations, financial condition and prospects.

Our future success depends partly on our ability to expand the pipeline of our energy segment in several key markets, which exposes us to a number of risks and uncertainties.

Historically, our MSS segment has accounted for the majority of our net revenues, contributing 80.0%, 57.9% and 77.5% of our net revenues in 2017, 2018 and 2019, respectively. We have, in recent years, increased our investment in, and management attention on, our energy segment, which primarily consists of solar power project development and sale, operating solar power projects and sale of electricity.

While we plan to continue to monetize our current portfolio of solar power projects in operation, we also intend to grow our energy segment by developing and selling or operating more solar projects, including those that we develop and those that we acquire from third-parties. As we do, we will be increasingly exposed to the risks associated with these activities. Further, our future success largely depends on our ability to expand our solar power project pipeline. The risks and uncertainties associated with our energy segment and our ability to expand our solar power project pipeline include:

- the uncertainty of being able to sell the projects, receive full payment for them upon completion, or receive payment in a timely manner;
- the need to raise significant additional funds to develop greenfield or purchase late-stage solar power projects, which we may be unable to obtain on commercially reasonable terms or at all;
- delays and cost overruns as a result of a number of factors, many of which are beyond our control, including delays in regulatory approvals, construction, grid-connection and customer acceptance testing;
- delays or denial of required regulatory approvals by relevant government authorities;
- diversion of significant management attention and other resources; and
- failure to execute our project pipeline expansion plan effectively.

If we are unable to successfully expand our energy segment, and, in particular, our solar power project pipeline, we may be unable to expand our business, maintain our competitive position, improve our profitability and generate cash flows.

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Governments may revise, reduce or eliminate subsidies and economic incentives for solar energy, which could cause demand for our products to decline.

The market for on-grid applications, where solar power supplements the electricity a customer purchases from the utility network or sells to a utility under a FIT, depends largely on the availability and size of government subsidy programs and economic incentives. At present, the cost of solar power exceeds retail electricity rates in many locations. Government incentives vary by geographic market. Governments in many countries have provided incentives in the form of FITs, rebates, tax credits, renewable portfolio standards and other incentives. These governments have implemented mandates to end-users, distributors, system integrators and manufacturers of solar power products to promote the use of solar energy in on-grid applications and to reduce dependency on other forms of energy. Some of these government mandates and economic incentives have been or are scheduled to be reduced or eliminated altogether. It is likely that this trend will continue, and that, eventually, subsidies for solar energy will be phased out completely. Over the past few years, the cost of solar energy has declined and the industry has become less dependent on government subsidies and economic incentives. However, some of our largest markets still rely on government subsidies and economic incentives. We believe that the near-term growth of the market still depends in large part on the availability and size of such government subsidies and economic incentives.

While solar power projects may continue to offer attractive internal rates of return, it is unlikely that these rates will be as high as they were in the past. If internal rates of return fall below an acceptable rate for project investors, and governments continue to reduce or eliminate subsidies for solar energy, this may cause a decrease in demand and considerable downward pressure on solar systems and therefore negatively impact both solar module prices and the value of our solar power projects. The reduction, modification or elimination of government subsidies and economic incentives in one or more of our markets could therefore materially and adversely affect the growth of such markets or result in increased price competition, either of which could cause our revenues to decline and harm our financial results.

General global economic conditions may have an adverse impact on our operating performance and results of operations.

The demand for solar power products and services is influenced by macroeconomic factors, such as global economic conditions, demand for electricity, supply and prices of other energy products, such as oil, coal and natural gas, as well as government regulations and policies concerning the electric utility industry, the solar and other alternative energy industries and the environment. As a result of global economic conditions, some governments may implement measures that reduce the FITs and other subsidies designed to benefit the solar industry. During 2017, 2018 and 2019, a decrease in solar power tariffs in many markets placed downward pressure on the price of solar systems in those and other markets. In addition, reductions in oil and coal prices may reduce the demand for and the prices of solar power products and services. Our growth and profitability depend on the demand for and the prices of solar power products and services. If we experience negative market and industry conditions and demand for solar power projects and solar power products and services weakens as a result, our business and results of operations may be adversely affected.

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Imposition of antidumping and countervailing duty orders or safeguard measures in one or more markets may result in additional costs to our customers, which could materially or adversely affect our business, results of operations, financial conditions and future prospects.

We have been in the past, and may be in the future, subject to the imposition of antidumping and countervailing duty orders in one or more of the markets in which we sell our products. In the past, we have been subject to the imposition of antidumping and countervailing duty orders in the U.S., the EU and Canada and have, as a result, been party to lengthy proceedings related thereto. See “Item 8. Financial Information—A. Consolidated Statements and Other Financial Information—Legal and Administrative Proceedings.” The U.S. and the EU are important markets for us. Ongoing proceedings relating to past, and the imposition of any new, antidumping and countervailing duty orders or safeguard measures in these markets may result in additional costs to us and/or our customers, which may materially and adversely affect our business, results of operations, financial conditions and future prospects.

Our project development and construction activities may not be successful, projects under development may not receive required permits, property rights, EPC agreements, interconnection and transmission arrangements, and financing or construction of projects may not commence or continue as scheduled, all of which could increase our costs, delay or cancel a project, and have a material adverse effect on our revenue and profitability.

The development and construction of solar power projects involve known and unknown risks. We may be required to invest significant amounts of money for land and interconnection rights, preliminary engineering and permitting and may incur legal and other expenses before we can determine whether a project is feasible. Success in developing a particular project is contingent upon, among other things:

- securing land rights and related permits, including satisfactory environmental assessments;
- receipt of required land use and construction permits and approvals;
- receipt of rights to interconnect to the electric grid;
- availability of transmission capacity, potential upgrade costs to the transmission grid and other system constraints;
- payment of interconnection and other deposits (some of which are non-refundable);
- negotiation of satisfactory EPC agreements; and
- obtaining construction financing, including debt, equity and tax credits.

In addition, successful completion of a particular project may be adversely affected by numerous factors, including:

- delays in obtaining and maintaining required governmental permits and approvals;
- potential challenges from local residents, environmental organizations, and others who may not support the project;
- unforeseen engineering problems; subsurface land conditions; construction delays; cost over-runs; labor, equipment and materials supply shortages or disruptions (including labor strikes);
- additional complexities when conducting project development or construction activities in foreign jurisdictions, including compliance with the U.S. Foreign Corrupt Practices Act and other applicable local laws and customs; and
- force majeure events, including adverse weather conditions, pandemics and other events beyond our control.

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If we are unable to complete the development of a solar power project or we fail to meet any agreed upon system-level capacity or energy output guarantees or warranties (including our 25 year power output performance guarantees) or other contract terms, or our projects cause grid interference or other damage, the EPC or other agreements related to the project may be terminated and/or we may be subject to significant damages, penalties and other obligations relating to the project, including obligations to repair, replace or supplement materials for the project.

We may enter into fixed-price EPC agreements in which we act as the general contractor for our customers in connection with the installation of their solar power systems. All essential costs are estimated at the time of entering into the EPC agreement for a particular project, and these costs 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 and the subcontractors, suppliers and other parties involved in the project. In addition, we require qualified, licensed subcontractors to install most of our solar power systems. Shortages of skilled labor could significantly delay a project or otherwise increase our costs. Should miscalculations in planning a project occur, including those due to unexpected increases in commodity prices or labor costs, or delays in execution occur and we are unable to increase the EPC sales price commensurately, we may not achieve our expected margins or our results of operations may be adversely affected.

Developing and operating solar power projects exposes us to different risks than producing solar modules.

The development of solar power projects can take many months or years to complete and may be delayed for reasons beyond our control. It often requires us to make significant up-front payments for, among other things, land rights and permitting in advance of commencing construction, and revenue from these projects may not be recognized for several additional months following contract signing. Any inability or significant delays in entering into sales contracts with customers after making such up-front payments could adversely affect our business and results of operations. Furthermore, we may become constrained in our ability to simultaneously fund our other business operations and invest in other projects.

In contrast to producing solar modules, developing solar power projects requires more management attention to negotiate the terms of our engagement and monitor the progress of the projects which may divert management's attention from other matters. Our revenue and liquidity may be adversely affected to the extent the market for solar power projects weakens or we are not able to successfully complete the customer acceptance testing due to technical difficulties, equipment failure, or adverse weather, and we are unable to sell our solar power projects at prices and on terms and timing that are acceptable to us.

Our energy segment also includes operating solar power projects and selling electricity to the local or national grid or other power purchasers. As a result, we are subject to a variety of risks associated with intense market competition, changing regulations and policies, insufficient demand for solar power, technological advancements and the failure of our power generation facilities.

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We face a number of risks involving PPAs and project-level financing arrangements, including failure or delay in entering into PPAs, defaults by counterparties and contingent contractual terms such as price adjustment, termination, buy-out, acceleration and other clauses, all of which could materially and adversely affect our energy segment, financial condition, results of operations and cash flows.

We may not be able to enter into PPAs for our solar power projects due to intense competition, increased supply of electricity from other sources, reduction in retail electricity prices, changes in government policies or other factors. There is a limited pool of potential buyers for electricity generated by our solar power plants since the transmission and distribution of electricity is either monopolized or highly concentrated in most jurisdictions. The willingness of buyers to purchase electricity from an independent power producer may be based on a number of factors and not solely on pricing and surety of supply. Failure to enter into PPAs on terms favorable to us, or at all, would negatively impact our revenue and our decisions regarding the development of additional power plants. We may experience delays in entering into PPAs for some of our solar power projects or may not be able to replace an expiring PPA with a contract on equivalent terms and conditions, or otherwise at prices that permit operation of the related facility on a profitable basis. Any delay in entering into PPAs may adversely affect our ability to enjoy the cash flows generated by such projects. If we are unable to replace an expiring PPA with an acceptable new PPA, the affected site may temporarily or permanently cease operations, which could materially and adversely affect our financial condition, results of operations and cash flows.

Substantially all of the electric power generated by our solar power projects will be sold under long-term PPAs with public utilities, licensed suppliers or commercial, industrial or government end users. We expect our future projects will also have long-term PPAs or similar offtake arrangements such as FIT programs. If, for any reason, any of the purchasers of power under these contracts are unable or unwilling to fulfill their related contractual obligations, they refuse to accept delivery of the power delivered thereunder or they otherwise terminate them prior to their expiration, our assets, liabilities, business, financial condition, results of operations and cash flows could be materially and adversely affected. Further, to the extent any of our power purchasers are, or are controlled by, governmental entities, our facilities may be subject to legislative or other political action that may impair their contractual performance or contain contractual remedies that do not provide adequate compensation in the event of a counterparty default.

Some of our PPAs are subject to price adjustments over time. If the price under any of our PPAs is reduced below a level that makes a project economically viable, our financial conditions, cash flow and results of operations could be materially and adversely affected. Further, some of our long-term PPAs do not include inflation-based price increases. Certain of the PPAs for our own projects and those for projects that we have acquired and may acquire in the future contain or may contain provisions that allow the offtake purchaser to terminate or buy out the project or require us to pay liquidated damages upon the occurrence of certain events. If these provisions are exercised, our financial condition, results of operations and cash flows could be materially and adversely affected. Additionally, certain of the project-level financing arrangements for projects allow, and certain of the projects that we may acquire in the future may allow, the lenders or investors to accelerate the repayment of the financing arrangement in the event that the related PPA is terminated or if certain operating thresholds or performance measures are not achieved within specified time periods. Certain of our PPAs and project-level financing arrangements include, and in the future may include, provisions that would permit the counterparty to terminate the contract or accelerate maturity in the event we own, directly or indirectly, less than 50% of the combined voting power or, in some cases, if we cease to be the majority owner, directly or indirectly, of the applicable project subsidiary. The termination of any of our PPAs or the acceleration of the maturity of any of our financing arrangements as a result of a change-in-control event could have a material adverse effect on our financial condition, results of operations and cash flows.

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If the supply of solar wafers and cells increases in line with increases in the supply of polysilicon, then the corresponding oversupply of solar wafers, cells and modules may cause substantial downward pressure on the prices of our products and reduce our revenues and earnings.

Silicon production capacity has expanded rapidly in recent years. As a result of this expansion, coupled with the global economic downturn, the solar industry has experienced an oversupply of high-purity silicon since the beginning of 2009. This has contributed to an oversupply of solar wafers, cells and modules and resulted in substantial downward pressure on prices throughout the value chain. The average selling price of our solar modules decreased from \$0.58 per watt in 2015 to \$0.51 per watt in 2016, \$0.40 per watt in 2017, \$0.34 per watt in 2018 and \$0.29 per watt in 2019. Although we believe that there is a relative balance between capacity and demand at low prices due to industry consolidation, increases in solar module production in excess of market demand may result in further downward pressure on the price of solar wafers, cells and modules, including our products. Increasing competition could also result in us losing sales or market share. Moreover, due to fluctuations in the supply and price of solar power products throughout the value chain, we may not be able, on an ongoing basis, to procure silicon, wafers and cells at reasonable costs if any of the above risks materializes. If, on an ongoing basis, we are unable to procure silicon, solar wafers and solar cells at reasonable prices or mark up the price of our solar modules to cover our manufacturing and operating costs, our revenues and margins will be adversely impacted, either due to higher costs compared to our competitors or due to further write-downs of inventory, or both. In addition, our market share could decline if our competitors are able to price their products more competitively.

We are subject to numerous laws, regulations and policies at the national, regional and local levels of government in the markets where we do business. Any changes to these laws, regulations and policies may present technical, regulatory and economic barriers to the purchase and use of solar power products, solar projects and solar electricity, which may significantly reduce demand for our products and services or otherwise adversely affect our financial performance.

We are subject to a variety of laws and regulations in the markets where we do business, some of which may conflict with each other and all of which are subject to change. These laws and regulations include energy regulations, export and import restrictions, tax laws and regulations, environmental regulations, labor laws and other government requirements, approvals, permits and licenses. We also face trade barriers and trade remedies such as export requirements, tariffs, taxes and other restrictions and expenses, including antidumping and countervailing duty orders, which could increase the prices of our products and make us less competitive in some countries. See “—Imposition of antidumping and countervailing duty orders or safeguard measures in one or more markets may result in additional costs to our customers, which could materially or adversely affect our business, results of operations, financial conditions and future prospects.”

In the countries where we do business, the market for solar power products, solar projects and solar electricity is heavily influenced by national, state and local government regulations and policies concerning the electric utility industry, as well as policies disseminated by electric utilities. These regulations and policies often relate to electricity pricing and technical interconnection of customer-owned electricity generation, and could deter further investment in the research and development of alternative energy sources as well as customer purchases of solar power technology, which could result in a significant reduction in the potential demand for our solar power products, solar projects and solar electricity.

In our MSS segment, we expect that our solar power products and their installation will continue to be subject to national, state and local regulations and policies relating to safety, utility interconnection and metering, construction, environmental protection, and other related matters. Any new regulations or policies pertaining to our solar power products may result in significant additional expenses to us, our resellers and customers, which could cause a significant reduction in demand for our solar power products.

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In our energy segment, we are subject to numerous national, regional and local laws and regulations. Changes in applicable energy laws or regulations, or in the interpretations of these laws and regulations, could result in increased compliance costs or the need for additional capital expenditures. If we fail to comply with these requirements, we could also be subject to civil or criminal liability and the imposition of fines. Further, national, regional or local regulations and policies could be changed to provide for new rate programs that undermine the economic returns for both new and existing projects by charging additional, non-negotiable fixed or demand charges or other fees or reductions in the number of projects allowed under net metering policies. National, regional or local government energy policies, law and regulation supporting the creation of wholesale energy markets are currently, and may continue to be, subject to challenges, modifications and restructuring proposals, which may result in limitations on the commercial strategies available to us for the sale of our power.

Regulatory changes in a jurisdiction where we are developing a solar power project may make the continued development of the project infeasible or economically disadvantageous and any expenditure that we have previously made on the project may be wholly or partially written off. Any of these changes could significantly increase the regulatory related compliance and other expenses incurred by the projects and could significantly reduce or entirely eliminate any potential revenues that can be generated by one or more of the projects or result in significant additional expenses to us, our offtakers and customers, which could materially and adversely affect our business, financial condition, results of operations and cash flows.

We also face regulatory risks imposed by various transmission providers and operators, including regional transmission operators and independent system operators, and their corresponding market rules. These regulations may contain provisions that limit access to the transmission grid or allocate scarce transmission capacity in a particular manner, which could materially and adversely affect our business, financial condition, results of operations and cash flows.

We are also subject to the Foreign Corrupt Practices Act of 1977, or the FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act and other anti-corruption laws that prohibit companies and their employees and third-party intermediaries from authorizing, offering or providing, directly or indirectly, improper payments or benefits to foreign government officials, political parties and private-sector recipients for the purpose of obtaining or retaining business in countries in which we conduct activities. We face significant liabilities if we fail to comply with these laws. We may have direct or indirect interactions with officials and employees of government agencies or state-owned or affiliated entities. For example, in China, we may contract with and sell electricity to the national grid, a state-owned enterprise. In other countries where we develop, acquire or sell solar projects, we need to obtain various approvals, permits and licenses from the local or national governments. We can be held liable for the illegal activities of our employees, representatives, contractors, partners, and agents, even if we do not explicitly authorize such activities. Any violation of the FCPA or other applicable anticorruption laws could result in whistleblower complaints, adverse media coverage, investigations, loss of export privileges, severe criminal or civil sanctions, which could have a material adverse effect on our business, financial condition, results of operation, cash flows and reputation. In addition, responding to any enforcement action may result in the diversion of management's attention and resources, significant defense costs and other professional fees.

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Because the markets in which we compete are highly competitive and evolving quickly, because many of our competitors have greater resources than we do or are more adaptive, and because we have a limited track record in our energy segment, we may not be able to compete successfully and we may not be able to maintain or increase our market share.

In our MSS segment, we face intense competition from a large number of competitors, including non-China-based companies such as First Solar, Inc., or First Solar, and SunPower Corporation, or SunPower, and China-based companies such as LONGI Green Energy Technology Co. Ltd., or Longi, Trina Solar Limited, or Trina, JinkoSolar Holding Co., Limited, or Jinko, JA Solar Co., Limited, or JA Solar, and Hanwha Q Cells Co., Ltd., or Hanwha Q Cells. Some of our competitors are developing or are currently producing products based on new solar power technologies that may ultimately have costs similar to or lower than our projected costs. These include products based on thin film PV technology, which requires either no silicon or significantly less silicon to produce than crystalline silicon solar modules, such as the ones that we produce, and is less susceptible to increases in silicon costs. Some of our competitors have longer operating histories, greater name and brand recognition, access to larger customer bases, greater resources and significantly greater economies of scale than we do. In addition, some of our competitors may have stronger relationships or may enter into exclusive relationships with some of the key distributors or system integrators to whom we sell our products. As a result, they may be able to respond more quickly to changing customer demands or devote greater resources to the development, promotion and sales of their products. Some of our competitors have more diversified product offerings, which may better position them to withstand a decline in demand for solar power products. Some of our competitors are more vertically integrated than we are, from upstream silicon wafer manufacturing to solar power system integration. This may allow them to capture higher margins or have lower costs. In addition, new competitors or alliances among existing competitors could emerge and rapidly acquire significant market share. If we fail to compete successfully, our business will suffer and we may not be able to maintain or increase our market share.

In our energy segment, we compete in a more diversified and complicated landscape since the commercial and regulatory environments for solar power project development and operation vary significantly from region to region and country to country. Our primary competitors are local and international developers and operators of solar power projects. Some of our competitors may have advantages over us in terms of greater experience or resources in the operation, financing, technical support and management of solar power projects, in any particular markets or in general.

Our energy segment has a global footprint and develops solar power projects primarily in the U.S., Japan, China, Argentina, Mexico, India, Brazil, the United Kingdom, Australia, Italy and Namibia. There is no guarantee that we can compete successfully in the markets in which we currently operate or the ones we plan to enter in the future. For example, in certain of our target markets, such as China, state-owned and private companies have emerged to take advantage of the significant market opportunity created by attractive financial incentives and favorable regulatory environment provided by the governments. State-owned companies may have stronger relationships with local governments in certain regions and private companies may be more focused and experienced in developing solar power projects in the markets where we compete. Accordingly, we need to continue to be able to compete against both state-owned and private companies in these markets. Our energy segment also provides EPC services. We face intense competition from other service providers in those markets.

Since our energy segment includes electricity generation and sale, we believe that our primary competitors in the electricity generation markets in which we operate are the incumbent utilities that supply energy to our potential customers under highly regulated rate and tariff structures. We compete with these conventional utilities primarily based on price, predictability of price, reliability of delivery and the ease with which customers can switch to electricity generated by our solar energy projects.

As the solar power and renewable energy industry grows and evolves, we will also face new competitors who are not currently in the market. Our failure to adapt to changing market conditions and to compete successfully with existing or new competitors will limit our growth and will have a material adverse effect on our business and prospects.

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We face risks associated with the marketing, distribution and sale of our solar power products and services internationally.

The international marketing, sale, distribution and delivery of our products and services expose us to a number of risks, including:

- fluctuating sources of revenues;
- difficulties in staffing and managing overseas operations;
- fluctuations in foreign currency exchange rates;
- differing regulatory and tax regimes across different markets;
- the increased cost of understanding local markets and trends and developing and maintaining an effective marketing and distribution presence in various countries;
- the difficulty of providing customer service and support in various countries;
- the difficulty of managing our sales channels effectively as we expand beyond distributors to include direct sales to systems integrators, end users and installers;
- the difficulty of managing the development, construction and sale of our solar power projects on a timely and profitable basis as a result of technical difficulties, commercial disputes with our customers and changes in regulations, among other factors;
- the difficulties and costs of complying with the different commercial, legal and regulatory requirements in the overseas markets in which we operate;
- any failure to develop appropriate risk management and internal control structures tailored to overseas operations;
- any inability to obtain, maintain or enforce intellectual property rights;
- any unanticipated changes in prevailing economic conditions and regulatory requirements; and
- any trade barriers such as export requirements, tariffs, taxes and other restrictions and expenses, which could increase the prices of our products and make us less competitive in some countries.

If we are unable to effectively manage these risks, our ability to expand our business abroad could suffer.

Our revenue sources have fluctuated significantly over recent years. For example, in 2008, 89.5% of our revenues were attributable to Europe, while only 4.6% and 5.9% were attributable to the Americas and to Asia and other regions, respectively. However, in 2017, Europe and other regions contributed 10.5% while the Americas contributed 32.7% and Asia contributed 56.8% of our revenues; in 2018, Europe and other regions contributed 18.6% while the Americas contributed 39.4% and Asia contributed 42.0% of our revenues; and in 2019, Europe and other regions contributed 24.4% while the Americas contributed 43.8% and Asia contributed 31.8% of our revenues. As we shift the focus of our operations between different regions of the world, we have limited time to prepare for and address the risks identified above. Furthermore, some of these risks, such as currency fluctuations, will increase as our revenue contribution from certain global regions becomes more prominent. This may adversely influence our financial performance.

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Our future business depends in part on our ability to make strategic acquisitions, investments and divestitures and to establish and maintain strategic relationships, and our failure to do so could have a material and adverse effect on our market penetration and revenue growth.

We frequently look for and evaluate opportunities to acquire other businesses, make strategic investments or establish strategic relationships with third parties to improve our market position or expand our products and services. When market conditions permit and opportunities arise, we may also consider divesting part of our current business to focus management attention and improve our operating efficiency. Investments, strategic acquisitions and relationships with third parties could subject us to a number of risks, including risks associated with integrating their personnel, operations, services, internal controls and financial reporting into our operations as well as the loss of control of operations that are material to our business. If we divest any material part of our business, particularly our upstream manufacturing business or downstream energy business, we may not be able to benefit from our investment and experience associated with that part of the business and may be subject to intensified concentration risks with less flexibility to respond to market fluctuations. Moreover, it could be expensive to make strategic acquisitions, investments, divestitures and establish and maintain relationships, and we may be subject to the risk of non-performance by a counterparty, which may in turn lead to monetary losses that materially and adversely affect our business. We cannot assure you that we will be able to successfully make strategic acquisitions and investments and successfully integrate them into our operations, or make strategic divestitures or establish strategic relationships with third parties that will prove to be effective for our business. Our inability to do so could materially and adversely affect our market penetration, our revenue growth and our profitability.

Our significant international operations expose us to a number of risks, including unfavorable political, regulatory, labor and tax conditions in the countries where we operate.

We intend to continue to extend our global reach and capture market share in various global markets. In doing so, we will be exposed to various risks, including political, regulatory, labor and tax risks. However, many perceive globalization to be in retreat and protectionism on the rise, as evidenced by the decision of the United Kingdom to leave the EU and the decision of U.S. President Donald Trump, to impose punitive tariffs on goods imported from China and renegotiate certain trade arrangements, such as the North American Free Trade Agreement. If trade tensions increase among the U.S., China and other countries, it may have a material adverse effect on our international operations. Furthermore, we may need to make substantial investments in our overseas operations, both initially and on an ongoing basis, in order to attain longer-term sustainable returns. These investments could negatively impact our financial performance before sustainable profitability is recognized.

We face risks related to private securities litigation.

Our company and certain of our directors and executive officers were named as defendants in class action lawsuits in the U.S. and Canada alleging that our financial disclosures during 2009 and early 2010 were false or misleading and in violation of U.S. federal securities laws and Ontario securities laws, respectively. The lawsuits in the U.S. were consolidated into one class action, which was dismissed with prejudice by the district court in March 2013. The dismissal was subsequently affirmed by the circuit court in December 2013. The lawsuit in Canada is still on-going. As a preliminary matter, we challenged the Ontario Court's jurisdiction to hear the plaintiff's claim, but this motion was unsuccessful. In September 2014, the plaintiff obtained an order granting him leave to assert the statutory cause of action under the Ontario Securities Act for certain of his misrepresentation claims. In January 2015, the plaintiff obtained an order for class certification in respect of the claims for which he obtained leave to assert the statutory cause of action under the Ontario Securities Act, for certain negligent misrepresentation claims and for oppression remedy claims advanced under the Canada Business Corporations Act, or CBCA. The Court dismissed our application for leave to appeal. The class action is at the merits stage and the common issues trial is scheduled to proceed in November 2020. See "Item 8. Financial Information—A. Consolidated Statements and Other Financial Information—Legal and Administrative Proceedings." If the case goes to trial, the Canadian action could require significant management time and attention and result in significant legal expenses. There is no guarantee that we will not become party to additional lawsuits. In addition, we are generally obligated, to the extent permitted by law, to indemnify our directors and officers who are named defendants in these lawsuits. If we were to lose a lawsuit, we may be required to pay judgments or settlements and incur expenses in aggregate amounts that could have a material and adverse effect on our financial condition or results of operations.

Our quarterly operating results may fluctuate from period to period.

Our quarterly operating results may fluctuate from period to period based on a number of factors, including:

- the average selling prices of our solar power products and services;
- the timing of completion of construction of our solar power projects;
- the timing and pricing of project sales;
- changes in payments from power purchasers of solar power plants already in operation;
- the rate and cost at which we are able to expand our internal production capacity;
- the availability and cost of solar cells and wafers from our suppliers and toll manufacturers;
- the availability and cost of raw materials, particularly high-purity silicon;
- changes in government incentive programs and regulations, particularly in our key and target markets;
- the unpredictable volume and timing of customer orders;
- the loss of one or more key customers or the significant reduction or postponement of orders;
- the availability and cost of external financing for on-grid and off-grid solar power applications;
- acquisition and investment costs;
- the timing of successful completion of customer acceptance testing of our solar power projects;
- geopolitical turmoil and natural disasters within any of the countries in which we operate;
- foreign currency fluctuations, particularly in British pounds, Renminbi, Canadian dollars, Japanese yen, Euros, Brazilian reals, South African rand and Thailand Baht;
- our ability to establish and expand customer relationships;

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- changes in our manufacturing costs;
- the timing of new products or technology introduced or announced by our competitors;
- fluctuations in electricity rates due to changes in fossil fuel prices or other factors;
- allowances for doubtful accounts and advances to suppliers;
- inventory write-downs;
- impairment of property, plant and equipment;
- impairment of project assets;
- impairment of investments in affiliates;
- depreciation charges relating to under-utilized assets;
- construction progress of solar power projects and related revenue recognition; and
- antidumping, countervailing and other duty costs and true-up charges

We base our planned operating expenses in part on our expectations of future revenues. A significant portion of our expenses will be fixed in the short-term. If our revenues for a particular quarter are lower than we expect, we may not be able to reduce our operating expenses proportionately, which would harm our operating results for the quarter. As a result, our results of operations may fluctuate from quarter to quarter and our interim and annual financial results may differ from our historical performance.

Fluctuations in exchange rates could adversely affect our business, including our financial condition and results of operations.

The majority of our sales in 2017, 2018 and 2019 were denominated in U.S. dollars, Renminbi and Japanese yen, with the remainder in other currencies such as Euros, Brazilian reals, Australian dollars and Canadian dollars. The majority of our costs and expenses in 2017, 2018 and 2019 were denominated in Renminbi and were primarily related to the sourcing of solar cells, silicon wafers and silicon, other raw materials, including aluminium and silver paste, toll manufacturing fees, labor costs and local overhead expenses within the PRC. From time to time, we enter into loan arrangements with commercial banks that are denominated primarily in Renminbi, U.S. dollars and Japanese yen. Most of our cash and cash equivalents and restricted cash are denominated in Renminbi. Fluctuations in exchange rates, particularly between the U.S. dollars, Renminbi, British pounds, Canadian dollars, Japanese yen, Euros, Brazilian reals, South African rand and Thailand Baht may result in foreign exchange gains or losses. We recorded net foreign exchange loss of \$23.4 million in 2017, and net foreign exchange gain of \$6.5 million and \$10.4 million in 2018 and 2019, respectively.

The value of the Renminbi against the U.S. dollars, the Euros and other currencies is affected by, among other things, changes in China's political and economic conditions and China's foreign exchange policies. We cannot provide any assurances that the policy of the PRC government will not affect, or the manner in which it may affect the exchange rate between the Renminbi and the U.S. dollars or other foreign currencies in the future.

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Since 2008, we have hedged part of our foreign currency exposures against the U.S. dollars using foreign currency forward or option contracts. In addition to the requirement to provide collateral when entering into hedging contracts, there are notional limits on the size of the hedging transactions that we may enter into with any particular counterparty at any given time. While these contracts are intended to reduce the effects of fluctuations in foreign currency exchange rates, our hedging strategy does not mitigate the longer-term impacts of changes to foreign exchange rates. We do not enter into these contracts for trading purposes or speculation, and we believe all these contracts are entered into as hedges of underlying transactions. Nonetheless, these contracts involve costs and risks of their own in the form of transaction costs, credit requirements and counterparty risk. Also, the effectiveness of our hedging program may be limited due to cost effectiveness, cash management, exchange rate visibility and associated management judgment on exchange rate movement, and downside protection. We recorded losses on change in foreign currency derivatives of \$2.6 million in 2017, \$18.4 million in 2018 and \$21.3 million in 2019. Gains or losses on change in foreign currency derivatives are related to our hedging program. If our hedging program is not successful, or if we change our hedging activities in the future, we may experience significant unexpected expenses from fluctuations in exchange rates.

Volatility in foreign exchange rates will hamper, to some extent, our ability to plan our pricing strategy. To the extent that we are unable to pass along increased costs resulting from exchange rate fluctuations to our customers, our profitability may be adversely impacted. As a result, fluctuations in foreign currency exchange rates could have a material and adverse effect on our financial condition and results of operations.

A change in our effective tax rate can have a significant adverse impact on our business.

A number of factors may adversely impact our future effective tax rates, such as the jurisdictions in which our profits are determined to be earned and taxed; changes in the valuation of our deferred tax assets and liabilities; adjustments to provisional taxes upon finalization of various tax returns; adjustments to the interpretation of transfer pricing standards; changes in available tax credits; changes in stock-based compensation expenses; changes in tax laws or the interpretation of tax laws (e.g., in connection with fundamental U.S. international tax reform); changes in U.S. GAAP; expiration of or the inability to renew tax rulings or tax holiday incentives; and the repatriation of non-U.S. earnings for which we have not previously provided for U.S. taxes. A change in our effective tax rate due to any of these factors may adversely influence our future results of operations.

Seasonal variations in demand linked to construction cycles and weather conditions may influence our results of operations.

Our business is subject to seasonal variations in demand linked to construction cycles and weather conditions. Demand for solar power products and services from some countries, such as the U.S. and China, may also be subject to significant seasonality due to adverse weather conditions that can complicate the installation of solar power systems and negatively impact the construction schedules of solar power projects. Seasonal variations could adversely affect our results of operations and make them more volatile and unpredictable.

Our future success depends partly on our ability to maintain and expand our solar components manufacturing capacity, which exposes us to a number of risks and uncertainties.

Our future success depends partly on our ability to maintain and expand our solar components manufacturing capacity. If we are unable to do so, we may be unable to expand our business, maintain our competitive position, and improve our profitability. Our ability to expand our solar components production capacity is subject to risks and uncertainties, including:

- the need to raise significant additional funds to purchase raw materials and to build additional manufacturing facilities, which we may be unable to obtain on commercially reasonable terms or at all;
- delays and cost overruns as a result of a number of factors, many of which are beyond our control, including delays in equipment delivery by vendors;

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- delays or denial of required regulatory approvals by relevant government authorities;
- diversion of significant management attention and other resources; and
- failure to execute our expansion plan effectively.

If we are unable to maintain and expand our internal production capacity, we may be unable to expand our business as planned. Moreover, even if we do maintain and expand our production capacity, we might still not be able to generate sufficient customer demand for our solar power products to support the increased production levels.

We may be unable to generate sufficient cash flows or have access to external financing necessary to fund planned operations and make adequate capital investments in manufacturing capacity and solar project development.

We anticipate that our operating and capital expenditures requirements may increase. To develop new products, support future growth, achieve operating efficiencies and maintain product quality, we may need to make significant capital investments in manufacturing technology, facilities and capital equipment, research and development, and product and process technology. We also anticipate that our operating costs may increase as we expand our manufacturing operations, hire additional personnel, increase our sales and marketing efforts, invest in joint ventures and acquisitions, and continue our research and development efforts with respect to our products and manufacturing technologies.

Our operations are capital intensive. We rely on working capital financing substantially from Chinese banks for our manufacturing operations. We cannot guarantee that we will continue to be able to extend existing or obtain new working capital financing on commercially reasonable terms or at all. See “—Our dependence on Chinese banks to extend our existing loans and provide additional loans exposes us to funding risks, which may materially and adversely affect our operations.” Also, even though we are a publicly-traded company, we may not be able to raise capital via public equity and debt issuances due to market conditions and other factors, many of which are beyond our control. Our ability to obtain external financing is subject to a variety of uncertainties, including:

- our future financial condition, results of operations and cash flows;
- general market conditions for financing activities by manufacturers of solar power products; and
- economic, political and other conditions in the PRC and elsewhere.

If we are unable to obtain funding in a timely manner and on commercially acceptable terms, our growth prospects and future profitability may be adversely affected.

Construction of our solar power projects may require us to obtain project financing. If we are unable to obtain project financing, or if project financing is only available on terms which are not acceptable to us, we may be unable to fully execute our business plan. In addition, we generally expect to sell our projects to tax-oriented, strategic industry and other investors. Such investors may not be available or may only have limited resources, in which case our ability to sell our projects may be hindered or delayed and our business, financial condition, and results of operations may be adversely affected. There can be no assurance that we will be able to generate sufficient cash flows, find other sources of capital to fund our operations and solar power projects, make adequate capital investments to remain competitive in terms of technology development and cost efficiency required by our projects. If adequate funds and alternative resources are not available on acceptable terms, our ability to fund our operations, develop and construct solar power projects, develop and expand our manufacturing operations and distribution network, maintain our research and development efforts or otherwise respond to competitive pressures would be significantly impaired. Our inability to do the foregoing could have a material and adverse effect on our business and results of operations.

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We have substantial indebtedness and may incur substantial additional indebtedness in the future, which could adversely affect our financial health and our ability to generate sufficient cash to satisfy our outstanding and future debt obligations.

We have substantial indebtedness and may incur substantial additional indebtedness in the future, which could adversely affect our financial health and our ability to generate sufficient cash to satisfy our outstanding and future debt obligations. Our substantial indebtedness could have important consequences to us and our shareholders. For example, it could:

- limit our ability to satisfy our debt obligations;
- increase our vulnerability to adverse general economic and industry conditions;
- require us to dedicate a substantial portion of our cash flow from operations to servicing and repaying our indebtedness, thereby reducing the availability of our cash flow to fund working capital, capital expenditures and for other general corporate purposes;
- limit our flexibility in planning for or reacting to changes in our businesses and the industry in which we operate;
- place us at a competitive disadvantage compared with our competitors that have less debt;
- limit, along with the financial and other restrictive covenants of our indebtedness, among other things, our ability to borrow additional funds; and
- increase the cost of additional financing.

In the future, we may from time to time incur substantial additional indebtedness and contingent liabilities. If we incur additional debt, the risks that we face as a result of our already substantial indebtedness and leverage could intensify.

Our ability to generate sufficient cash to satisfy our outstanding and future debt obligations will depend upon our future operating performance, which will be affected by prevailing economic conditions and financial, business and other factors, many of which are beyond our control. We cannot assure you that we will be able to generate sufficient cash flow from operations to support the repayment of our current indebtedness. If we are unable to service our indebtedness, we will be forced to adopt an alternative strategy that may include actions such as reducing or delaying capital expenditures, selling assets, restructuring or refinancing our indebtedness or seeking equity capital. These strategies may not be instituted on satisfactory terms, if at all. In addition, certain of our financing arrangements impose operating and financial restrictions on our business, which may negatively affect our ability to react to changes in market conditions, take advantage of business opportunities we believe to be desirable, obtain future financing, fund required capital expenditures, or withstand a continuing or future downturn in our business. Any of these factors could materially and adversely affect our ability to satisfy our debt obligations.

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We must comply with certain financial and other covenants under the terms of our debt instruments and the failure to do so may put us in default under those instruments.

Many of our loan agreements include financial covenants and broad default provisions. The financial covenants primarily include current ratios, quick ratios, debt to asset ratios, contingent liability ratios and minimum equity requirements, which, in general, govern our existing long-term debt and debt we may incur in the future. These covenants could limit our ability to plan for or react to market conditions or to meet our capital needs in a timely manner and complying with these covenants may require us to curtail some of our operations and growth plans. In addition, any global or regional economic deterioration may cause us to incur significant net losses or force us to assume considerable liabilities, which would adversely impact our ability to comply with the financial and other covenants of our outstanding loans. If our creditors refuse to grant waivers for any non-compliance with these covenants, such non-compliance will constitute an event of default which may accelerate the amounts due under the applicable loan agreements. Some of our loan agreements also contain cross-default clauses, which could enable creditors under our debt instruments to declare an event of default should there be an event of default on our other loan agreements. We cannot assure you that we will be able to remain in compliance with these covenants in the future. We may not be able to cure future violations or obtain waivers of non-compliance on a timely basis. An event of default under any agreement governing our existing or future debt, if not cured by us or waived by our creditors, could have a material adverse effect on our liquidity, financial condition and results of operations.

Our dependence on Chinese banks to extend our existing loans and provide additional loans exposes us to funding risks, which may materially and adversely affect our operations.

We require significant cash flow and funding to support our operations. As a result, we rely on short-term borrowings to provide working capital for our daily operations. Since a significant portion of our borrowings come from Chinese banks, we are exposed to lending policy changes by the Chinese banks. As of December 31, 2019, we had outstanding borrowings of \$889.8 million with Chinese banks.

If the Chinese government changes its macroeconomic policies and forces Chinese banks to tighten their lending practices, or if Chinese banks are no longer willing to provide financing to solar power companies, including us, we may not be able to extend our short-term borrowings or make additional borrowings in the future. As a result, we may not be able to fund our operations to the same extent as in previous years, which may have a material and adverse effect on our operations.

Cancellations of customer orders may make us unable to recoup any prepayments made to suppliers.

In the past, we were required to make prepayments to certain suppliers, primarily suppliers of machinery, silicon raw materials, solar ingots, wafers and cells. Although we require certain customers to make partial prepayments, there is generally a lag between the due date for the prepayment of purchased machinery, silicon raw materials, solar ingots, wafers and cells and the time that our customers make prepayments. In the event that our customers cancel their orders, we may not be able to recoup prepayments made to suppliers, which could adversely influence our financial condition and results of operations.

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Long-term supply agreements may make it difficult for us to adjust our raw material costs should prices decrease. Also, if we terminate any of these agreements, we may not be able to recover all or any part of the advance payments we have made to these suppliers and we may be subject to litigation.

In the past, we have entered into, and may in the future enter into, long-term supply agreements with silicon and wafer suppliers with fixed price and quantity terms in order to secure a stable supply of raw materials to meet our production requirements. If, during the term of these agreements, the price of materials decreases significantly and we are unable to renegotiate favorable terms with our suppliers, we may be placed at a competitive disadvantage compared to our competitors, and our earnings could decline. In addition, if demand for our solar power products decreases, yet our supply agreements require us to purchase more silicon wafers and solar cells than required to meet customer demand, we may incur costs associated with carrying excess inventory. To the extent that we are not able to pass these increased costs on to our customers, our business, cash flows, financial condition and results of operations may be materially and adversely affected. If our suppliers file lawsuits against us for early termination of these contracts, such events could be costly, may divert management's attention and other resources away from our business, and could have a material and adverse effect on our reputation, business, financial condition, results of operations and prospects.

Credit terms offered to some of our customers expose us to the credit risks of such customers and may increase our costs and expenses, which could in turn materially and adversely affect our revenues, liquidity and results of operations.

We offer unsecured short-term or medium-term credit to some of our customers based on their creditworthiness and market conditions. As a result, our claims for payments and sales credits rank as unsecured claims, which expose us to credit risk if our customers become insolvent or bankrupt.

From time to time, we sell our products to high credit risk customers in order to gain early access to emerging or promising markets, increase our market share in existing key markets or because of the prospects of future sales with a rapidly growing customer. There are significant credit risks in doing business with these customers because they are often small, young and high-growth companies with significant unfunded working capital, inadequate balance sheets and credit metrics and limited operating histories. If these customers are not able to obtain satisfactory working capital, maintain adequate cash flow, or obtain construction financing for the projects where our solar products are used, they may be unable to pay for the products for which they have ordered or of which they have taken delivery. Our legal recourse under such circumstances may be limited if the customer's financial resources are already constrained or if we wish to continue to do business with that customer. Revenue recognition for this type of customer is deferred until cash is received. If more customers to whom we extend credit are unable to pay for our products, our revenues, liquidity and results of operations could be materially and adversely affected.

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Our dependence on a limited number of suppliers of silicon wafers, cells and silicon, and the limited number of suppliers for certain other components, such as silver metallization paste, solar module back-sheet, and ethylene vinyl acetate encapsulant, could prevent us from delivering our products to our customers in the required quantities or in a timely manner, which could result in order cancellations and decreased revenues.

We purchase silicon raw materials, silicon wafers and solar cells, from a limited number of third-party material suppliers. In 2019, we purchased a significant portion of the silicon wafers used in our solar modules from third parties. Our major silicon wafer suppliers in 2019 included GCL and Zhenjiang Rende New Energy Science Technology Co., Ltd. Our major suppliers of solar cells in 2019 included Jiangsu Shunfeng New Energy Technology Co., Ltd., or Jiangsu Shunfeng, and Tongwei Solar (Chengdu) Co., Ltd. These suppliers may not always be able to meet our quantity requirements, or keep pace with the price reductions or quality improvements, necessary for us to price our products competitively. Supply may also be interrupted by accidents, disasters or other unforeseen events beyond our control. The failure of a supplier, for whatever reason, to supply silicon wafers, solar cells, silicon raw materials or other essential components that meet our quality, quantity and cost requirements in a timely manner could impair our ability to manufacture our products or increase our costs. The impact could be more severe if we are unable to access alternative sources on a timely basis or on commercially reasonable terms, and could prevent us from delivering our products to our customers in the required quantities and at prices that are profitable. Problems of this kind could cause order cancellations, reduce our market share, harm our reputation and cause legal disputes with our customers.

We are developing and commercializing higher conversion efficiency cells, but we may not be able to mass-produce these cells in a cost-effective way, if at all.

Higher efficiency cell structures are becoming an increasingly important factor in cost competitiveness and brand recognition in the solar power industry. Such cells may yield higher power outputs at the same cost to produce as lower efficiency cells, thereby lowering the manufactured cost per watt. The ability to manufacture and sell solar modules made from such cells may be an important competitive advantage because solar system owners can obtain a higher yield of electricity from the modules that have a similar infrastructure, footprint and system cost compared to systems with modules using lower efficiency cells. Higher conversion efficiency solar cells and the resulting higher output solar modules are one of the considerations in maintaining a price premium over thin-film products. However, while we are making the necessary investments to develop higher conversion efficiency solar power products, there is no assurance that we will be able to commercialize some or any of these products in a cost-effective way, or at all. In the near term, such products may command a modest premium. In the longer term, if our competitors are able to manufacture such products and we cannot do the same at all or in a cost-effective way, we will be at a competitive disadvantage, which will likely influence our product pricing and our financial performance.

We may be subject to unexpected warranty expense that may not be adequately covered by our insurance policies.

We warrant, for a period up to twelve years, that our solar products will be free from defects in materials and workmanship.

We also warrant that, for a period of 25 years, our standard polycrystalline modules will maintain the following performance levels:

- during the first year, the actual power output of the module will be no less than 97.5% of the labeled power output;
- from the second year to the 24th year, the actual annual power output decline of the module will be no more than 0.7%; and
- by the end of the 25th year, the actual power output of the module will be no less than 80.7% of the labeled power output.

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We have lengthened this warranty against decline in performance to 30 years for our bifacial module and double glass module products.

We believe that our warranty periods are consistent with industry practice. Due to the long warranty period, however, we bear the risk of extensive warranty claims long after we have shipped our products and recognized revenue. We began selling specialty solar products in 2002 and began selling standard solar modules in 2004. Any increase in the defect rate of our products would require us to increase our warranty reserves and would have a corresponding negative impact on our results of operations. Although we conduct quality testing and inspection of our solar module products, these have not been and cannot be tested in an environment simulating the up-to-30-year warranty periods. In particular, unknown issues may surface after extended use. These issues could potentially affect our market reputation and adversely affect our revenues, giving rise to potential warranty claims by our customers. As a result, we may be subject to unexpected warranty costs and associated harm to our financial results as long as 30 years after the sale of our products.

For solar power projects built by us, we also provide a limited workmanship or balance of system warranty against defects in engineering, design, installation and construction under normal use, operation and service conditions for a period of up to ten years following the energizing of the solar power plant. In resolving claims under the workmanship or balance of system warranty, we have the option of remedying through repair, refurbishment or replacement of equipment. We have also entered into similar workmanship warranties with our suppliers to back up our warranties.

As part of our energy business, before commissioning solar power projects, we conduct performance testing to confirm that the projects meet the operational and capacity expectations set forth in the agreements. In limited cases, we also provide for an energy generation performance test designed to demonstrate that the actual energy generation for up to the first three years meets or exceeds the modeled energy expectation (after adjusting for actual solar irradiation). In the event that the energy generation performance test performs below expectations, the appropriate party (EPC contractor or equipment provider) may incur liquidated damages capped at a percentage of the contract price.

We have entered into agreements with a group of insurance companies with high credit ratings to back up our warranties. Under the terms of the insurance policies, which are designed to match the terms of our solar module product warranty policy, the insurance companies are obliged to reimburse us, subject to certain maximum claim limits and certain deductibles, for the actual product warranty costs that we incur under the terms of our solar module product warranty policy. We record the insurance premiums initially as prepaid expenses and amortize them over the respective policy period of one year. However, potential warranty claims may exceed the scope or amount of coverage under this insurance and, if they do, they could materially and adversely affect our business.

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We may not continue to be successful in developing and maintaining a cost-effective solar cell, wafer and ingot manufacturing capability.

Our annual solar cell, solar wafer and ingot production capacity was 9.6 GW, 5 GW and 1.85 GW, respectively, as of December 31, 2019. To remain competitive, we intend to expand our annual solar cell, wafer and ingot production capacity to meet expected growth in demand for our solar modules. In doing so, we may face significant product development challenges. Manufacturing solar cells, wafers and ingots is a complex process and we may not be able to produce a sufficient quality of these items to meet our solar module manufacturing standards. Minor deviations in the manufacturing process can cause substantial decreases in yield and in some cases result in no yield or cause production to be suspended. We will need to make capital expenditures to purchase manufacturing equipment for solar cell, wafer and ingot production and will also need to make significant investments in research and development to keep pace with technological advances in solar power technology. Any failure to successfully develop and maintain cost-effective manufacturing capability may have a material and adverse effect on our business and prospects. For example, we have in the past purchased a large percentage of solar cells from third parties. This negatively affected our margins compared with those of our competitors since it is less expensive to produce cells internally than to purchase them from third parties. Because third party solar cell purchases are usually made in a period of high demand, prices tend to be higher and availability reduced.

Although we intend to continue direct purchasing of solar cells, wafers and ingots and toll manufacturing arrangements through a limited number of strategic partners, our relationships with our suppliers may be disrupted if we engage in the large-scale production of solar cells, wafers and ingots ourselves. If our suppliers discontinue or reduce the supply of solar cells, wafers and ingots to us, through direct sales or through toll manufacturing arrangements, and we are not able to compensate for the loss or reduction by manufacturing our own solar cells, wafers and ingots, our business and results of operations may be adversely affected. For more details, see “Item 6. Directors, Senior Management and Employees—D. Employees.”

We may not achieve acceptable yields and product performance as a result of manufacturing problems.

We need to continuously enhance and modify our solar module, cell, wafer and ingot production capabilities in order to improve yields and product performance. Microscopic impurities such as dust and other contaminants, difficulties in the manufacturing process, disruptions in the supply of utilities or defects in the key materials and tools used to manufacture solar modules, cells, ingots and wafers can cause a percentage of the solar modules, cells, ingots and wafers to be rejected, which would negatively affect our yields. We may experience manufacturing difficulties that cause production delays and lower than expected yields.

Problems in our facilities, including but not limited to production failures, human errors, weather conditions, equipment malfunction or process contamination, may limit our ability to manufacture products, which could seriously harm our operations. We are also susceptible to floods, tornados, droughts, power losses and similar events beyond our control that would affect our facilities. A disruption in any step of the manufacturing process will require us to repeat each step and recycle the silicon debris, which would adversely affect our yields and manufacturing cost.

If we are unable to attract, train and retain technical personnel, our business may be materially and adversely affected.

Our future success depends, to a significant extent, on our ability to attract, train and retain technical personnel. Recruiting and retaining qualified technical personnel, particularly those with expertise in the solar power industry, are vital to our success. There is substantial competition for qualified technical personnel, and there can be no assurance that we will be able to attract or retain sufficient qualified technical personnel. If we are unable to attract and retain qualified employees, our business may be materially and adversely affected.

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Our dependence on a limited number of customers and our lack of long-term customer contracts in our solar modules business may cause significant fluctuations or declines in our revenues.

We sell a substantial portion of our solar module products to a limited number of customers, including distributors, system integrators, project developers and installers/EPC companies. Our top five customers by revenues collectively accounted for approximately 27.7%, 31.9% and 24.2% of our net revenues in 2017, 2018 and 2019, respectively. We anticipate that our dependence on a limited number of customers will continue for the foreseeable future. Consequently, any of the following events may cause material fluctuations or declines in our revenues:

- reduced, delayed or cancelled orders from one or more of our significant customers;
- the loss of one or more of our significant customers;
- a significant customer's failure to pay for our products on time; and
- a significant customer's financial difficulties or insolvency.

As we continue to expand our business and operations, our top customers continue to change. We cannot assure that we will be able to develop a consistent customer base.

There are a limited number of purchasers of utility-scale quantities of electricity and entities that have the ability to interconnect projects to the grid, which exposes us and our utility scale solar power projects to additional risk.

Since the transmission and distribution of electricity is either monopolized or highly concentrated in most jurisdictions, there are a limited number of possible purchasers for utility-scale quantities of electricity in a given geographic location, normally transmission grid operators, state and investor owned power companies, public utility districts and cooperatives. As a result, there is a concentrated pool of potential buyers for electricity generated by our solar power plants, which may restrict our ability to negotiate favorable terms under new PPAs and could impact our ability to find new customers for the electricity generated by our solar power plants should this become necessary. Additionally, these possible purchasers may have a role in connecting our projects to the grid to allow the flow of electricity. Furthermore, if the financial condition of these utilities and/or power purchasers deteriorates, or government policies or regulations to which they are subject and which compel them to source renewable energy supplies change, demand for electricity produced by our plants or the ability to connect to the grid could be negatively impacted. For example, Pacific Gas and Electric Company, or PG&E, a California-based utility and customer that has entered into interconnection agreements, or IAs, and PPAs with us, filed for bankruptcy protection in 2019. The IAs require PG&E to, among other things, reimburse us for certain network upgrade costs advanced by us during the development of our solar power plants and the PPAs require PG&E to, among other things, pay for certain of the electricity generated by our solar power plants. Depending on a variety of factors, including future decisions of PG&E, and the bankruptcy court, and the state government, PG&E's ability to meet may not meet, or may be delayed in meeting, its obligations to us under the IAs and PPAs could be adversely impacted, which could result in a decrease or delay in our revenues. Any decision by PG&E to meet, or fail to meet, its obligations may also be subject to applicable regulatory requirements, including those of the Federal Energy Regulatory Commission (FERC). However, in this example, we view the risk as relatively low due to the fact that, with the approval of the bankruptcy court, PG&E has both assumed our PPAs and stipulated that it will continue to pay network upgrade reimbursements in accordance with the terms of its customers' interconnection agreements and CAISO's FERC-approved Open Access Transmission Tariff. In addition, provisions in our PPAs or applicable laws may provide for the curtailment of delivery of electricity for various reasons, including preventing damage to transmission systems, system emergencies, force majeure or economic reasons. Such curtailment could reduce revenues to us from our PPAs. If we cannot enter into PPAs on terms favorable to us, or at all, or if the purchaser under our PPAs were to exercise its curtailment or other rights to reduce purchases or payments under the PPAs, our revenues and our decisions regarding development of additional projects in the energy segment may be adversely affected.

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Product liability claims against us could result in adverse publicity and potentially significant monetary damages.

We, along with other solar power product manufacturers, are exposed to risks associated with product liability claims if the use of our solar power products results in injury or death. Since our products generate electricity, it is possible that users could be injured or killed by our products due to product malfunctions, defects, improper installation or other causes. Although we carry limited product liability insurance, we may not have adequate resources to satisfy a judgment if a successful claim is brought against us. The successful assertion of product liability claims against us could result in potentially significant monetary damages and require us to make significant payments. Even if the product liability claims against us are determined in our favor, we may suffer significant damage to our reputation.

Our founder, Dr. Shawn Qu, has substantial influence over our company and his interests may not be aligned with the interests of our other shareholders.

As of March 31, 2020, Dr. Shawn Qu, our founder, Chairman, President and Chief Executive Officer, beneficially owned 13,964,711 common shares, or 23.6% of our outstanding shares. As a result, Dr. Shawn Qu has substantial influence over our business, including decisions regarding mergers and acquisition, consolidations, the sale of all or substantially all of our assets, the election of directors and other significant corporate actions. This concentration of ownership may discourage, delay or prevent a change in control of our company, which could deprive our other shareholders of an opportunity to receive a premium for their shares as part of a sale of our company and might reduce the price of our common shares.

We may be exposed to infringement, misappropriation or other claims by third parties, which, if determined adversely to us, could require us to pay significant damage awards.

Our success depends on our ability to develop and use our technology and know-how and sell our solar power products and services without infringing the intellectual property or other rights of third parties. The validity and scope of claims relating to solar power technology patents involve complex scientific, legal and factual questions and analyses and are therefore highly uncertain. We may be subject to litigation involving claims of patent infringement or the violation of intellectual property rights of third parties. Defending 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. Additionally, we use both imported and China-made equipment in our production lines, sometimes without sufficient supplier guarantees that our use of such equipment does not infringe third-party intellectual property rights. This creates a potential source of litigation or infringement claims. 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 or require us to seek licenses from third parties, pay ongoing royalties, redesign our products or subject us to injunctions prohibiting the manufacture and sale of our products or the use of our technologies. Protracted litigation could also defer customers or potential customers or limit their purchase or use of our products until such litigation is resolved.

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Compliance with environmental laws and regulations can be expensive, and noncompliance with these regulations may result in adverse publicity and potentially significant monetary damages, fines and the suspension or even termination of our business operations.

We are required to comply with all national and local environmental regulations. Our business generates noise, wastewater, gaseous wastes and other industrial waste in our operations and the risk of incidents with a potential environmental impact has increased as our business has expanded. We believe that we substantially comply with all relevant environmental laws and regulations and have all necessary and material environmental permits to conduct our business as it is presently conducted. However, if more stringent regulations are adopted in the future, the costs of complying with these new regulations could be substantial. If we fail to comply with present or future environmental regulations, we may be required to pay substantial fines, suspend production or cease operations.

Our solar power products must comply with the environmental regulations of the jurisdictions in which they are installed, and we may incur expenses to design and manufacture our products to comply with such regulations. If compliance is unduly expensive or unduly difficult, we may lose market share and our financial results may be adversely affected. Any failure by us to control our use or to restrict adequately the discharge, of hazardous substances could subject us to potentially significant monetary damages, fines or suspensions of our business operations.

We face risks related to natural disasters, health epidemics, such as COVID-19, and other catastrophes, which could significantly disrupt our operations.

Our business could be materially and adversely affected by natural disasters or other catastrophes, such as earthquakes, fire, floods, hail, windstorms, severe weather conditions, environmental accidents, power loss, communications failures, explosions, terrorist attacks and similar events. Our business could also be materially and adversely affected by public health emergencies, such as the outbreak of avian influenza, severe acute respiratory syndrome, or SARS, Zika virus, Ebola virus, the 2019 novel coronavirus or other local health epidemics in China and elsewhere and global pandemics. If any of our employees is suspected of having contracted any contagious disease, we may, under certain circumstances, be required to quarantine those employees and the affected areas of our operations. As a result, we may have to temporarily suspend part or all of our facilities. Furthermore, authorities may impose restrictions on travel and transportation and implement other preventative measures in affected regions to deal with the catastrophe or emergency, which may lead to the temporary closure of our facilities and declining economic activity at large. A prolonged outbreak of any health epidemic or other adverse public health developments, in China or elsewhere in the world, could have a material adverse effect on our business operations.

In early February 2020, the World Health Organization declared the outbreak of novel coronavirus, or COVID-19, a Public Health Emergency of International Concern. In an effort to limit the spread of the disease, the national Chinese authorities took various emergency measures, including extending the Lunar New Year holiday, implementing travel bans, closing factories and businesses, and placing quarantine restrictions on high-risk areas. These measures prevented many of our employees from going to work for several weeks during the first quarter of 2020, which adversely impacted our business operations during that time. While the majority of our employees have since resumed their normal working functions, any further outbreaks resulting in prolonged deviations from normal daily operations could further negatively impact our business. Due to the widespread nature and severity of COVID-19 as well as the measures taken to limit its spread, the Chinese economy has been adversely impacted in the first quarter of 2020 and beyond. Further, the spread of COVID-19 has caused severe disruptions in the EU and the U.S. and global economies and financial markets and could potentially create widespread business continuity issues of an as-yet unknown magnitude and duration. To the extent that COVID-19 or any health epidemic harms the Chinese and global economies in general, our results of operations could be adversely affected.

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We may not be successful in establishing our brand name in important markets and the products we sell under our brand name may compete with the products we manufacture on an original equipment manufacturer, or OEM, basis for our customers.

We sell our products primarily under our own brand name but also on an OEM basis. In certain markets, our brand may not be as prominent as other more established solar power product vendors, and there can be no assurance that the brand names “Canadian Solar,” or “CSI” or any of our possible future brand names will gain acceptance among customers. Moreover, because the range of products that we sell under our own brands and those we manufacture for our OEM customers may be substantially similar, we may end up directly or indirectly competing with our OEM customers, which could negatively affect our relationship with them.

Failure to protect our intellectual property rights in connection with new solar power products may undermine our competitive position.

As we develop and bring to market new solar power products, we may need to increase our expenditures to protect our intellectual property. Our failure to protect our intellectual property rights may undermine our competitive position. As of March 31, 2020, we had 1,567 patents and 712 patent applications pending in the PRC for products that contribute a relatively small percentage of our net revenues. We have nine U.S. patents, including one design patent, and five European patents, including four design patents. We have registered the “Canadian Solar” trademark in the U.S., Australia, Canada, Europe, South Korea, Japan, the United Arab Emirates, Hong Kong, Singapore, India, Argentina, Brazil, Peru and more than 20 other countries and we have applied for registration of the “Canadian Solar” trademark in a number of other countries. As of March 31, 2020, we had 82 registered trademarks and 8 trademark applications pending in the PRC, and 106 registered trademarks and 38 trademark applications pending outside of China. These intellectual property rights afford only limited protection and the actions we take to protect our rights as we develop new solar power products may not be adequate. Policing the unauthorized use of proprietary technology can be difficult and expensive. In addition, litigation, which can be costly and divert management attention, 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 have limited insurance coverage and may incur significant losses resulting from operating hazards, product liability claims or business interruptions.

Our operations involve the use, handling, generation, processing, storage, transportation and disposal of hazardous materials, which may result in fires, explosions, spills and other unexpected or dangerous accidents causing personal injuries or death, property damages, environmental damages and business interruption. Although we currently carry third-party liability insurance against property damage, the policies for this insurance are limited in scope and may not cover all claims relating to personal injury, property or environmental damage arising from incidents on our properties or relating to our operations. See “Item 4. Information on the Company—B. Business Overview—Insurance.” Any occurrence of these or other incidents which are not insured under our existing insurance policies could have a material adverse effect on our business, financial condition or results of operations.

We are also exposed to risks associated with product liability claims in the event that the use of our solar power products results in injury. See “—Product liability claims against us could result in adverse publicity and potentially significant monetary damages.” Although we carry limited product liability insurance, we may not have adequate resources to satisfy a judgment if a successful claim is brought against us.

In addition, the normal operation of our manufacturing facilities may be interrupted by accidents caused by operating hazards, power supply disruptions, equipment failure, as well as natural disasters. While our manufacturing plants in China and elsewhere are covered by business interruption insurance, any significant damage or interruption to these plants could still have a material and adverse effect on our results of operations.

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If our internal control over financial reporting or disclosure controls and procedures are not effective, investors may lose confidence in our reported financial information, which could lead to a decline in our share price.

We are subject to the reporting obligations under U.S. securities laws. As required by Section 404 of the Sarbanes-Oxley Act of 2002, the SEC has adopted rules requiring every public company to include a management report on its internal control over financial reporting in its annual report, which contains management's assessment of the effectiveness of its internal control over financial reporting. In addition, an independent registered public accounting firm must report on the effectiveness of our internal controls over financial reporting. As of December 31, 2019, our management concluded that our internal control over financial reporting was effective. However, we cannot assure you that material weaknesses in our internal controls over financial reporting will not be identified in the future. Any material weaknesses in our internal controls could cause us not to meet our periodic reporting obligations in a timely manner or result in material misstatements in our financial statements. Material weaknesses in our internal controls over financial reporting could also cause investors to lose confidence in our reported financial information, leading to a decline in the market price of our common shares.

The audit report included in our annual report on Form 20-F was prepared by auditors who are not inspected by the Public Company Accounting Oversight Board and, as a result, you are deprived of the benefits of such inspection.

The independent registered public accounting firm that issues the audit reports included in our annual reports filed with the SEC, as auditors of companies that are traded publicly in the U.S. and a firm registered with the Public Company Accounting Oversight Board (United States), or the PCAOB, is required by the laws of the U.S. to undergo regular inspections by the PCAOB to assess its compliance with the laws of the U.S. and professional standards. Because we have substantial operations within the PRC and the PCAOB is currently unable to conduct inspections of the work of our independent registered public accounting firm as it relates to those operations without the approval of the Chinese authorities, our independent registered public accounting firm is not currently inspected fully by the PCAOB. This lack of PCAOB inspections in the PRC prevents the PCAOB from regularly evaluating our independent registered public accounting firm's audits and its quality control procedures. As a result, investors may be deprived of the benefits of PCAOB inspections.

On May 24, 2013, PCAOB announced that it had entered into a Memorandum of Understanding on Enforcement Cooperation with the China Securities Regulatory Commission, or the CSRC, and the Ministry of Finance which establishes a cooperative framework between the parties for the production and exchange of audit documents relevant to investigations in the United States and China. On inspection, it appears that the PCAOB continues to be in discussions with the Mainland China regulators CSRC and the Ministry of Finance to permit joint inspections in the PRC of audit firms that are registered with PCAOB in relation to the audit of and audit Chinese companies that trade on U.S. exchanges. On December 7, 2018, the SEC and the PCAOB issued a joint statement highlighting continued challenges faced by the U.S. regulators in their oversight of financial statement audits of U.S.-listed companies with significant operations in China. The joint statement reflects a heightened interest in this issue. However, it remains unclear what further actions the SEC and PCAOB will take and its impact on Chinese companies listed in the U.S.

Inspections of other firms that the PCAOB has conducted outside the PRC have identified deficiencies in those firms' audit procedures and quality control procedures, which may be addressed as part of the inspection process to improve future audit quality. The inability of the PCAOB to conduct full inspections of auditors in the PRC makes it more difficult to evaluate the effectiveness of our independent registered public accounting firm's audit procedures or quality control procedures as compared to auditors outside the PRC that are subject to PCAOB inspections. Investors may lose confidence in our reported financial information and procedures and the quality of our financial statements.

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If additional remedial measures are imposed on the big four PRC-based accounting firms, including our independent registered public accounting firm, in administrative proceedings brought by the SEC alleging the firms' failure to meet specific criteria set by the SEC, with respect to requests for the production of documents, we could be unable to timely file future financial statements in compliance with the requirements of the Exchange Act.

In late 2012, the SEC commenced administrative proceedings under Rule 102(e) of its Rules of Practice and also under the Sarbanes-Oxley Act of 2002 against the mainland Chinese affiliates of the “Big Four” accounting firms (including the mainland Chinese affiliate of our independent registered public accounting firm). A first instance trial of the proceedings in July 2013 in the SEC’s internal administrative court resulted in an adverse judgment against the firms. The administrative law judge proposed penalties on the Chinese accounting firms including a temporary suspension of their right to practice before the SEC, although that proposed penalty did not take effect pending review by the Commissioners of the SEC. On February 6, 2015, before a review by the Commissioner had taken place, the Chinese accounting firms reached a settlement with the SEC whereby the proceedings were stayed. Under the settlement, the SEC accepted that future requests by the SEC for the production of documents would normally be made to the CSRC. The Chinese accounting firms would receive requests matching those under Section 106 of the Sarbanes-Oxley Act of 2002, and would be required to abide by a detailed set of procedures with respect to such requests, which in substance would require them to facilitate production via the CSRC. The CSRC for its part initiated a procedure whereby, under its supervision and subject to its approval, requested classes of documents held by the accounting firms could be sanitized of problematic and sensitive content so as to render them capable of being made available by the CSRC to US regulators.

Under the terms of the settlement, the underlying proceeding against the four PRC-based accounting firms was deemed dismissed with prejudice at the end of four years starting from the settlement date, which was on February 6, 2019. Despite the final ending of the proceedings, the presumption is that all parties will continue to apply the same procedures: i.e. the SEC will continue to make its requests for the production of documents to the CSRC, and the CSRC will normally process those requests applying the sanitization procedure. We cannot predict whether, in cases where the CSRC does not authorize production of requested documents to the SEC, the SEC will further challenge the four PRC-based accounting firms’ compliance with U.S. law. If additional challenges are imposed on the Chinese affiliates of the “big four” accounting firms, we could be unable to timely file future financial statements in compliance with the requirements of the Exchange Act.

In the event that the SEC restarts administrative proceedings, depending upon the final outcome, listed companies in the U.S. with major PRC operations may find it difficult or impossible to retain auditors in respect of their operations in the PRC, which could result in their financial statements being determined to not be in compliance with the requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, including possible delisting. Moreover, any negative news about any such future proceedings against the firms may cause investor uncertainty regarding China-based, U.S.-listed companies and the market price of their shares may be adversely affected.

If our independent registered public accounting firm was denied, even temporarily, the ability to practice before the SEC and we were unable to timely find another registered public accounting firm to audit and issue an opinion on our financial statements, our financial statements could be determined not to be in compliance with the requirements of the Exchange Act. Such a determination could ultimately lead to the delisting of our common shares from Nasdaq, or deregistration from the SEC, or both, which would substantially reduce or effectively terminate the trading of our common shares in the U.S.

Risks Related to Doing Business in China

The enforcement of the labor contract law and increases in labor costs in the PRC may adversely affect our business and our profitability.

The Labor Contract Law came into effect on January 1, 2008, and was later revised on December 28, 2012; the Implementation Rules and the amendment thereunder became effective on September 18, 2008 and July 1, 2013, respectively. The Labor Contract Law and the Implementation Rules imposed stringent requirements on employers with regard to executing written employment contracts, hiring temporary employees, dismissing employees, consultation with the labor union and employee assembly, compensation upon termination and overtime work, collective bargaining and labor dispatch business. In addition, under the Regulations on Paid Annual Leave for Employees, which came into effect on January 1, 2008, and their Implementation Measures, which were promulgated and became effective on September 18, 2008, employees who have served for more than one year with an employer are entitled to a paid vacation ranging from five to fifteen days, depending on their length of service. Employees who waive such vacation time at the request of the employer must be compensated for each vacation day waived at a rate equal to three times their normal daily salary. According to the Interim Provisions on Labor Dispatching, which came into effect on March 1, 2014, the number of dispatched workers used by an employer shall not exceed 10% of its total number of workers. Our labor costs are expected to continue to increase due to these new laws and regulations. Higher labor costs and labor disputes with our employees stemming from these new rules and regulations could adversely affect our business, financial condition, and results of operations.

The increase or decrease in tax benefits from local tax bureau could affect our total PRC taxes payments, which could have a material and adverse impact on our financial condition and results of operations.

The Enterprise Income Tax Law, or the EIT Law, came into effect in China on January 1, 2008 and was amended on February 24, 2017 and December 29, 2018. Under the EIT Law, both foreign-invested enterprises and domestic enterprises are subject to a uniform enterprise income tax rate of 25%. The EIT Law provides for preferential tax treatment for certain categories of industries and projects that are strongly supported and encouraged by the state. For example, enterprises qualified as a “High and New Technology Enterprise,” or HNTE, are entitled to a 15% enterprise income tax rate provided that they satisfy other applicable statutory requirements.

Certain of our PRC subsidiaries, such as CSI New Energy Holding Co., Ltd., or CSI New Energy Holding, Canadian Solar Manufacturing (Luoyang) Inc., or CSI Luoyang Manufacturing, were once HNTEs and enjoyed preferential enterprise income tax rates. These benefits have, however, expired. In 2019, only Suzhou Sanysolar Materials Technology Co., Ltd., or Suzhou Sanysolar, CSI Cells Co., Ltd., or CSI Cells, Canadian Solar Manufacturing (Changshu) Inc., or CSI Changshu Manufacturing, Changshu Tegu New Material Technology Co., Ltd., or Changshu Tegu, Suzhou Gaochuangte New Energy Development Co., Ltd., or Suzhou Gaochuangte, and Changshu Tlian Co., Ltd., or Changshu Tlian, were HNTEs and enjoyed preferential enterprise income tax rates.

There are significant uncertainties regarding our tax liabilities with respect to our income under the EIT Law.

We are a Canadian company with a significant portion of our manufacturing operations in China. Under the EIT Law and its implementation regulations, enterprises established outside China whose “de facto management body” is located in China are considered PRC tax residents and will generally be subject to the uniform 25% enterprise income tax rate on their global income. Under the implementation regulations, the term “de facto management body” is defined as substantial and overall management and control over aspects such as the production and business, personnel, accounts and properties of an enterprise. The Circular on Identification of China-controlled Overseas-registered Enterprises as Resident Enterprises on the Basis of Actual Management Organization, or Circular 82, further provides certain specific criteria for determining whether the “de facto management body” of a PRC-controlled offshore incorporated enterprise is located in the PRC. The criteria include whether (a) the premises where the senior management and the senior management bodies responsible for the routine production and business management of the enterprise perform their functions are mainly located within the PRC, (b) decisions relating to the enterprise’s financial and human resource matters are made or subject to approval by organizations or personnel in the PRC, (c) the enterprise’s primary assets, accounting books and records, company seals, and board and shareholders’ meeting minutes are located or maintained in the PRC and (d) 50% or more of voting board members or senior executives of the enterprise habitually reside in the PRC. Although Circular 82 only applies to offshore enterprises controlled by enterprises or enterprise groups located within the PRC, the determining criteria set forth in the Circular 82 may reflect the tax authorities’ general position on how the “de facto management body” test may be applied in determining the tax resident status of offshore enterprises. As the tax resident status of an enterprise is subject to the determination by the PRC tax authorities, uncertainties remain with respect to the interpretation of the term “de facto management body” as applicable to our offshore entities.

Dividends paid by us to our non-PRC shareholders and gains on the sale of our common shares by our non-PRC shareholders may be subject to PRC enterprise income tax liabilities or individual income tax liabilities.

Under the EIT Law and its implementation regulations, dividends paid to a non-PRC investor are generally subject to a 10% PRC withholding tax, if such dividends are derived from sources within China and the non-PRC investor is considered to be a non-resident enterprise without any establishment or place within China or if the dividends paid have no connection with the non-PRC investor’s establishment or place within China, unless such tax is eliminated or reduced under an applicable tax treaty. Similarly, any gain realized on the transfer of shares by such investor is also subject to a 10% PRC withholding tax if such gain is regarded as income derived from sources within China, unless such tax is eliminated or reduced under an applicable tax treaty.

The implementation regulations of the EIT Law provide that (a) if the enterprise that distributes dividends is domiciled in the PRC, or (b) if gains are realized from transferring equity interests of enterprises domiciled in the PRC, then such dividends or capital gains shall be treated as China-sourced income.

Currently there are no detailed rules applicable to us that govern the procedures and specific criteria for determining the meaning of being “domiciled” in the PRC. As a result, it is not clear how the concept of domicile will be interpreted under the EIT Law. Domicile may be interpreted as the jurisdiction where the enterprise is incorporated or where the enterprise is a tax resident. As a result, if we are considered a PRC “resident enterprise” for tax purposes, it is possible that the dividends we pay with respect to our common shares to non-PRC enterprises, or the gain non-PRC enterprises may realize from the transfer of our common shares or our convertible notes, would be treated as income derived from sources within China and be subject to the PRC withholding tax at a rate of 10% or a lower applicable treaty rate for enterprises.

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Under the Law of the People's Republic of China on Individual Income Tax, or the IIT Law, individual income tax is payable on PRC-source dividend income. The implementation regulations of the IIT Law provide that income from dividends derived from companies, enterprises and other economic organizations in China as well as income realized from transfer of properties in China is considered derived from sources inside China, regardless of whether the place of payment was inside China. Therefore, if we are treated as a company in China for tax purposes, any dividends we pay to our non-PRC individual shareholders as well as any gains realized by our non-PRC individual shareholders or our non-PRC individual note holders from the transfer of our common shares or our convertible notes may be regarded as China-sourced income and, consequently, be subject to PRC withholding tax at a rate of up to 20% or a lower applicable treaty rate for individuals. The investment returns of our non-PRC investors may be materially and adversely affected if any dividends we pay, or any gains realized on a transfer of our common shares, are subject to PRC tax.

Restrictions on currency exchange may limit our ability to receive and use our revenues effectively.

Certain of our revenues and expenses are denominated in Renminbi. If our revenues denominated in Renminbi increase or our expenses denominated in Renminbi decrease in the future, we may need to convert a portion of our revenues into other currencies to meet our foreign currency obligations. Under China's existing foreign exchange regulations, our PRC subsidiaries are able to pay dividends in foreign currencies without prior approval from the State Administration of Foreign Exchange, or SAFE, by complying with certain procedural requirements. However, we cannot assure you that the PRC government will not take further measures in the future to restrict access to foreign currencies for current account transactions.

Foreign exchange transactions by our PRC subsidiaries under most capital accounts continue to be subject to significant foreign exchange controls and require the approval of or registration with PRC governmental authorities. In particular, if we finance our PRC subsidiaries by means of additional capital contributions, the approval of or the record-filing with, certain government authorities, including the Ministry of Commerce or its local counterparts, is required. These limitations could affect the ability of our PRC subsidiaries to obtain foreign exchange through equity financing.

Uncertainties with respect to the Chinese legal system could materially and adversely affect us.

We conduct a significant portion of our manufacturing operations through our subsidiaries in China. These subsidiaries are generally subject to laws and regulations applicable to foreign investment in China and, in particular, laws applicable to wholly foreign-owned enterprises and joint venture companies. The PRC legal system is based on written statutes. Prior court decisions may be cited for reference but have limited precedential value. Since 1979, PRC legislation and regulations have significantly enhanced the protections afforded to various forms of foreign investments in China. However, since these laws and regulations are relatively new and the PRC legal system is still developing, the implementation and enforcement of many laws, regulations and rules may be inconsistent, which may limit legal protections available to us. In addition, any litigation in China may be protracted and may result in substantial costs and divert our resources and the attention of our management.

Risks Related to Our Common Shares

We may issue additional common shares, other equity or equity-linked or debt securities, which may materially and adversely affect the price of our common shares.

We may issue additional equity, equity-linked or debt securities for a number of reasons, including to finance our operations and business strategy (including in connection with acquisitions, strategic collaborations or other transactions), to satisfy our obligations for the repayment of existing indebtedness, to adjust our ratio of debt to equity, to satisfy our obligations upon the exercise of outstanding warrants or options or for other reasons. Any future issuances of equity securities or equity-linked securities could substantially dilute the interests of our existing shareholders and may materially and adversely affect the price of our common shares. We cannot predict the timing or size of any future issuances or sales of equity, equity-linked or debt securities, or the effect, if any, that such issuances or sales, may have on the market price of our common shares. Market conditions could require us to accept less favorable terms for the issuance of our securities in the future.

The market price for our common shares may be volatile.

The market price for our common shares has been highly volatile and subject to wide fluctuations. During the period from November 9, 2006, the first day on which our common shares were listed on Nasdaq, until December 31, 2018, the market price of our common shares ranged from \$1.95 to \$51.8 per share. From January 1, 2019 to December 31, 2019, the market price of our common shares ranged from \$14.00 to \$25.89 per share. The closing market price of our common shares on December 31, 2019 was \$22.10 per share. The market price of our common shares may continue to be volatile and subject to wide fluctuations in response to a wide variety of factors, including the following:

- announcements of technological or competitive developments;
- regulatory developments in our target markets affecting us, our customers or our competitors;
- actual, projected or anticipated fluctuations in our quarterly operating results;
- changes in financial estimates by securities research analysts;
- changes in the economic performance or market valuations of other solar power companies;
- the departure of executive officers and key research personnel;
- patent litigation and other intellectual property disputes;
- litigation and other disputes with our long-term suppliers;
- fluctuations in the exchange rates between the U.S. dollars, Euros, Japanese yen, British pounds, Canadian dollars, Renminbi, Brazilian reals and Thailand Bhat;
- the release or expiration of lock-up or other transfer restrictions on our outstanding common shares;
- sales or anticipated sales of additional common shares; and
- share repurchase program.

In addition, the securities market has from time to time experienced significant price and volume fluctuations that are not related to the operating performance of particular companies. These market fluctuations may also have a material and adverse effect on the price of our common shares.

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Substantial future sales of our common shares in the public market, or the perception that such sales could occur, could cause the price of our common shares to decline.

Sales of our common shares in the public market, or the perception that such sales could occur, could cause the market price of our common shares to decline. As of December 31, 2019, we had 59,371,684 common shares outstanding. The number of common shares outstanding and available for sale will increase when our employees and former employees who are holders of restricted share units and options to acquire our common shares become entitled to the underlying shares under the terms of their units or options. In addition, in connection with debt financing, we have issued warrants and may issue additional warrants to purchase our common shares. To the extent these warrants are exercised and the common shares sold into the market, the market price of our common shares could decline.

Your right to participate in any future rights offerings may be limited, which may cause dilution to your holdings.

We may from time to time distribute rights to our shareholders, including rights to acquire our securities. However, we cannot make these rights available in the U.S. unless we register the rights and the securities to which the rights relate under the Securities Act of 1933, or the Securities Act, or an exemption from the registration requirements is available. We are under no obligation to file a registration statement with respect to any such rights or securities or to endeavor to cause a registration statement to be declared effective. Moreover, we may not be able to establish an exemption from registration under the Securities Act. Accordingly, you may be unable to participate in our rights offerings and may experience dilution in your holdings.

Our articles of continuance contain anti-takeover provisions that could adversely affect the rights of holders of our common shares.

The following provisions in our amended articles of continuance may deprive our shareholders of the opportunity to sell their shares at a premium over the prevailing market price by delaying or preventing a change of control of our company:

- Our board of directors has the authority, without approval from the shareholders, to issue an unlimited number of preferred shares in one or more series. Our board of directors may establish the number of shares to be included in each such series and may fix the designations, preferences, powers and other rights of the shares of a series of preferred shares.
- Our board of directors is entitled to fix and may change the number of directors within the minimum and maximum number of directors provided for in our articles. Our board of directors may appoint one or more additional directors to hold office for a term expiring no later than the close of the next annual meeting of shareholders, subject to the limitation that the total number of directors so appointed may not exceed one-third of the number of directors elected at the previous annual meeting of shareholders.

You may have difficulty enforcing judgments obtained against us.

We are a corporation organized under the laws of Canada and a substantial portion of our assets are located outside of the U.S. A substantial portion of our current business operations is conducted in the PRC. In addition, a majority of our directors and officers are nationals and residents of countries other than the U.S. and a substantial portion of the assets of these persons are located outside the U.S. As a result, it may be difficult for you to effect service of process within the U.S. upon these persons. It may also be difficult for you to enforce judgments obtained in U.S. courts based on the civil liability provisions of the U.S. federal securities laws against us and our officers and directors. In addition, there is uncertainty as to whether the courts of Canada or the PRC would recognize or enforce judgments of U.S. courts against us or such persons predicated upon the civil liability provisions of the securities laws of the U.S. or any state. In addition, it is uncertain whether such Canadian or PRC courts would be competent to hear original actions brought in Canada or the PRC against us or such persons predicated upon the securities laws of the U.S. or any state.

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If a United States person is treated as owning at least 10% of our shares, such person may be subject to adverse United States federal income tax consequences.

If a United States person is treated as owning (directly, indirectly or constructively) at least 10% of the value or voting power of our shares, such person may be treated as a “United States shareholder” with respect to each “controlled foreign corporation,” or CFC, in our group. Where our group includes one or more United States subsidiaries, in certain circumstances we could be treated as a CFC and certain of our non-United States subsidiaries could be treated as CFCs (regardless of whether we are or are not treated as a CFC). We believe we and certain of our non-United States subsidiaries may be treated as CFCs for our taxable year ended December 31, 2018.

A United States shareholder of a CFC may be required to annually report and include in its United States taxable income its pro rata share of “Subpart F income,” “global intangible low-taxed income” and investments in United States property by CFCs, whether or not we make any distributions. An individual that is a United States shareholder with respect to a CFC generally would not be allowed certain tax deductions or foreign tax credits that would be allowed to a United States shareholder that is a United States corporation. A failure to comply with these reporting obligations may subject a United States shareholder to significant monetary penalties and may prevent starting of the statute of limitations with respect to such shareholder’s United States federal income tax return for the year for which reporting was due. We do not intend to monitor whether we or any of our non-United States subsidiaries are treated as CFCs or whether any investor is treated as a United States shareholder with respect to us or any of our CFC subsidiaries or to furnish to any United States shareholders information that may be necessary to comply with the aforementioned reporting and tax paying obligations. A United States investor should consult its own advisor regarding the potential application of these rules in its particular circumstances.

We may be classified as a passive foreign investment company, which could result in adverse United States federal income tax consequences to United States Holders of our common shares.

Based on the current value of our assets and the composition of our income and assets, we do not believe we were a passive foreign investment company, or PFIC, for United States federal income tax purposes for our taxable year ended December 31, 2019. However, because our PFIC status for 2020 or any future taxable year may depend, in part, on the manner in which we operate our renewable energy generation assets, we cannot assure you that we will not be a PFIC for our current taxable year ending December 31, 2020 or any future taxable year. A non-United States corporation such as ourselves will be treated as a PFIC for United States federal income tax purposes for any taxable year if, applying applicable look-through rules, either (a) at least 75% of its gross income for such year is passive income or (b) at least 50% of the value of its assets (determined based on an average of the quarterly values of the assets) during such year is attributable to assets that produce or are held for the production of passive income. There are exceptions for income derived in the conduct of certain active businesses, including for income earned from commodities transactions. There is authority to suggest that income earned from our electricity generation business may qualify under the active business exception, but this authority is unclear. PFIC status is based on an annual determination that cannot be made until the close of a taxable year, involves extensive factual investigation, including ascertaining the fair market value of all of our assets on a quarterly basis and the character of each item of income that we earn, and is subject to uncertainty in several respects. In particular, the application of the PFIC rules to certain of our business lines is complex and unclear, and we cannot guarantee that the United States Internal Revenue Service, or IRS, will agree with any positions that we ultimately take. Accordingly, we cannot assure you that we will not be treated as a PFIC for any taxable year or that the IRS will not take a contrary position.

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Changes in the composition of our income or composition of our assets may cause us to be more likely to be a PFIC. The determination of whether we are a PFIC for any taxable year may depend in part upon the value of our goodwill and other unbooked intangibles not reflected on our balance sheet (which may depend upon the market value of our common shares from time to time, which may be volatile) and also may be affected by how, and how quickly, we spend our liquid assets. Among other matters, if our market capitalization declines, we may be more likely to be a PFIC because our liquid assets and cash (which are for this purpose considered assets that produce passive income) may then represent a greater percentage of our overall assets. Further, while we believe our classification methodology and valuation approach is reasonable, it is possible that the IRS may challenge our methodology or valuation of our goodwill and other unbooked intangibles, which may result in our being or becoming a PFIC for the current or a future taxable year.

If we are a PFIC for any taxable year during which a United States Holder (as defined in “Item 10. Additional Information—E. Taxation—United States Federal Income Taxation”) holds a common share, certain adverse United States federal income tax consequences could apply to such United States Holder. See “Item 10. Additional Information—E. Taxation—United States Federal Income Taxation—Passive Foreign Investment Company.”

ITEM 4. INFORMATION ON THE COMPANY

A. History and Development of the Company

Our legal and commercial name is Canadian Solar Inc. We were incorporated under the laws of the Province of Ontario, Canada in October 2001. We changed our jurisdiction by continuing under the Canadian federal corporate statute, the Canada Business Corporations Act, or CBCA, effective June 1, 2006. As a result, we are governed by the CBCA. See “—C. Organizational Structure” for additional information on our corporate structure, including a list of our major subsidiaries.

Our principal executive office and principal place of business is located at 545 Speedvale Avenue West, Guelph, Ontario, Canada N1K 1E6. Our telephone number at this address is (1-519) 837-1881 and our fax number is (1-519) 837-2550. Our agent for service of process in the United States is CT Corporation System, located at 111 Eighth Avenue, New York, New York 10011.

All inquiries to us should be directed at the address and telephone number of our principal executive office set forth above. Our website is www.canadiansolar.com. The information contained on or accessible through our website does not form part of this annual report.

B. Business Overview

Overview

We are one of the world’s largest solar power companies and a leading vertically-integrated provider of solar power products, services and system solutions with operations in North America, South America, Europe, South Africa, the Middle East, Australia and Asia.

We design, develop and manufacture solar ingots, wafers, cells, modules and other solar power products. Our solar power products include standard solar modules and specialty solar products. We are incorporated in Canada and conduct most of our manufacturing operations in China and south-east Asia. Our products include a range of solar modules built to general specifications for use in a wide range of residential, commercial and industrial solar power generation systems. Specialty solar products consist of customized solar modules that our customers incorporate into their own products and complete specialty products, such as portable solar home systems. We sell our products primarily under our “Canadian Solar” brand name.

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In recent years, we have increased our investment in, and management attention on, our energy segment. Our energy segment primarily comprises solar power project development and sale, operating solar power projects and sales of electricity. Our energy segment contributed 20.0%, 42.1% and 22.5% of our net revenues in 2017, 2018 and 2019, respectively. While we plan to continue to monetize our current portfolio of solar power projects in operation, we also intend to grow our energy segment by building up our project pipeline and increasing the EPC services which we provide to customers. In March 2015, we acquired Recurrent Energy, LLC, or Recurrent, a leading solar energy developer with solar power projects located principally in California and Texas, and thereby significantly increased our solar project pipeline. As of January 31, 2020, our project backlog (formerly called late-stage, utility-scale, solar project pipeline), which refers to projects that have passed their Cliff Risk Date and are expected to be built in the next one to four years, totaled approximately 3.7 gigawatt peak, or GWp, with 1,597 megawatt peak, or MWp, in North America, 1,087 MWp in Latin America, 806 MWp in Asia Pacific, 206 MWp in EMEA, 45 MWp in China. The Cliff Risk Date depends on the country where a project is located and is defined as the date on which the project passes the last of the high-risk development stages (usually receipt of all required environmental approvals, interconnection agreements, FITs and PPAs. As of January 31, 2020, our project pipeline (formerly called our early-to-mid-stage, utility-scale, solar project pipeline) totaled 11.7 GW. In addition to our project backlog and project pipeline, as of January 31, 2020, we had 512 MWp of solar projects in construction; and a portfolio of solar power projects in operation totaling 880.2 MWp with an estimated resale value of approximately \$1.0 billion. For those projects that are subject to U.S. tax equity deals, only the value of the class B shares held by us was included in such estimate of resale value. See “—Sales, Marketing and Customers—Energy Segment—Solar Project Development and Sale” and “—Sales, Marketing and Customers—Energy Segment—Operating Solar Power Projects and Sales of Electricity” for a description of the status of our solar power projects in operation.

We believe that we offer one of the broadest crystalline silicon solar power product lines in the industry. Our product lines range from modules of medium power output to high efficiency, high-power output multi-crystalline and mono-crystalline modules, as well as a range of specialty products. We currently sell our products to a diverse customer base in various markets worldwide, including the U.S., Brazil, Japan, China, Australia, Germany, Mexico, South Africa, Spain, Korea, and India. Our customers are primarily distributors, system integrators, project developers and installers/EPC companies.

We employ a flexible vertically integrated business model that combines internal manufacturing capacity with direct material purchases of both cells and wafers. We believe this approach has benefited us by lowering the cost of materials of our solar module products. We also believe that this approach provides us with greater flexibility to respond to short-term demand increases.

As of December 31, 2019, we had:

- 13 GW of total annual solar module manufacturing capacity, approximately 9.6 GW of which is located in China, 3.1 GW in Southeast Asia and the rest in other regions;
- 9.6 GW of total annual solar cell manufacturing capacity, approximately 3.1 GW of which is located in Southeast Asia and the rest in China;
- 5 GW of total annual wafer manufacturing capacity located in China; and
- 1.85 GW of total annual ingot manufacturing capacity located in China.

We intend to use substantially all of the silicon wafers that we manufacture to supply our own solar cell plants and to use substantially all of the solar cells that we manufacture to produce our own solar module products. We also intend to use some of the solar modules we produce in our energy segment. Our solar module manufacturing costs in China, including purchased polysilicon, wafers and cells, decreased from 31.5 cents per watt in December 2017 to 20.4 cents per watt in December 2018, and further to 18.8 cents per watt in December 2019. We expect to continue to decrease the manufacturing costs for our production of wafers, cells and modules.

We intend to continue to focus on reducing our manufacturing costs by improving solar cell conversion efficiency, enhancing manufacturing yields and reducing raw material costs.

Our Products and Services

Our business consists of the following two business segments: MSS segment and energy segment. Our MSS segment primarily involves the design, development, manufacturing and sale of a wide range of solar power products, including standard solar modules, specialty solar products and solar system kits. The MSS segment also provides EPC and O&M services. Our energy segment primarily consists of solar power project development and sale, operating solar power plants and sales of electricity.

Products Offered in Our MSS Segment

Standard Solar Modules

Our standard solar modules are arrays of interconnected solar cells in weatherproof encapsulation. We produce a wide variety of standard solar modules, ranging from 3W to over 445W in power and using multi-crystalline or mono-crystalline cells in several different design patterns, including shingled cells. We introduced the industry's first module product using 166mm wafers, in comparison with the conventional 156.75mm wafers. Our mainstream solar modules include CS3K (120 half-cells, 156.75mm wafer), CS3U (144 half-cells, 156.75mm wafer), BiKu CS3U-B-AG (144 half-cells, bifacial module with 156.75mm wafer), CS3L (120 half-cells, 166mm wafer), CS3W (144 half-cells, 166mm wafer), BiHiKu CS3W-B-AG (144 half-cells, bifacial module, 166mm wafer), HiDM CS1H (60 cells, shingled module, 156.75mm wafer), and HiDM CS1H all-black modules. The mainstream modules are designed for residential, commercial and utility applications. The small modules are for specialty applications.

We launched our Quartech modules in March 2013. Quartech modules use 4-busbar solar cell technology which improves module reliability and efficiency. CS6P (6 × 10 cell layout) Quartech modules have power output between 255 W and 270 W, which enables us to offer customers modules with high power. We launched and started shipping Dymond modules in October 2014. Dymond modules are designed with double-glass encapsulation, which is more reliable for harsh environments and ready for 1500V solar systems.

We launched and started shipping SmartDC modules in September 2015. SmartDC modules feature an innovative integration of our module technology and power optimization for grid-tied PV applications. By replacing the traditional junction-box, SmartDC modules eliminate module power mismatch, mitigate shading losses and optimize power output at module-level. SmartDC modules also provide module-level data to minimize operational costs and to permit effective system management.

In March 2016, we launched our new Quintech SuperPower mono-crystalline modules. Quintech SuperPower mono-crystalline modules are made of cells with PERC technology and significantly improve module efficiency and reliability. CS6K (6 × 10 cell layout aligned with mainstream dimensions) Quintech SuperPower mono modules have a power output between 285 W and 300 W with high efficiency and high reliability. We started commercial production of Quintech CS6K and CS6U modules in 2016. These modules have features such as 5 busbar cells, standardized module dimensions and cell and module improvements, resulting in higher wattage production and better performance. These modules are intended for broad base introduction, which covers mono-crystalline cells, multi-crystalline cells and mono-crystalline PERC cells.

At the beginning of 2015, we started commercial production of Onyx cells with our in-house developed black silicon technology, Onyx technology. Onyx technology employs a nano-texturing process to make the multi-crystalline cell almost fully black, increasing cell efficiency and module wattage at the same time. We started increasing the production volume of Onyx cells in 2016, which have been incorporated into our Quartech and Quintech module families.

In July 2016, we launched the 1500V System Voltage crystalline solar module portfolio. The 1500V System Voltage crystalline module provides a robust and cost-efficient system solution by adding more modules in a string, which decreases the number of combiner boxes, direct current homeruns and trenching. This unique product design improves the overall system performance and efficiency and reduces labor cost and installation time.

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In 2017, we launched the Ku module series which results in 100% improvement in failure redundancy with innovative cell matrix interconnection technology. The module power output is enhanced by up to 10 Watt per module while reducing the module working temperature. We developed P4 cell technology, which is multi-crystalline PERC technology. The combination of P4 cell and Ku module technologies enable us to offer customer higher wattage and more reliable multi crystalline module products. We also launched and shipped HDM (High Density Module) product to some markets this year. The HDM offers high wattage, high module efficiency and pleasant aesthetics for residential applications.

In 2018, we launched the BiKu modules which are bifacial designed and can generate additional electricity from the backside of the module. These modules have more shading tolerance and a much lower hot spot risk thanks to the innovative design on the bifacial cell and double glass module. At the end of 2018, we began the mass production of the HiKu module, the first commercially available multi-crystalline module exceeding 400 watts with significant leveraged cost of energy, or LCOE, advantages. In 2018, we launched the HiDM module, which is an upgrade of the HDM module and uses shingled cells to increase both module wattage and efficiency. We also launched P5 technology, which is based on casted mono technology developed in house, and will boost cell and module efficiencies close to mono while retaining all the advantages of multi technology, such as LID, LeTID and lower cost.

In 2019, we continued to expand our high-power module product portfolio based on 166mm wafers. In July 2019, we started to mass-produce BiHiku modules. BiHiKu is a bifacial module utilizing our 166mm P4 (multi PERC) cells which have a front side power output exceeding 400 watts. In addition to modules utilizing our 166mm P4 (multi PERC) cells, we launched HiKu and BiHiKu modules using 166mm P5 (casted mono) and mono PERC cells. Our CS3L (120 half-cells, 166mm wafer) mono PERC modules can achieve power output exceeding 360 watts, which is suited for residential applications, and our CS3W (144 half-cells, 166mm wafer) mono modules can reach wattage up to 445 watts. By the end of August 2019, we converted 100% of our cell production capacity into PERC and by the end of the year, over one-third of our module capacity was for HiKu and BiHiKu. Our 166mm wafer module products are becoming our new “standard” products. For the residential market, we ramped up the all-black version of our HiDM module with appealing aesthetics and high module efficiency. Our full-cell modules such as CS6K and CS6U are gradually being phased out and replaced by Ku, BiKu and HiDM modules. In 2019, we also officially phased out all the double glass mono-facial modules due to the introduction of the more competitive bifacial modules.

Our standard solar modules are designed to endure harsh weather conditions and to be transported and installed easily. We sell our standard solar modules primarily under our brand name.

Energy Solution Products

Our non-module, energy solution products are mainly solar inverters and energy storage systems for utility, commercial, residential and specialty product applications.

Our solar inverters are grid-tied, converting direct current electricity from our solar modules. Our inverter products cover typical power ranges from 1.5kW to 125kW power levels and are certified and available broadly in many regions globally.

Our Maple solar system is an economical, safe and clean energy solution for families who burn kerosene for lighting. The Maple solar system includes a solar panel, energy-efficient light-emitting diode, or LED, lights, Li-ion batteries and multiple cell phone charger plugs. It can be used as a regular light at home or for camping, as an SOS signal in emergency, and as a mobile power bank for consumer electronics, such as mobile phones or other 5 V DC electronic devices.

Solar System Kits

A solar system kit is a ready-to-install package consisting of solar modules produced by us and components, such as inverters, racking system and other accessories, supplied by third parties. We began selling solar system kits in 2010 and in 2019 sold them primarily to customers in Japan, and China.

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EPC and O&M Services

Our MSS segment started to provide EPC services in 2018 and O&M services in 2012. In 2019, we provided EPC services primarily in Australia and O&M services primarily in the North America, Japan, Australia and China. O&M services include inspections, repair and replacement of plant equipment and site management and administrative support services for solar power projects in operation.

Products and Services Offered in Our Energy Segment

Solar Project Development and Sale

We develop, build and sell solar power projects. Our solar project development activities have grown over the past several years through a combination of organic growth and acquisitions. Our global solar power project business develops projects primarily in the U.S., Japan, China, Argentina, Mexico, India, Brazil, the United Kingdom, Australia, Italy and Namibia. We have a team of experts who specialize in project development, evaluations, system designs, engineering, managing, project coordination and organizing financing. Our project sales team actively identifies and pursues suitable buyers for our solar power projects. See “—Sales, Marketing and Customers—Energy Segment—Solar Project Development and Sale” for a description of the status of our solar power projects.

Operating Solar Power Plants and Sales of Electricity

We operate certain of our solar plants and generate income from the sale of electricity. Although most of our solar power projects are developed for sale, we may operate them for a period of time before they are sold. As of January 31, 2020, we had a fleet of solar power plants in operation with an aggregate capacity of approximately 880.2 MWp.

Supply Chain Management

MSS Segment

Our MSS segment depends on our ability to obtain a stable and cost-effective supply of polysilicon, solar ingots, wafers and cells. Our silicon wafer agreements set forth price and quantity information, delivery terms and technical specifications. While these agreements usually set forth specific price terms, most of them also include mechanisms to adjust the prices, either upwards or downwards, based on market conditions. Over the years, we have entered into a number of long-term supply agreements with various silicon and wafer suppliers in order to secure a stable supply of raw materials to meet our production requirements. Under our supply agreements with certain suppliers, and consistent with historical industry practice, we make advance payments prior to scheduled delivery dates. These advance payments are made without collateral and are credited against the purchase prices payable by us. In 2019, we purchased a significant portion of the silicon wafers used in our solar modules from third parties. Our largest silicon wafer supplier was GCL, and we have recently extended our silicon wafer purchase agreement with GCL through 2020. We plan to continue to diversify our external wafer and polysilicon suppliers.

We purchase solar cells from a number of international and local suppliers, in addition to manufacturing our own solar cells and having toll manufacturing arrangements with our solar cell suppliers. Our solar cell agreements set forth price and quantity information, delivery terms and technical specifications. These agreements generally provide for a period of time during which we can inspect the product and request the seller to make replacements for damaged goods. We generally require the seller to bear the costs and risks of transporting solar cells until they have been delivered to the location specified in the agreement. In 2019, our largest supplier of solar cells was Jiangsu Shunfeng. As we expand our business, we expect to increase our solar cell manufacturing capacity and diversify our solar cell supply channel to ensure we have the flexibility to adapt to future changes in the supply of, and demand for, solar cells.

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For risks relating to the long-term agreements with our raw material suppliers, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Long-term supply agreements may make it difficult for us to adjust our raw material costs should prices decrease. Also, if we terminate any of these agreements, we may not be able to recover all or any part of the advance payments we have made to these suppliers and we may be subject to litigation.”

Energy Segment

Our MSS segment supplies part of the solar modules used in our energy segment. For the solar power projects that we develop, we have the option of either using our own engineering and operation teams or hiring third-party contractors to build and operate the projects prior to sale.

Manufacturing, Construction and Operation

MSS Segment

We assemble our solar modules by interconnecting multiple solar cells by tabbing and stringing them into a desired electrical configuration. We lay the interconnected cells, laminate them in a vacuum, cure them by heating and package them in a protective lightweight anodized aluminum frame. We seal and weatherproof our solar modules to withstand high levels of ultraviolet radiation, moisture and extreme temperatures.

We selectively use automated equipment to enhance the quality and consistency of our finished products and to improve the efficiency of our manufacturing processes. Key equipment in our manufacturing process includes automatic laminators, simulators and solar cell testers. The design of our assembly lines provides flexibility to adjust the ratio of automated equipment to skilled labor in order to maximize quality and efficiency.

Energy Segment

We develop, construct, maintain, sell and/or operate solar power projects primarily in the U.S., Japan, China, Argentina, Mexico, India, Brazil, the United Kingdom, Australia, Italy and Namibia. We engage in all aspects of the development and operation of solar power projects, including project selection, design, permitting, engineering, procurement, construction, installation, monitoring, operation and maintenance. We also provide EPC services to third-parties.

Our solar power projects development process primarily consists of the following stages:

- *Market due diligence and project selection.*

We search for project opportunities globally with the goal of maintaining a robust and geographically diversified project portfolio. Our business team closely monitors the global solar power projects market and gathers market intelligence to identify project development opportunities. Our development team prepares market analysis reports, financial models and feasibility studies to guide us in evaluating and selecting solar power projects. As we consider undertaking new solar power projects, we weigh a number of factors including location, local policies and regulatory environment, financing costs and potential internal rate of returns.
- *Project financing.*

We typically include project financing plans in our financial models and feasibility studies. We finance our projects through our working capital and debt financing from local banks or international financing sources that require us to pledge project assets.
- *Permitting and approval.*

We either obtain the permits and approvals necessary for solar projects ourselves or we acquire projects that have already received the necessary permits and approvals. The permitting and approval process for solar power projects varies from country to country and often from region to region within a country.

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- *Project design, engineering, procurement and construction.* Our engineering team generally designs solar power projects to optimize performance while minimizing construction and operational costs and risks. The engineering design process includes the site layout and electrical design as well choosing the appropriate technology, in particular module and inverter types. We use solar modules produced by us and by third-party manufacturers, and procure inverters and other equipment from third-party suppliers. In China, we generally construct solar projects through Suzhou Gaochuangte New Energy Development Co., Ltd., our 90% owned subsidiary.

Currently, we operate and maintain solar power plants primarily in the U.S., Japan, China, Argentina and India. We enter into grid-connection agreements and/or PPAs with the local grid companies. After a project is connected to the grid, we regularly inspect, monitor and manage the project site with the intention to maximize the utilization rate, rate of power generation and system life of the project.

We operate a monitoring center in Guelph, Ontario, Canada, which adopts the global monitoring platform (CSEye) to manage system alarms and reports. Our proprietary algorithms analyze the performance of the third party power plants that we operate and maintain on a daily basis and identify potential problems. For example, they raise alarms when inverters or strings are under-performing.

Quality Control and Certifications

We have registered our quality control system according to the requirements of ISO 9001:2008 standards. TÜV Rheinland Group, a leading international service company that documents the safety and quality of products, systems and services, audits our quality systems. We inspect and test incoming raw materials to ensure their quality. We monitor our manufacturing processes to ensure quality control and we inspect finished products by conducting reliability and other tests.

We also maintain various international and domestic certifications for our solar modules. For example, we have obtained IEC61215/61730 certifications for sales of our modules in Europe, UL1703 and UL61730 certifications for sales of our modules in North America, and other necessary certifications for sales of our modules in Japan, South Korea, India, Brazil, Australia, Taiwan, and Great Britain and under several solar programs in China, including Top Runner. The IEC certification is issued by Verband Deutscher Elektrotechniker, or VDE, and the UL certification by Canadian Standards Association, or CSA. All of our modules launched in the past years satisfy the latest standards, including IEC 61215, IEC61730 and UL 1703, and have achieved high California Energy Commission, or CEC, PVUSA test condition ratings. All have passed additional extended stress program qualifications such as salt mist testing, ammonia testing, PID testing, as well as extra-standard or “3-times” testing programs from PVEL and VDE. Earlier this year, we also achieved successfully all required steps for a new competitive carbon footprint certification for the French market special tender requirements.

Our PV test laboratory is accredited by CNAS according to ISO 17025 quality management standard, and has been approved into various Data Acceptance Program by the CSA, the VDE, Intertek Satellite Lab in the U.S. and the China Quality Certification Center, or CQC, in China. The PV test laboratory allows us to conduct some product certification testing in-house, which decreases time-to-market and certification costs, as well as exhaustive product and component reliability research to drive improvements in product durability.

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Sales, Marketing and Customers

The following table sets forth, for the periods indicated, certain information relating to our total net revenues derived from our customers categorized by their geographic locations for the periods indicated:

Region	Years Ended December 31,					
	2017		2018		2019	
	Total Net Revenues	%	Total Net Revenues	%	Total Net Revenues	%
	(In thousands of \$, except for percentages)					
Asia	1,926,091	56.8	1,571,287	42.0	1,018,083	31.8
Americas	1,108,162	32.7	1,474,657	39.4	1,402,041	43.8
Europe and others	356,140	10.5	698,568	18.6	780,459	24.4
Total	3,390,393	100.0	3,744,512	100.0	3,200,583	100.0

MSS Segment

Our primary customers are distributors, system integrators, project developers and installers/EPC companies. A small number of customers have historically accounted for a significant portion of our net revenues. In 2017, 2018 and 2019, the top five customers of the MSS segment by net revenues collectively accounted for approximately 18.0%, 9.1% and 15.8%, respectively, of our total net revenues. Sales to our largest customer in those years accounted for 7.2%, 2.6% and 6.6%, respectively, of our total net revenues.

We market and sell solar modules worldwide for residential, commercial and utility-scale solar energy projects and solutions. We primarily sell our products to distributors and large-scale installers through our own, home-grown sales teams, who operate throughout Europe, the Americas, the Middle East and the Asia-Pacific regions.

Our marketing activities include brand sponsorship, social media discussions and digital marketing. Our teams also develop channel marketing programs to support our customers in their marketing of our business and products, in addition to providing to them various services such as product training, new product briefing, and sales training. Furthermore, our marketing team focuses heavily on public relations and crisis management to safeguard our public image. By working closely with our sales teams and other leading solar research companies, our marketing team provides up-to-date market information on a constant basis, supporting the efforts of our sales team. Our marketing staff is located throughout the Americas, China, Europe, India, Japan, Australia, South Africa and South Korea.

We sell our standard solar module products primarily under three types of arrangements: sales contracts to distributors; sales to systems integrators, installers/EPC companies and project developers; and OEM/tolling manufacturing arrangements.

We target our sales and marketing efforts for our specialty solar products at companies in selected industry sectors, including the automotive, telecommunications and LED lighting sectors. As standard solar modules increasingly become commoditized and technology advancements allow solar power to be used in more off-grid applications, we intend to increase our sales and marketing efforts on our specialty solar products and capabilities. Our sales and marketing team works with our specialty solar products development team to take into account changing customer preferences and demands to ensure that our sales and marketing team is able to effectively communicate to customers our product development changes and innovations. We intend to establish additional relationships in other market sectors as the specialty solar products market expands.

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As we expand our manufacturing capacity and enhance our brand name, we continue to develop new customer relationships in a wider range of geographic markets to decrease our market concentration. In 2013, we significantly increased our total number of customers and achieved a leading market share in Canada, Japan, Thailand and Central America, which we maintained in 2014. In 2015, we maintained our leading market share in those markets and at the same time expanded our customer base into several emerging solar markets, such as Southeast Asia. In 2016, we achieved a leading market share in Brazil and maintained our leading market share in Canada, Japan, Thailand and India. In 2017, we maintained our leading market share in India, Japan, Brazil, Europe and Middle East. In 2018, we increased our market share in the Middle East, Africa, Latin America and Australia, and maintained our leading market share in Japan and Europe. In 2019, we increased our market share in Latin America and Australia, and maintained our leading market share in Japan, Europe, Middle East and Africa. We intend to continue to expand our sales in these areas and develop more emerging markets in 2020.

In 2010, we commenced the sale of solar system kits. A solar system kit is a ready-to-install package consisting of solar modules produced by us and components, such as inverters, racking system and other accessories, supplied by third parties. In 2019, we sold approximately 219.6 MW of system kits primarily in Japan and China.

In 2012, we started to provide O&M services for solar power plants in commercial operation. Our O&M services include inspections, repair and replacement of plant equipment, site management and administrative support services.

Energy Segment

We develop, construct, maintain, sell and/or operate solar plants primarily in the U.S., Japan, China, Brazil, the United Kingdom, Mexico, India, Australia, Italy and Namibia. We also provide EPC, development and assets management services. We sell our projects to large utility companies, other power producers and asset managers. Customers for our EPC, development and asset management services include solar project developers and owners.

In order to continue to grow our energy segment, we conduct market due diligence, routinely meet with industry players and interested investors, and attend industry conferences and events to identify project development opportunities. Our energy segment team has extensive industry expertise and significant experience in working with government authorities and developing new projects for our target markets.

Solar Project Development

As of January 31, 2020, our project backlog (formerly called our late-stage, utility-scale, solar project pipeline), which refers to projects that have passed their Cliff Risk Date and are expected to be built in the next one to four years, totaled approximately 3.7 GWp, with 1,597 MWp in North America, 1,087 MWp in Latin America, 806 MWp in Asia Pacific, 206 MWp in EMEA, 45 MWp in China. The Cliff Risk Date depends on the country where a project is located and is defined as the date on which the project passes the last of the high-risk development stages (usually receipt of all required environmental approvals, interconnection agreements, FITs and PPAs).

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As of January 31, 2020, our project pipeline (formerly called our early-to-mid-stage, utility-scale, solar project pipeline) totaled 11.7 GW.

Region	Project Backlog and Pipeline by Region*		
	Backlog	Pipeline	Total
North America	1,597	5,232	6,829
Latin America	1,087	3,246	4,333
EMEA	206	2,113	2,319
Asia Pacific	806	676	1,482
China	45	410	455
Total	3,741	11,677	15,418

Note: Backlog and pipeline table represents the gross MWp size of the projects, including minority interest.

More recently, in 2018, the Energy team at Recurrent, our subsidiary in the U.S., secured two PPAs for a total of 150 MWac with 180 MWh of storage attached. These PPAs allow Recurrent to develop in-house expertise on energy storage matters, including permitting, interconnection, engineering and design, structuring of off-take agreements to meet customer's needs, as well as plant operation. The energy segment has been selected and is in negotiation with multiple off-take parties for additional energy storage projects totaling 705 MWac with 2,820 MWh of storage.

The table below sets forth our storage project backlog and pipeline as of January 31, 2020.

	Backlog	Pipeline	Total
Storage (MWh)	320	2,500	2,820

The expected COD schedule of our project backlog, as of January 31, 2020, was as follows:

Expected COD Schedule (MWp)			
2020	2021	2022 and Thereafter	Total
63	449	—	512

Note: Approximately 264 MWp from LatAm portfolio in Brazil sold at NTP to Nebras, with milestone revenue recognition over 2019-2021.

Operating Solar Power Plants and Sales of Electricity

In addition to our project backlog, we had a portfolio of solar power plants in operation totaling 880.2 MWp as of January 31, 2020. Our revenue generated from sale of electricity was \$5.9 million in 2019. The resale value of these plants was estimated at approximately \$1.0 billion as of January 31, 2020. For those plants that are subject to U.S. tax equity deals, only the value of the class B shares held by us was included in the aforementioned estimate of resale value.

Our total portfolio of solar power plants in operation as of January 31, 2020 was as follows:

Projects in Operation (MWp)						
U.S.	Japan	China	India	Mexico	Others	Total
103.9	133.7	458.7	35.0	100.1	48.8	880.2

Customer Support and Service

We typically sell our standard solar modules with a twelve-year warranty against defects in materials and workmanship and a linear power performance warranty that guarantees the actual power output of our modules.

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For solar power projects built by us, we provide a limited workmanship or balance of system warranty against defects in engineering, design, installation and construction under normal use, operation and service conditions for a period of up to ten years following the energizing of the solar power project. In resolving claims under the workmanship or balance of system warranty, we have the option of remedying through repair, refurbishment or replacement of equipment. We have also entered into similar workmanship warranties with our suppliers to back up our warranties.

As part of our energy business, before commissioning solar power projects, we conduct performance testing to confirm that the projects meet the operational and capacity expectations set forth in the agreements. In limited cases, we also provide for an energy generation performance test designed to demonstrate that the actual energy generation for up to the first three years meets or exceeds the modeled energy expectation (after adjusting for actual solar irradiation). In the event that the energy generation performance test performs below expectations, the appropriate party (EPC contractor or equipment provider) may incur liquidated damages capped at a percentage of the contract price. In certain instances, a bonus payment may be received if the energy generation performance test performs above expectations.

Our customer support and service function handles technical inquiries and warranty-related issues. In recent years, we expanded our capacity in these areas to better enable us to handle our customer's questions and concerns in a timely and professional manner.

In 2019, we renewed our product warranty insurance coverage to provide additional security to our customers. See "—Insurance" below. Our customer support and service function will continue to expand and improve services we provide to our customers.

Competition

MSS Segment

The market for solar power products is competitive and evolving. We compete with American companies, such as First Solar and SunPower, and Asia-based companies such as Longi, Trina, Jinko, JA Solar and Hanwha Q Cells. Some of our competitors are developing or producing products based on alternative solar technologies, such as thin film PV materials, that may ultimately have costs similar to, or lower than, our projected costs. Solar modules produced using thin film materials, such as cadmium telluride and copper indium gallium selenide technology, generally have lower conversion efficiency but do not use silicon for production, compared to our crystalline silicon solar module products, and as such are less susceptible to increases in the costs of silicon. Some of our competitors have also become vertically integrated, from upstream polysilicon manufacturing to solar system integration. In addition, the solar power market in general competes with other sources of renewable and alternative energy as well as conventional power generation.

We believe that the key competitive factors in the market for solar power products include:

- price;
- the ability to deliver products to customers on time and in the required volumes;
- product quality and associated service issues;
- nameplate power and other performance parameters of the module, such as power tolerances;
- value-added services such as system design and installation;
- value-added features such as those that make a module easier or cheaper to install;
- additional system components such as mounting systems, delivered as a package or bundle;
- brand equity and any good reputation resulting from the above items, including the willingness of banks to finance projects using modules produced by a particular supplier;

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- customer relationships and distribution channels; and
- the aesthetic appearance of solar power products.

In the immediate future, we believe that our ability to compete depends on our ability to deliver cost-effective products in a timely manner and to develop and maintain a strong brand name based on high quality products and strong relationships with downstream customers. Our competitiveness also depends on our ability to effectively manage our cash flow and balance sheet and to maintain our relationships with the financial institutions that fund solar power projects. Consolidation of the solar industry is already occurring and is expected to continue in the near future. We believe that such consolidation will benefit our company in the long-term. We believe that the key to competing successfully in the long-term is to produce innovative, high quality products at competitive prices and develop an integrated sales approach that includes services, ancillary products, such as mounting systems and inverters, and value-added product features. Our goal is to offer our customers solar power products that deliver the lowest LCOE. Additionally, we believe that a good marketing program and the strong relationships that we are building with customers and suppliers will support us in this competitive environment.

Energy Segment

Our energy segment is a capital-intensive business with numerous industry participants. We face competition from a large and diverse group of local and international project developers, financial investors and certain utility companies. These competitors vary in terms of size, geographic focus, financial resources and operating capabilities and are active in Japan, the U.S., China, Brazil, India, Mexico, the EU, Australia and other markets where we operate or intend to enter. We compete in a diversified and complicated landscape since the commercial and regulatory environments for solar power project development, sale and operation vary significantly from region to region and country to country. Our primary competitors are local and international developers and operators of solar power projects. We believe the key competitive factors in the global solar power project development industry include:

- vertical integration with upstream manufacturing;
- permit and project development experience and expertise;
- reputation and track record;
- relationship with government authorities and knowledge of local policies;
- strong internal working capital and good relationship with banks and international organizations that enhance access to external financing;
- experienced technicians and executives who are familiar with the industry and the implementation of our business plans; and
- expertise and experience in providing EPC.

We cannot, however, guarantee that some of our competitors do not or will not have advantages over us in terms of greater operational, financial, technical, management or other resources in particular markets or in general.

Currently, we develop and construct and, in limited cases, operate and maintain solar power projects in various regions including the U.S., China, Japan, Brazil, Argentina, India, Italy and Australia. We compete to supply energy to potential customers with a limited number of utilities and providers of distributed generation in these markets. If we wish to enter into new PPAs for our solar power projects upon termination of previous PPAs, we compete with conventional utilities primarily based on cost of capital, generation located at customer sites, operations and management expertise, price (including predictability of price), green attributes of power, the ease by which customers can switch to electricity generated by our energy systems and our open architecture approach to working within the industry, which facilitates collaboration and project acquisitions.

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For further discussion of the competitive risks that we face, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Because the markets in which we compete are highly competitive and quickly evolving, because many of our competitors have greater resources than we do or are more adaptive, and because we have a limited track record in our energy segment, we may not be able to compete successfully and we may not be able to maintain or increase our market share.”

Insurance

We maintain property risk insurance policies with reputable insurance companies to cover our equipment, facilities, buildings and inventories. The coverage of these insurance policies includes losses due to natural hazards and losses arising from unforeseen accidents. Our manufacturing plants in China and elsewhere are covered by business interruption insurance. However, significant damage or interruption to any of our manufacturing plants, whether as a result of fire or other causes, could still have a material and adverse effect on our results of operations. We also maintain commercial general liability (including product liability) coverage. We obtained credit insurance from China Export & Credit Insurance Corporation, or Sinasure. Credit insurance is designed to offset the collection risk of our account receivables for certain customers within the credit limits approved by Sinasure. Risks related to marine, air and inland transit for the export of our products and domestic transportation of materials and products are covered under cargo transportation insurance. We also maintain directors and officers liability insurance.

We have agreements with a group of insurance companies to reduce some of the risks associated with our warranties. Under the terms of the insurance policies, the insurance companies are obliged to reimburse us, subject to certain maximum claim limits and certain deductibles, for the actual product warranty costs that we incur under the terms of our warranty against defects in workmanship and material and our warranty relating to power output. The warranty insurance is renewable annually. We believe that our warranty improves the marketability of our products and our customers are willing to pay more for products with warranties backed by insurance.

Environmental Matters

Except as disclosed in the “Item 3. Key Information—D. Risk Factors—Risks Related to Doing Business in China,” we believe we have obtained the environmental permits necessary to conduct the business currently carried on by us at our existing manufacturing facilities. We have also conducted environmental studies in conjunction with our solar power projects to assess and reduce the environmental impact of such projects.

Our products must comply with the environmental regulations of the jurisdictions in which they are installed. We make efforts to ensure that our products comply with the EU Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

Our operations are subject to regulation and periodic monitoring by local environmental protection authorities. If we fail to comply with present or future environmental laws and regulations, we could be subject to fines, suspension of production or cessation of operations.

Government Regulations

This section sets forth a summary of certain significant regulations or requirements that affect our business activities in China or our shareholders’ right to receive dividends and other distributions from us.

Renewable Energy Law and Other Government Directives

In February 2005, China enacted its Renewable Energy Law, which became effective on January 1, 2006 and was revised in December 2009. The revised Renewable Energy Law, which became effective on April 1, 2010, sets forth policies to encourage the development and use of solar energy and other non-fossil energy sources and their on-grid generation. It also authorizes the relevant pricing authorities to set favorable prices for the purchase of electricity generated by solar and other renewable power generation systems.

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The law also sets forth the national policy to encourage the installation and use of solar energy water-heating systems, solar energy heating and cooling systems, solar PV systems and other solar energy utilization systems. It also provides financial incentives, such as national funding, preferential loans and tax preferences for the development of renewable energy projects subject to certain regulations of the relevant authorities.

In November 2005, the NDRC promulgated the Renewable Energy Industry Development Guidance Catalogue, in which solar power figured prominently. In January 2006, the NDRC promulgated two implementation directives with respect to the Renewable Energy Law. In January 2007, the NDRC promulgated another related implementation directive. These directives set forth specific measures for setting the price of electricity generated by solar and other renewable power generation systems, for sharing additional expenses, and for allocating administrative and supervisory authority among different government agencies at the national and provincial levels. They also stipulate the responsibilities of electricity grid companies and power generation companies with respect to the implementation of the Renewable Energy Law.

In August 2007, the NDRC promulgated the Medium and Long-Term Development Plan for the Renewable Energy Industry. This plan sets forth national policy to provide financial allowance and preferential tax regulations for the renewable energy industry. The Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of the PRC, which was approved by the National People's Congress in March 2016, the Thirteenth Five-Year Plan for Renewable Energy Development, which was promulgated by the NDRC in December 2016, and the Thirteenth Five-Year Plan for Solar Power Generation, which was promulgated by the National Energy Administration in December 2016 also demonstrates a commitment to promote the development of renewable energy to enhance the competitiveness of the renewable energy industry, including the solar energy industry.

China's Ministry of Housing and Urban-Rural Development (formerly, the Ministry of Construction) also issued a directive in June 2005 which seeks to expand the use of solar energy in residential and commercial buildings and encourages the increased application of solar energy in different townships. Similarly, China's State Council promulgated a directive in July 2005, which sets forth specific measures to conserve energy resources. In November 2005, China's Ministry of Housing and Urban-Rural Development promulgated the Administrative Provisions on Energy Conservation for Civil Constructions which encourages the development of solar energy. In August 2006, the State Council issued the Decision on Strengthening the Work of Energy Conservation which encourages the great development of the solar energy and other renewable energy. In addition, on April 1, 2008, the PRC Energy Conservation Law came into effect. Among other objectives, this law encourages the installation of solar power facilities in buildings to improve energy efficiency. In July 2009, China's Ministry of Finance and Ministry of Housing and Urban-Rural Development jointly promulgated "the Urban Demonstration Implementation Program of the Renewable Energy Building Construction" and "the Implementation Program of Acceleration in Rural Application of the Renewable Energy Building Construction" to support the development of the new energy industry and the new energy-saving industry.

On March 8, 2011, China's Ministry of Finance and Ministry of Housing and Urban-Rural Development jointly promulgated the Notice on Further Application of Renewable Energy in Building Construction, which aims to raise the percentage of renewable energy used in buildings.

On August 21, 2012, China's Ministry of Finance and Ministry of Housing and Urban-Rural Development jointly promulgated the Notice on Improving Policies for Application of Renewal Energy in Building and Adjusting Fund Allocation and Management Method, which aims to promote the use of solar energy and other new energy products in public facilities and residences, further amplifying the effect of the policies for application of renewable energy in buildings.

In June 2014, the General Office of the State Council issued its Notice on Printing and Distributing the Action Plan for the Energy Development Strategy (2014-2020), which requested accelerating the development of solar power generation, including promoting the construction of photovoltaic base construction, among others.

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In April 2015, China's Ministry of Finance promulgated the Interim Measures for Administration of the Special Fund for the Development of Renewable Energy Sources, which stipulated the division of regulation of special fund for the development of renewable energy sources and the main scopes to be supported.

In April 2016, the NDRC and National Energy Administration issued the Notice on Printing and Distributing the Action Plan for Energy Technology Revolution and Innovation (2016-2030), which sets forth the focus, the main direction, the timetable and the route of energy technology innovation.

In November 2017, the NDRC issued the Opinions on Comprehensively Deepening the Reform of the Price Mechanism, which requested improving the price mechanism of renewable energy, including adopting the decrement mechanism on the on-grid benchmark price of new energy resources such as wind power and photovoltaic power.

Environmental Regulations

As we have expanded our ingot, silicon wafer and solar cell manufacturing capacities, we have begun to generate material levels of noise, wastewater, gaseous wastes and other industrial waste. Additionally, as we expand our internal solar components production capacity, our risk of facility incidents that would negatively affect the environment also increases. We are subject to a variety of governmental regulations related to the storage, use and disposal of hazardous materials. The major environmental laws and regulations applicable to us include the PRC Environmental Protection Law, which became effective in 1989, as amended and promulgated in 2014, the PRC Law on the Prevention and Control of Noise Pollution, which became effective in 1997, as amended and promulgated in 2018, the PRC Law on the Prevention and Control of Air Pollution, which became effective in 1988, as amended and promulgated in 1995, 2000, 2015 and 2018, the PRC Law on the Prevention and Control of Water Pollution, which became effective in 1984, as amended and promulgated in 1996, 2008 and 2017, the PRC Law on the Prevention and Control of Solid Waste Pollution, which became effective in 1996, as amended and promulgated in 2004, 2013, 2015 and 2016, the PRC Law on Evaluation of Environmental Affects, which became effective in 2003, as amended and promulgated in 2016 and 2018, the PRC Law on Promotion of Clean Production, which became effective in 2003, as amended and promulgated in 2012, and the Regulations on the Administration of Construction Project Environmental Protection, which became effective in 1998, as amended and promulgated in 2017.

Some of our PRC subsidiaries are located in Suzhou, China, which is adjacent to Taihu Lake, a nationally renowned and protected body of water. As a result, production at these subsidiaries is subject to the Regulations on the Administration of Taihu Basin, which became effective on 2011, the Regulation of Jiangsu Province on Preventing Water Pollution in Taihu Lake, which became effective in 1996 and was further revised and promulgated in 2007, 2010, 2012 and 2018, and the Implementation Plan of Jiangsu Province on Comprehensive Treatment of Water Environment in Taihu Lake Basin, which was promulgated in February 2009 and amended in 2013. Because of these regulations, the environmental protection requirements imposed on nearby manufacturing projects, especially new projects, have increased noticeably, and Jiangsu Province has stopped approving construction of new manufacturing projects that increase the amount of nitrogen and phosphorus released into Taihu Lake, except for those satisfy certain applicable statutory requirements.

Admission of Foreign Investment

The principal regulation governing foreign ownership of solar power businesses in the PRC is the Foreign Investment Industrial Guidance Catalogue. Under the current catalogue, which was amended in June 2017 and became effective on July 28, 2017, the solar power related business is classified as an "encouraged foreign investment industry." Companies that operate in encouraged foreign investment industries and satisfy applicable statutory requirements are eligible for preferential treatment, including exemption from customs of certain self-used equipment and priority consideration in obtaining land use rights provided by certain local governments.

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While the 2004 catalogue only applied to the construction and operation of solar power stations, the 2007 catalogue expanded its application also applies to the production of solar cell manufacturing machines, the production of solar powered air conditioning, heating and drying systems and the manufacture of solar cells, and the 2011 catalogue, the 2015 catalogue and the current 2017 catalogue also cover the manufacture of solar light collector glass and etc.

Administration of Foreign Invested Companies

The establishment, approval, registered capital requirement and day-to-day operational matters of wholly foreign-owned enterprises, are regulated by the Wholly Foreign-Owned Enterprise Law of the PRC, effective in 1986 and amended in 2000 and 2016, and the Implementation Rules of the Wholly Foreign-owned Enterprise Law of the PRC, effective in 1990 and amended in 2001 and 2014. The establishment, operation and management of corporate entities in China are governed by the Company Law of the PRC, or the Company Law, effective in 1994 and amended in 1999, 2004, 2005, 2013 and 2018. The Company Law is applicable to our PRC subsidiaries unless PRC laws on foreign investment stipulate otherwise.

In March 2019, the Foreign Investment Law was promulgated, effective on January 1, 2020, at which time the Wholly Foreign-owned Enterprise Law will be repealed. Regulation for Implementing the Foreign Investment Law of the People's Republic of China took effect on January 1, 2020. Foreign-invested enterprises that were established in accordance with Wholly Foreign-owned Enterprise Law before the implementation of Foreign Investment Law may retain their original organizational forms and other aspects for five years.

Income Tax and VAT

PRC enterprise income tax is calculated based on taxable income determined under PRC accounting principles. Under the EIT Law, both foreign-invested enterprises and domestic enterprises are subject to a uniform enterprise income tax rate of 25%. The EIT Law provides for preferential tax treatment for certain categories of industries and projects that are strongly supported and encouraged by the state. For example, enterprises qualified as HNTEs are entitled to a 15% enterprise income tax rate, provided that they satisfy other applicable statutory requirements.

Certain of our PRC subsidiaries, such as CSI New Energy Holding and CSI Luoyang Manufacturing, were once HNTEs and enjoyed preferential enterprise income tax rates. These benefits have, however, expired. In 2019, only Suzhou Sanysolar, CSI Cells, CSI Changshu Manufacturing, Changshu Tegu, Suzhou Gaochuangte New Energy Development, Canadian Solar Sunenergy (Suzhou) and Changshu Tlian were HNTEs and enjoyed preferential enterprise income tax rates.

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The EIT Law also provides that enterprises established outside China whose “de facto management body” is located in China are considered PRC tax residents and will generally be subject to the uniform 25% enterprise income tax rate on their global income. Under the implementation regulations, the term “de facto management body” is defined as substantial and overall management and control over aspects such as the production and business, personnel, accounts and properties of an enterprise. Circular 82 further provides certain specific criteria for determining whether the “de facto management body” of a PRC-controlled offshore incorporated enterprise is located in the PRC. The criteria include whether (a) the premises where the senior management and the senior management bodies responsible for the routine production and business management of the enterprise perform their functions are mainly located within the PRC, (b) decisions relating to the enterprise’s financial and human resource matters are made or subject to approval by organizations or personnel in the PRC, (c) the enterprise’s primary assets, accounting books and records, company seals, and board and shareholders’ meeting minutes are located or maintained in the PRC and (d) 50% or more of voting board members or senior executives of the enterprise habitually reside in the PRC. Although Circular 82 only applies to offshore enterprises controlled by enterprises or enterprise groups located within the PRC, the determining criteria set forth in the Circular 82 may reflect the tax authorities’ general position on how the “de facto management body” test may be applied in determining the tax resident status of offshore enterprises. As the tax resident status of an enterprise is subject to the determination by the PRC tax authorities, uncertainties remain with respect to the interpretation of the term “de facto management body” as applicable to our offshore entities.

Under the EIT Law and implementing regulations issued by the State Council, the PRC withholding tax rate of 10% is generally applicable to interest and dividends payable to investors from companies that are not “resident enterprises” in the PRC, to the extent such interest or dividends have their sources within the PRC. If our Canadian parent entity is deemed a PRC tax resident under the EIT Law based on the location of our “de facto management body,” dividends distributed from our PRC subsidiaries to our Canadian parent entity could be exempt from Chinese dividend withholding tax. However, in that case, dividends from us to our shareholders may be regarded as China-sourced income and, consequently, be subject to Chinese withholding tax at the rate of 10%, or at a lower treaty rate if applicable. Similarly, if we are considered a PRC tax resident, any gain realized by our shareholders from the transfer of our common shares is also subject to Chinese withholding tax at the rate of 10% if such gain is regarded as income derived from sources within the PRC. It is unclear whether any dividends that we pay on our common shares or any gains that our shareholders may realize from the transfer of our common shares would be treated as income derived from sources within the PRC and subject to PRC tax.

Under the Provisional Regulation of the PRC on Value Added Tax amended in 2008, 2016 and 2017 and its implementation rules, which became effective in 2009 and were amended in 2011, all entities and individuals that are engaged in the sale of goods, processing, repairs and replacement services, the sales of services, intangible assets or real estate, and the importation of goods in China are required to pay VAT. Gross proceeds from sales and importation of goods and sales of labor services are generally subject to VAT at a rate of 17%, with exceptions for certain categories of goods that are taxed at a rate of 11%. Gross proceeds from sales of real estate are subject to VAT at a rate of 11%. Gross proceeds from sales of services and intangible assets are generally subject to VAT at a rate of 6%, with exceptions for certain categories of services or intangible assets that are taxed at a rate of 17% or 11%. When engaging in exportation of certain goods or cross-border sales of certain services or intangible assets, the exporter or the seller is entitled to a refund of a portion or all of the VAT that it has already paid or borne.

In April 2018, Ministry of Finance and State Administration of Taxation jointly announced that as of May 1, 2018, if the VAT taxpayer is subject to VAT taxable sales or imported goods, the original 17% tax rate or the original 11% tax rate shall be adjusted to 16% or 10%, respectively.

In March 2019, Ministry of Finance, State Administration of Taxation and General Administration of Customs jointly announced that as of April 1, 2019, if the VAT general taxpayer is subject to VAT taxable sales or imported goods, the original 16% tax rate shall be adjusted to 13%; if the original 10% tax rate is applied, the tax rate shall be adjusted to 9%.

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Foreign Currency Exchange

Foreign currency exchange regulation in China is primarily governed by the Foreign Currency Administration Rules, which became effective in 1996 and were amended in 1997 and 2008, and the Settlement, Sale and Payment of Foreign Exchange Administration Rules (1996), or the Settlement Rules.

Currently, the Renminbi is convertible for current account items, including the distribution of dividends, interest payments, trade and service-related foreign exchange transactions. Conversion of the Renminbi for most capital account items, such as security investment and repatriation of investment, however, is still subject to limitation and requires the approval by or registration with SAFE.

However, SAFE began to reform the foreign exchange administration system and issued the Notice on Reforming the Administrative Approach Regarding the Settlement of the Foreign Exchange Capitals of Foreign-invested Enterprises, or Circular 19, on March 30, 2015, which allows foreign invested enterprises to settle their foreign exchange capital on a discretionary basis according to the actual needs of their business operation and allows a foreign-invested enterprise with a business scope including “investment” to use the RMB capital converted from foreign currency registered capital for equity investments within the PRC. On June 9, 2016, SAFE issued the Circular on Reforming and Regulating Policies on the Control over Foreign Exchange Settlement of Capital Accounts, or Circular 16. Compared to Circular 19, Circular 16 provides that discretionary foreign exchange settlement applies to foreign exchange capital, foreign debt offering proceeds and remitted foreign listing proceeds, and the corresponding RMB obtained from foreign exchange settlement are not restricted from extending loans to related parties or repaying the inter-company loans (including advances by third parties).

On February 13, 2015, SAFE promulgated the Circular on Further Simplifying and Improving the Policies Concerning Foreign Exchange Control on Direct Investment, or SAFE Circular No. 13, which delegates the authority to enforce the foreign exchange registration in connection with the inbound and outbound direct investment under relevant SAFE rules to certain banks and therefore further simplifies the foreign exchange registration procedures for inbound and outbound direct investment.

On January 26, 2017, SAFE promulgated the Circular on Further Improving Reform of Foreign Exchange Administration and Optimizing Genuineness and Compliance Verification, which sets out various measures that relaxes the policy restriction on foreign exchange inflow to further enhance trade and investment facilitation and that tightens genuineness and compliance verification of cross-border transactions and cross-border capital flow.

Dividend Distribution

The principal regulations governing distribution of dividends paid by wholly foreign owned enterprises include the Wholly Foreign-Owned Enterprise Law of the PRC, effective in 1986 and amended in 2000 and 2016, the Implementation Rules of the Wholly Foreign-Owned Enterprise Law of the PRC, effective in 1990 and amended in 2001 and 2014, the Company Law effective in 1994 and amended in 1999, 2004, 2005, 2013 and 2018 and the EIT Law and its implementation rules, both effective in 2008.

Under these laws, foreign-invested enterprises in China may pay dividends only out of their accumulated profits, if any, determined in accordance with PRC accounting standards and regulations. In addition, a wholly foreign owned enterprise in China is required to set aside at least 10% of its after-tax profits determined in accordance with PRC accounting standards each year to its general reserves until the accumulative amount of such reserves reach 50% of its registered capital. These reserves are not distributable as cash dividends. The board of directors of a foreign-invested enterprise has the discretion to allocate a portion of its after-tax profits to staff welfare and bonus funds, which may not be distributed to equity owners except in the event of liquidation.

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Employment

The major laws and regulations governing the employment relationship, including wage and hour requirements, working and safety conditions, social insurance, housing funds and other welfare. The PRC Labor Law which became effective on January 1, 1995 and amended on August 27, 2009, and December 29, 2018, the Labor Contract Law of the People's Republic of China, which became effective on January 1, 2008, and was later revised on December 28, 2012, its Implementing Regulation and the amendment thereunder, which became effective on September 18, 2008 and July 1, 2013, respectively, permit workers in both state-owned and private enterprises in the PRC to bargain collectively. The PRC Labor Law and the PRC Labor Contract Law provide for collective contracts to be developed through collaboration between the labor unions (or worker representatives in the absence of a union) and management that specify such matters as working conditions, wage scales, and hours of work. The PRC Labor Contract Law and its Implementing Regulation impose certain requirements with respect to human resources management, including, among other things, signing labor contracts with employees, terminating labor contracts, paying remuneration and compensation and making social insurance contributions. In addition, the PRC Labor Contract Law requires employers to provide remuneration packages that meet the relevant local minimum standards. The PRC Labor Contract Law has enhanced rights for the nation's workers, including permitting open-ended labor contracts and severance payments. It requires employers to provide written contracts to their workers, restricts the use of temporary labor and makes it harder for employers to lay off employees. It also requires that employees with fixed-term contracts be entitled to an indefinite-term contract after a fixed-term contract is renewed twice or the employee has worked for the employer for a consecutive ten-year period. According to the Interim Provisions on Labor Dispatching, which came into effect on January 3, 2014, the number of dispatched workers used by an employer shall not exceed 10% of its total number of workers.

Under applicable PRC laws, rules and regulations, including the Social Insurance Law promulgated by the Standing Committee of the National People's Congress and effective as of July 1, 2011 and amended on December 29, 2018, the Rules on Implementing the Social Insurance Law issued by Ministry of Human Resource and Social Security and effective as of July 1, 2011, the Interim Regulations on the Collection and Payment of Social Security Funds promulgated by the State Council and effective as of January 22, 1999, as amended, the Interim Measures Concerning Maternity Insurance promulgated by the Ministry of Labor and effective as of January 1, 1995, the Regulations on Occupational Injury Insurance promulgated by the State Council and effective as of January 1, 2004 and amended on December 20, 2010, and the Regulations on the Administration of Housing Accumulation Funds promulgated by the State Council and effective as of April 3, 1999, as amended, employers are required to contribute, on behalf of their employees, to a number of social security funds, including funds for basic pension insurance, unemployment insurance, basic medical insurance, occupational injury insurance, maternity leave insurance, and to housing accumulation funds. These payments are made to local administrative authorities and any employer who fails to contribute may be fined and ordered to remediate on payments within a stipulated time period.

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C. Organizational Structure

The following table sets out our major subsidiaries, including their place of incorporation and our ownership interest, as of March 31, 2020.

Name of entity	Place of incorporation	Ownership interest
CSI Solartronics (Changshu) Co., Ltd.	PRC	100 %
CSI Solar Technologies Inc.	PRC	100 %
CSI New Energy Holding Co., Ltd.	PRC	100 %
Canadian Solar Manufacturing (Luoyang) Inc.	PRC	100 %
Canadian Solar Manufacturing (Changshu) Inc.	PRC	100 %
CSI Cells Co., Ltd.	PRC	100 %
Canadian Solar (USA) Inc.	USA	100 %
Canadian Solar Japan K.K.	Japan	100 %
Canadian Solar Solutions Inc.	Canada	100 %
CSI Solar Power Group Co., Ltd. (formerly named/known as “CSI Solar Power (China) Inc.”)	PRC	100 %
Canadian Solar EMEA GmbH	Germany	100 %
Canadian Solar (Australia) Pty Limited	Australia	100 %
Canadian Solar International Limited	Hong Kong	100 %
Canadian Solar O and M (Ontario) Inc.	Canada	100 %
Suzhou SanySolar Materials Technology Co., Ltd.	PRC	99.73 %
Canadian Solar South East Asia Pte. Ltd.	Singapore	100 %
Canadian Solar South Africa (Pty) Ltd	South Africa	100 %
Canadian Solar Brazil Commerce, Import and Export of Solar Panels Ltd.	Brazil	100 %
Canadian Solar Construction (USA) LLC	USA	100 %
Canadian Solar Projects K.K.	Japan	100 %
CSI&GCL Solar Manufacturing (Yan Cheng) Inc.	PRC	100 %
Canadian Solar UK Ltd.	United Kingdom	100 %
Canadian Solar UK Projects Ltd.	United Kingdom	100 %
Changshu Tegu New Material Technology Co., Ltd.	PRC	100 %
Changshu Tian Co., Ltd.	PRC	100 %
Recurrent Energy Group Inc.	USA	100 %
Recurrent Energy, LLC	USA	100 %
PT. Canadian Solar Indonesia	Indonesia	67 %
Canadian Solar Manufacturing Vietnam Co., Ltd.	Vietnam	100 %
Canadian Solar Energy Private Limited	India	100 %
Canadian Solar MSS (Australia) Pty Ltd (formerly named/known as “Canadian Solar Australia 1 Pty Ltd.”)	Australia	100 %
Canadian Solar Energy Holding Company Limited	Hong Kong	100 %

Canadian Solar Energy Singapore Pte. Ltd.	Singapore	100	%
Canadian Solar Manufacturing (Thailand) Co., Ltd.	Thailand	99.99992	%
Canadian Solar Sunenergy (Suzhou) Co., Ltd.	PRC	100	%
Canadian Solar Sunenergy (Baotou) Co., Ltd.	PRC	100	%
Canadian Solar Middle East DMCC	United Arab Emirates	100	%
CSI Investment Management (SuZhou) Co., Ltd.	PRC	100	%
Suzhou Gaochuangte New Energy Development Co., Ltd.	PRC	90	%
CSI Cells (Yancheng) Co., Ltd.	PRC	*	%
CSI Modules (Dafeng) Co., Ltd.	PRC	**	%
Canadian Solar Construction (Australia) Pty Ltd	Australia	100	%
CSUK Energy Systems Construction and Generation JSC	Turkey	100	%
CSI Modules (JiaXing) Co., Ltd.	PRC	100	%
CSI Wafer (LuoYang) Co., Ltd.	PRC	100	%
Canadian Solar Manufacturing Taiwan Co., Ltd.	Taiwan	100	%
Canadian Solar Argentina Investment Holding Ltd	Argentina	100	%
Canadian Solar New Energy Holding Company Limited	Hong Kong	100	%
Canadian Solar Energy Holding Singapore Pte. Ltd.	Singapore	100	%
Canadian Solar SSES (Canada) Inc.	Canada	100	%
Canadian Solar SSES (UK) Ltd	United Kingdom	100	%
Canadian Solar SSES (US) Inc.	USA	100	%
Canadian Solar Asset Management LLC	USA	100	%
Canadian Solar Netherlands Cooperative U.A.	Netherland	100	%

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- * CSI Cells Co., Ltd. holds 52% equity rights of CSI Cells (Yancheng) Co., Ltd., a limited partnership fund, of which CSI Cells Co., Ltd. holds 37.33% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.17% shares as a general partner, holds 48% equity rights of CSI Cells (Yancheng) Co., Ltd.
 - ** Canadian Solar Manufacturing (Changshu) Inc. holds 3.12% equity rights of CSI Modules (DaFeng) Co., Ltd., a limited partnership fund, of which Canadian Solar Manufacturing (Changshu) Inc. holds 20% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.067% shares as a general partner, holds 96.88% equity rights of CSI Modules (DaFeng) Co., Ltd.

D. Property, Plant and Equipment

The following is a summary of our material properties, including information on our manufacturing facilities and office buildings as of the date of this annual report on Form 20-F:

- CSI Changshu Manufacturing has the land use right to two pieces of land of approximately 40,000 square meters and 180,000 square meters, respectively, in Changshu, on which we have built manufacturing facilities with a total floor area of approximately 164,817 square meters. We have obtained certificates of property ownership for all of CSI Changshu Manufacturing's facilities.
- CSI Luoyang Manufacturing has a land use right to a piece of land of approximately 35,345 square meters in Luoyang (Phase I), on which we have built manufacturing facilities of approximately 6,761 square meters. The certificates for property ownership were granted in June 2008. In the same year of 2008, CSI Luoyang Manufacturing obtained the land use right to a piece of land adjacent of approximately 79,685 square meters (Phase II), on which we have built manufacturing facilities of approximately 29,811 square meters. The floor area of Phase II is approximately 29,811 square meters. The certificates for property ownership were granted in September 2013. Subsequently in 2016, CSI Luoyang Manufacturing obtained the land use right to another piece of land of 159,961 square meters (Phase III), on which we have constructed manufacturing facilities with the floor area of approximately 38,955 square meters. We obtained the certificates for property ownership of Phase III in March 2018.
- CSI Cells has the land use right to a piece of land of approximately 65,661 square meters in Suzhou. We completed the construction of our first solar cell manufacturing facilities of 14,077 square meters (Phase I) on this site in the first quarter of 2007 and subsequently obtained the certificate of property ownership. The Phase II cell manufacturing facilities, with 30,102 square meters of workshop space, were completed in 2009. The Phase III cell manufacturing facilities, with a total floor area of approximately 21,448 square meters of manufacturing and office space, were completed in August 2011. We obtained the certificates of property ownership for Phase II and Phase III in September 2019. CSI Cells merged with CSI Solar New Energy (Suzhou) Co., Ltd. in 2012, and obtained the land use right to another piece of land of approximately 10,000 square meters in Suzhou and the certificate of property ownership for approximately 4,833 square meters of floor area.
- CSI&GCL Solar Manufacturing (Yan Cheng) Inc., or CSI&GCL Solar Manufacturing, has leased the cell manufacturing facilities of approximately 26,921 square meters on a piece of land of approximately 66,667 square meters (Phase I) since 2015. It has the right and expects to purchase these facilities and obtain the property ownership and land use right between 2021 and 2022. In 2016, CSI&GCL Solar Manufacturing obtained the land use right to a piece of land of approximately 133,333 square meters (Phase II and Phase III), on which we have built cell manufacturing facilities with a total floor area of approximately 23,020 square meters. The commercial operations have commenced since then and we obtained the certificates for property ownership of Phase II and Phase III cell manufacturing facilities in August 2018. In 2017, CSI&GCL Solar Manufacturing obtained the land use right of approximately 33,664 square meters for the construction of Phase IV facilities.

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- In Baotou of Inner Mongolia, we have obtained the land use right of a piece of land of approximately 224,997 square meters, on which we have built module manufacturing facilities with a floor area of approximately 18,000 square meters. The production of module manufacturing has commenced since May 2017. We have also started the construction of other facilities producing poly ingots and mono ingots with a floor area of approximately 61,728 square meters on the same land.
- In Suzhou, Canadian Solar Sunenergy (Suzhou) Co., Ltd. has obtained the land use right to a piece of land of approximately 60,000 square meters and owns the module manufacturing facility thereon with a floor area of 28,355 square meters, which commenced production in the first quarter of 2017.
- CSI Cells (Yancheng) Co., Ltd. has the land use right to a piece of land of approximately 133,857 square meters (Phase I) located in National Yancheng Economic Technical Development Zone of Yancheng City. The floor area of cell manufacturing facilities (Phase I) is approximately 63,496 square meters. A part of the cell manufacturing facilities has completed construction and commenced operations since September 2018 and the entire Phase I facilities commenced operations in May 2019. In the same year of 2019, we made an advanced payment to purchase the Phase II land of approximately 64,436 square meters and we are in the process of closing the purchase and obtaining the land use right certificate.
- CSI Modules (DaFeng) Co., Ltd. obtained the land use right to a piece of land of 200,006 square meters in Yan-Cheng Da-Feng Economic Development District in 2017. The module production facility of 78,133 square meters (Phase I) completed construction and the production began in September 2018. We obtained the certificate of property ownership for Phase I in March 2020.
- CSI Modules (JiaXing) Co., Ltd. obtained the land use right to a piece of land of 165,057 square meters in 2018.
- Suzhou Gaochuangte New Energy Development Co., Ltd. and its wholly-owned subsidiary obtained the land use right to a piece of land of 598 square meters in 2018 and own the office building thereon with a floor area of 1,972 square meters.
- In Taiwan, we lease a plant facility of approximately 20,262 square meters located in Hukou Township of Hsinchu City with a five-year term in December 2017. The production of 200 MW module manufacturing commenced in the third quarter of 2019.
- In Ontario, we lease approximately 14,851 square meters of manufacturing facilities in Guelph, Ontario, Canada for a term of ten years commencing September 1, 2010. We also lease a warehouse of 7,912 square meters and an office building of 1,146 square meters on the same premises as the Guelph, Ontario, Canada manufacturing facilities for the same term. In December 2019, we have renewed the leases for three years from 2020 to 2023.
- In Vietnam, we lease approximately 15,784 square meters of manufacturing facilities in Haiphong City, Vietnam since 2015 and have renewed for another three years commencing August 7, 2018. The production has begun since 2016.
- In Thailand, Canadian Solar Manufacturing (Thailand) Co., Ltd. has a land of 179.2 Rai (286,732 square meters) with the ownership certificate obtained. A module manufacturing facility of 29,723 square meters and a cell manufacturing facility of 19,139 square meters were built and the production commenced in the third quarter of 2016 and in April 2017, respectively. The construction of another cell manufacturing facility with a floor area of 18,100 square meters and a module manufacturing facility with a floor area of 15,460 square meters were completed and the production commenced in the third quarter of 2019.
- In Indonesia, we lease a total floor area of approximately 8,000 square meters for our module production facilities, through our 67% owned subsidiary, PT. Canadian Solar Indonesia, which was established under a strategic partnership agreement with PT Comtel Energi. Production commenced in the first quarter of 2016.

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Except as disclosed in the “Item 3. Key Information—D. Risk Factors—Risks Related to Doing Business in China,” we believe we have obtained the environmental permits necessary to conduct the business currently carried on by us at our existing manufacturing facilities. For more details, see “B. Business Overview—Environmental Matters.”

ITEM 4A. UNRESOLVED STAFF COMMENTS

None.

ITEM 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

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 elsewhere in this annual report on Form 20-F. This discussion may contain forward-looking statements based upon current expectations that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under “Item 3. Key Information—D. Risk Factors” or in other parts of this annual report on Form 20-F. For discussion of 2017 items and year-over-year comparisons between 2018 and 2017 that are not included in this annual report on Form 20-F, refer to “Item 5. - Operating and Financial Review and Prospects” found in our Form 20-F for the year ended December 31, 2018, that was filed with the Securities and Exchange Commission on April 25, 2019.

A. Operating Results

Factors Affecting Our Results of Operations

The most significant factors that affect our financial performance and results of operations are:

- solar power products pricing;
- costs of silicon raw materials and solar ingots, wafers and cells relative to the selling prices of modules;
- government subsidies and the availability of financing for solar projects;
- industry and seasonal demand;
- impact of assets impairment;
- solar power project development and sale and EPC and development services;
- antidumping, countervailing and other duty costs and true-up charges; and
- foreign exchange.

Solar Power Products Pricing

Before 2004, all of our net revenues were generated from sales of specialty solar modules and products. In 2004, we began selling standard solar modules. In 2018, we generated 57.9% of our net revenues from our MSS segment, which primarily comprises the design, development, manufacture and sale of solar power products, solar system kits and the provision of EPC and O&M services, and 42.1% from our energy segment, which primarily comprises solar power project development and sale, operating solar power projects and sales of electricity. In 2019, we generated 77.5% of our net revenues from our MSS segment and 22.5% from our energy segment.

Our standard solar modules are priced based on the actual flash test result or the nameplate capacity of our modules, expressed in watts-peak. The actual price per watt is affected by overall demand for modules in the solar power market and increasingly by the total power of the module. Higher-powered modules usually command slightly higher prices per watt.

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We price our standard solar modules based on the prevailing market price at the time we enter into sales contracts with our customers, taking into account the size of the contract, the strength and history of our relationship with the customer and the costs of silicon raw materials and solar ingots, wafers and cells. During the first few years of our operations, the average selling price for standard solar modules rose year-over-year across the industry, primarily because of high demand. During the period from 2004 to 2008, the average selling price of our standard solar modules ranged from \$3.62 to \$4.23. Following a price peak in the third quarter of 2008, the industry-wide average selling price of standard solar modules has declined sharply as competition increased. In 2016 and 2017, the average selling price of our standard solar modules was approximately \$0.51 per watt and \$0.40 per watt, respectively; and, in 2018 and 2019, it was approximately \$0.34 per watt and \$0.29 per watt, respectively. We expect the averaging selling price of our standard solar modules to continue to decline, albeit at a more moderate rate.

Costs of Silicon Raw Materials and Solar Ingots, Wafers and Cells Relative to the Selling Prices of Modules

We produce solar modules, which are an array of interconnected solar cells encased in a weatherproof frame, and products that use solar modules. Solar cells are the most important component of solar modules. Our solar cells are currently made from mono-crystalline and multi-crystalline solar wafers through multiple manufacturing steps. Solar wafers are the most important material for making solar cells. Solar ingots are the most important material for making solar wafers. If we are unable to procure silicon raw materials and solar ingots, wafers and cells at reduced prices in line with the decreasing selling prices of our solar modules, our revenues and margins could be adversely impacted, either due to higher manufacturing costs than our competitors or write-downs of inventory, or both. Our market share could decline if our competitors are able to offer better pricing than we are.

Government Subsidies and the Availability of Financing for Solar Projects

Over the past few years, the cost of solar energy has declined and the industry has become less dependent on government subsidies and economic incentives. However, some of our largest markets still rely on government subsidies and economic incentives. We believe that the near-term growth of the market still depends in large part on the availability and size of such government subsidies and economic incentives, and the availability and cost of financing for solar projects.

For a detailed discussion of the impact of government subsidies and incentives, possible changes in government policy and associated risks to our business, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Governments may revise, reduce or eliminate subsidies and economic incentives for solar energy, which could cause demand for our products to decline.” and “Item 4. Information on the Company—B. Business Overview—Sales, Marketing and Customers.”

For a detailed discussion of the impact of the availability and cost of debt or equity for solar power projects and our customers’ ability to finance the purchase of our products or to construct solar power projects, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—The execution of our growth strategy depends upon the continued availability of third-party financing arrangements for our customers, which is affected by general economic conditions. Tight credit markets could depress demand or prices for solar power products and services, hamper our expansion and materially affect our results of operations.”

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Industry and Seasonal Demand

Our business and revenues depend on the demand for solar power. Although solar power technology has been used for several decades, the solar power market has only started to grow significantly in the past few years. See “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—We may be adversely affected by volatile solar power market and industry conditions; in particular, the demand for our solar power products and services may decline, which may reduce our revenues and earnings.” Industry demand is affected by seasonality. Demand tends to be lower in winter, when adverse weather conditions can complicate the installation of solar power systems, thereby decreasing demand for solar modules. See “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Seasonal variations in demand linked to construction cycles and weather conditions may influence our results of operations.”

Impact of Assets Impairment

For our property, plant and equipment, investments in affiliates, and project assets, if their fair value is less than their carrying value or their carrying value cannot be recoverable, we need to record an impairment loss. We had impairment loss of \$45.7 million and \$42.1 million for our property, plant and equipment, investments in affiliates, and project assets in 2018 and 2019, respectively.

Our business development and operation involves numerous risks and uncertainties which could lead to the assets impairment. These risks and uncertainties include what have been discussed in “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—We may not continue to be successful in developing and maintaining a cost-effective solar cell, wafer and ingot manufacturing capability.” and “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Our project development and construction activities may not be successful, projects under development may not receive required permits, property rights, PPAs, interconnection and transmission arrangements, and financing or construction of projects may not commence or continue as scheduled, all of which could increase our costs, delay or cancel a project, and have a material adverse effect on our revenue and profitability.”

Solar Power Project Development and Sale and EPC and Development Services

Revenues generated from our energy segment accounted for 42.1% and 22.5% of our net revenues in 2018 and 2019, respectively. The majority of these revenues came from the sale of solar power projects and the provision of EPC and development services. We intend to monetize the majority of our current portfolio of solar power plants in operation that have an estimated resale value of approximately \$1.0 billion as of January 31, 2020. We also intend to monetize certain of our projects before they reach COD. Our revenues from the energy segment are affected by the timing of the completion and sale of solar power projects. See “Item 4. Information on the Company—B. Business Overview—Sales, Marketing and Customers—Energy Segment—Solar Project Development and Sale” for a description of the status of our solar power projects.

Solar power project development and sale and EPC and development services involve numerous risks and uncertainties. For a detailed discussion of these risks and uncertainties, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Our future success depends partly on our ability to expand the pipeline of our energy segment in several key markets, which exposes us to a number of risks and uncertainties” and “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Our project development and construction activities may not be successful, projects under development may not receive required permits, property rights, PPAs, interconnection and transmission arrangements, and financing or construction of projects may not commence or continue as scheduled, all of which could increase our costs, delay or cancel a project, and have a material adverse effect on our revenue and profitability.”

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Antidumping, Countervailing and Other Duty Costs and True-up Charges

In 2019, we booked the benefits of antidumping and countervailing duty provision reversals of \$52.3 million, primarily associated with prior years' module sales based on the updated rates arising from the administrative reviews carried out by the U.S. Department of Commerce.

We have been in the past, and may be in the future, subject to antidumping and countervailing duty rulings and orders. In particular, we have been subject to antidumping and countervailing duty rulings in the U.S., the EU and Canada and have, as a result, been party to lengthy proceedings related thereto. See "Item 8. Financial Information—A. Consolidated Statements and Other Financial Information—Legal and Administrative Proceedings." The U.S., EU and Canada are important markets for us. Ongoing proceedings relating to, and the imposition of any new, antidumping and countervailing duty rulings and orders or safeguard measures in these markets may result in additional costs to us and/or our customers.

Foreign Exchange

The majority of our sales in 2019 were denominated in U.S. dollars, Japanese yen and Euros, with the remainder in other currencies such as Renminbi, Australian dollars, Brazilian reals and South African rand. The majority of our costs and expenses in 2019 were denominated in Renminbi, primarily related to purchases of solar cells and wafers and silicon and other raw materials, toll manufacturing fees, labor costs and local overhead expenses within the PRC. From time to time, we enter into loan arrangements with commercial banks that are denominated primarily in Renminbi, U.S. dollars and Japanese yen. The majority of our cash and cash equivalents and restricted cash is denominated in Renminbi. See "Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Fluctuations in exchange rates could adversely affect our business, including our financial condition and results of operations."

Segment Reporting

We use the management approach to determine operating segments. The management approach considers the internal organization and reporting used by our chief operating decision maker for making decisions, allocating resources and assessing performance. We have identified our chief executive officer as our chief operating decision maker, since he reviews consolidated and segment results when making decisions about allocating resources and assessing performance for us.

We have operated our business in two principal reportable business segments since 2016:

- *MSS Segment*, which primarily comprises the design, development, manufacture and sale of solar power products and solar system kits. The MSS segment also provides EPC and O&M services;
- *Energy Segment*, which primarily comprises solar power project development and sale, operating solar power projects and sales of electricity.

Impact of COVID-19

The outbreak of COVID-19 posed significant challenges to many aspects of our business. Global commerce generally has been negatively affected due to travel restrictions, disruptions of global shipping and logistics systems, quarantines, and other measures taken by governments. Near-term global economic growth has also been adversely impacted. As a result, investors may have a reduced appetite for equity investment in the near term; credit markets may become unsettled in the near term; and project installation activities may see delays. In addition, lockdowns may impact the rooftop installation market. The COVID-19 situation remains fluid and we will continue to monitor it closely to assess the potential impacts.

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We are taking mitigation strategies to reduce the adverse impact of COVID-19 to our business. For our MSS segment, we closely monitor market changes; secure orders by leveraging our channel strength and brand loyalty; adjust production plans by, for example, increasing the amount of "build-to-order" production and reducing "build-to-stock" production; tightening credit controls to reduce potential bad debt losses; and accelerating R&D and product development to improve our product offerings ahead of an eventual market recovery. For our energy segment, we intend to increase NTP and COD sales; renegotiate PPA execution dates; leverage our global footprint to ensure access to project finance; start construction on critical projects to sell later; and accelerate storage projects that do not require ITC.

We expect governments around the world will adopt various stimulus policies to curb the economic downturn resulting from the response to the outbreak of COVID-19. For example, a lower interest rate environment resulting from such stimulus policies around the world may facilitate capital partnerships to fund our energy segment development.

See "Item 3. Key Information-D. Risk Factors-Risks Related to Our Company and Our Industry-We face risks related to natural disasters, health epidemics, such as COVID-19, and other catastrophes, which could significantly disrupt our operations." for further discussion.

Overview of Financial Results

We evaluate our business using a variety of key financial measures.

Net Revenues

MSS Segment

Revenues generated from our MSS segment accounted for 57.9% and 77.5% of our net revenues in 2018 and 2019, respectively. Our revenues from our MSS segment are affected primarily by average selling prices per watt and unit volumes shipped, both of which depend on product supply and demand. Our revenues from sales to customers are recorded net of estimated returns.

Energy Segment

Revenues generated from our energy segment accounted for 42.1% and 22.5% of our net revenues in 2018 and 2019, respectively. Our revenues from our energy segment are affected primarily by the timing of the completion and sale of solar power projects. See "Item 4. Information on the Company—B. Business Overview—Sales, Marketing and Customers—Energy Segment—Solar Project Development and Sale" for a description of the status of our solar power projects.

Revenue recognition for our energy segment is not necessarily linear in nature due to the timing of when all relevant revenue recognition criteria for the sale of our solar power projects have been met. During 2019, we recognized \$668.5 million of revenue from the sale of solar power projects. Our revenue recognition policies for the solar power project development are described in "—Critical Accounting Policies—Revenue Recognition."

Cost of Revenues

MSS Segment

The cost of revenues of our MSS segment consists primarily of the costs of:

- solar cells;
- silicon wafers;
- high purity and solar grade silicon materials;
- materials used in solar cell production, such as metallic pastes;

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- other materials for the production of solar modules such as glass, aluminum frames, EVA (ethylene vinyl acetate, an encapsulant used to seal the module), junction boxes and polymer back sheets;
- production labor, including salaries and benefits for manufacturing personnel;
- warranty costs;
- overhead, including utilities, production equipment maintenance, share-based compensation expenses for restricted share units and options granted to employees in our manufacturing department and other support expenses associated with the manufacture of our solar power products;
- depreciation and amortization of manufacturing equipment and facilities, which are increasing as we expand our manufacturing capabilities;
- operation and maintenance costs;
- solar project EPC services; and
- antidumping, countervailing and other duty costs and true-up charges.

Before June 2009, we typically sold our standard solar modules with a two-year guarantee for defects in materials and workmanship and a 10-year and 25-year warranty against declines of more than 10% and 20%, respectively, from the initial minimum power generation capacity at the time of delivery. In June 2009, we increased our guarantee for defects in materials and workmanship to six years. In August 2011, we increased our guarantee for defects in materials and workmanship to ten years. In 2019, we increased our guarantee for defects in materials and workmanship up to twelve years and we warrant that, for a period of 25 years, our standard polycrystalline modules will maintain the following performance levels:

- during the first year, the actual power output of the module will be no less than 97.5% of the labeled power output;
- from the second year to the 24th year, the actual annual power output decline of the module will be no more than 0.7%; and
- by the end of the 25th year, the actual power output of the module will be no less than 80.7% of the labeled power output.

We have lengthened the warranty against decline in performance for our bifacial module and double glass module products to 30 years.

In resolving claims under the workmanship guarantee, we have the option of remedying the defect through repair, refurbishment or replacement of equipment. In resolving claims under the performance warranty, we have the right to repair or replace solar modules at our option.

We believe our warranty periods are consistent with industry practice. Due to the long warranty period, we bear the risk of extensive warranty claims long after we have shipped our products and recognized revenue. See “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—We may be subject to unexpected warranty expense that may not be adequately covered by our insurance policies.”

We maintain warranty reserves to cover potential liabilities that could arise under these guarantees and warranties. We currently take a 1% warranty provision against our revenue for sales of solar power products.

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We have entered into agreements with a group of insurance companies with high credit ratings to back up our warranties. Under the terms of the insurance policies, which are designed to match the terms of our solar module product warranty policy, the insurance companies are obliged to reimburse us, subject to certain maximum claim limits and certain deductibles, for the actual product warranty costs that we incur under the terms of our solar module product warranty policy. We record the insurance premiums initially as prepaid expenses and amortize them over the respective policy period of one year. The warranty insurance is renewable annually. See “—Critical Accounting Policies—Warranty Costs.”

In 2019, we booked the benefits of antidumping and countervailing duty provision reversals of \$52.3 million, primarily associated with prior years’ module sales based on the updated rates arising from the administrative reviews carried out by the U.S. Department of Commerce.

Energy Segment

The cost of revenues of our energy segment consists primarily of the costs of:

- acquiring solar power projects;
- acquiring and developing solar project sites, including interconnection fees and permitting costs;
- solar project EPC and development services;
- interest capitalized for solar power projects during construction period;
- operating and maintaining solar power plants, including depreciation of solar power plants; and
- impairment of project assets.

For solar power projects built by us, we provide a limited workmanship or balance of system warranty against defects in engineering design, installation and construction under normal use, operation and service conditions for a period of up to ten years following the energizing of the solar power project. In resolving claims under the workmanship or balance of system warranty, we have the option of remedying through repair, refurbishment or replacement of equipment. We have entered into similar workmanship warranties with our suppliers to back up our warranties. We maintain warranty reserves to cover potential liabilities that could arise under these guarantees and warranties.

Before commissioning solar power projects, we conduct performance testing to confirm that the projects meet the operational and capacity expectations set forth in the agreements. In limited cases, we also provide for an energy generation performance test designed to demonstrate that the actual energy generation for up to the first three years meets or exceeds the modeled energy expectation (after adjusting for actual solar irradiation). In the event that the energy generation performance test performs below expectations, the appropriate party (EPC contractor or equipment provider) may incur liquidated damages capped at a percentage of the contract price.

Gross Profit/Gross Margin

Our gross profit is affected by a number of factors, including the success of and contribution from both of our operating segments, the average selling price of our solar power products, our product mix, loss on firm purchase commitments under long-term supply agreements, our ability to cost-effectively manage our supply chain, the timing of completion of construction of our solar power projects, the timing and pricing of project sales and project financing.

Operating Expenses

Our operating expenses include selling expenses, general and administrative expenses, research development expenses and other operating income, net. Our operating expenses increased in 2018, and further increased in 2019. We expect our operating expenses to increase as our net revenues grow in the future.

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Selling Expenses

Selling expenses consist primarily of salaries and benefits, transportation and customs expenses for delivery of our products, sales commissions for our sales agents, advertising, promotional and trade show expenses, and other sales and marketing expenses. Our selling expenses increased in 2018 and 2019. We expect that as we increase our sales volumes in the future, our selling expenses will increase as we hire additional sales personnel, target more markets and initiate additional marketing programs to reach our goal of continuing to be a leading global brand.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and benefits for our administrative and finance personnel, consulting and professional service fees, government and administration fees, insurance fees and impairment of long-lived assets. Our general and administrative expenses increased in 2018 and decreased in 2019.

Research and Development Expenses

Research and development expenses consist primarily of costs of raw materials used in our research and development activities, salaries and benefits for research and development personnel and prototype and equipment costs related to the design, development, testing and enhancement of our products and our silicon reclamation program. In 2018 and 2019, our research and development expenses accounted for 1.2% and 1.5%, respectively, of our total net revenues. We expect that our research and development expenses will increase as we devote more efforts to research and development in the future.

Other Operating Income, Net

Other operating income, net, primarily consists of gains or losses on disposal of solar power systems and property, plant and equipment, and government grants received.

Share-based Compensation Expenses

Under our share incentive plan, as of December 31, 2019, we had outstanding:

- 120,799 stock options; and
- 116,500 restricted shares; and
- 1,659,767 restricted share units.

For a description of the stock options, restricted share units and restricted shares granted, including the exercise prices and vesting periods, see “Item 6. Directors, Senior Management and Employees—B. Compensation of Directors and Executive Officers—Share-based Compensation—Share Incentive Plan.” We recognize share-based compensation to employees as expenses in our statement of operations based on the fair value of the equity awards on the date of the grant. The compensation expense is recognized over the period in which the recipient is required to provide services in exchange for the equity award.

We have made an estimate of expected forfeitures and recognize compensation costs only for those equity awards that we expect to vest. We estimate our forfeitures based on past employee retention rates and our expectations of future retention rates. We prospectively revise our forfeiture rates based on actual history. Our share-based compensation expenses may change based on changes in actual forfeitures.

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For the year ended December 31, 2019, we recorded share-based compensation expenses of \$10.7 million, compared to \$10.3 million for the year ended December 31, 2018. We have allocated these share-based compensation expenses to our cost of revenues, selling expenses, general and administrative expenses and research and development expenses, depending on the job functions of the individuals to whom we granted the options and restricted share units.

The following table sets forth, for the periods indicated, the allocation of our share-based compensation expenses both in absolute amounts and as a percentage of total share-based compensation expenses.

	Years Ended December 31,			
	2018	2019		
(In thousands of \$, except for percentages)				
Share-based compensation expenses included in:				
Cost of revenues	1,053	10.3%	1,196	11.2%
Selling expenses	1,370	13.4%	1,664	15.6%
General and administrative expenses	7,040	68.6%	6,991	65.4%
Research and development expenses	795	7.7%	831	7.8%
Total share-based compensation expenses	10,258	100.0%	10,682	100.0%

We expect to incur additional share-based compensation expenses as we expand our operations.

Interest Expense

Interest expense consists primarily of interest incurred with respect to our short and long-term borrowings from banks and other lenders, and the convertible senior notes issued by us in February 2014.

Gain (Loss) on Change in Fair Value of Derivatives

We have entered into foreign currency derivatives to hedge part of the risks of our expected cash flows, mainly in Renminbi, Canadian dollars, British pounds, and Japanese Yen, and interest rate swap to hedge the part of risks of floating interest rate. In 2018, we had a loss on the change in fair value of derivatives of \$19.2 million, which included an \$18.4 million loss on change in fair value of foreign currency derivatives and a \$0.8 million loss on change in fair value of interest rate swap contracts. In 2019, we had a loss on the change in fair value of derivatives of \$22.2 million, which included a \$21.3 million loss on change in fair value of foreign currency derivatives and a \$0.9 million loss in change in fair value of interest rate swap.

Income Tax Expense

We recognize deferred tax assets and liabilities for temporary differences between the financial statement and income tax bases of assets and liabilities. Valuation allowances are provided against deferred tax assets when management cannot conclude that it is more likely than not that some portion or all deferred tax assets will be realized.

We are governed by the CBCA, a federal statute of Canada and are registered to carry on business in Ontario. This subjects us to both Canadian federal and Ontario provincial corporate income taxes. Our combined tax rate was 26.5% for each of the years ended 2018 and 2019.

PRC enterprise income tax is calculated based on taxable income determined under PRC accounting principles with a uniform enterprise income tax rate of 25%. Certain of our PRC subsidiaries, such as CSI New Energy Holding and CSI Luoyang Manufacturing, once enjoyed preferential enterprise income tax rates. These benefits have, however, expired. In 2019, only Suzhou Sanysolar, CSI Cells, CSI Changshu Manufacturing, Changshu Tegu, Suzhou Gaochuangte New Energy Development, Canadian Solar Sunenergy (Suzhou) and Changshu Tlian enjoyed preferential enterprise income tax rates.

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Under the EIT Law and implementing regulations issued by the State Council, the PRC withholding tax rate of 10% is generally applicable to interest and dividends payable to investors that are not “resident enterprises” in the PRC, to the extent such interest or dividends have their sources within the PRC. We consider the undistributed earnings of our PRC subsidiaries (\$625.9 million as of December 31, 2019) to be indefinitely reinvested in China, and, consequently, we have made no provision for withholding taxes for those amounts.

Critical Accounting Policies

We prepare financial statements in accordance with U.S. GAAP, which requires us to make judgments, estimates and assumptions that affect:

- the reported amounts of our assets and liabilities;
- the disclosure of our contingent assets and liabilities at the end of each fiscal period; and
- the reported amounts of revenues and expenses during each fiscal period.

We regularly evaluate these judgments, estimates and assumptions based on our own historical experience, knowledge and assessment of current business and other conditions, our expectations regarding the future based on available information and reasonable assumptions, which together form our basis for making judgments about matters that are not readily apparent from other sources. Since the use of estimates is an integral component of the financial reporting process, our actual results could differ from those estimates. Some of our accounting policies require a higher degree of judgment than others in their application.

When reviewing our financial statements, the following should be considered:

- our selection of critical accounting policies;
- the judgment and other uncertainties affecting the application of such policies; and
- the sensitivity of reported results to changes in conditions and assumptions.

We believe the following accounting policies involve the most significant judgments and estimates used in the preparation of our financial statements.

Revenue Recognition

We recognize revenue when it satisfies a performance obligation by transferring a promised good or service to a customer.

Solar power products and materials

Solar power products, including solar modules, other solar power products, solar system kits and materials related to solar power products are transferred at a point in time when the customer obtains control of the products, which is typically upon shipment or delivery depending on the contract terms. Revenues of solar product sales also include reimbursements received from customers for shipping and handling costs. Sales agreements typically contain the assurance-type customary product warranties but do not contain any post-shipment obligations nor any return or credit provisions, see our accounting policy for warranty.

We assessed whether it is probable that we will collect substantially all of the consideration to which it will be entitled in exchange for the products that will be transferred to the customer. As of December 31, 2018 and 2019, we had inventories of \$9.0 million and \$7.7 million, respectively, relating to sales to customers where revenues were not recognized because the collection of payment was determined to be not probable. The delivered products remain as inventories on consolidated balance sheets, regardless of whether the control has been transferred. If the collection of payment becomes probable in the future, we would then recognize revenue, adjust inventories and recognize cost of revenues.

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O&M services

O&M services are transferred over time when customers receive and consume the benefits provided by our performance under the terms of service arrangements. Revenues from O&M services are recognized overtime based on the work completed to date which does not require re-performances and the costs of O&M services are expensed when incurred.

EPC and development services

We recognize revenue for sales of EPC and development services over time based on the estimated progress to completion using a cost-based input method. In applying the cost-based input method of revenue recognition, we use the actual costs incurred relative to the total estimated costs to determine our progress towards contract completion and to calculate the corresponding amount of revenue and gross profit to recognize. Cost based input method of revenue recognition is considered a faithful depiction of our efforts to satisfy EPC and development services contracts and therefore reflect the transfer of goods or services to a customer under such contracts. Costs incurred towards contract completion may include costs associated with direct materials, labor, subcontractors, and other indirect costs related to contract performance. The cost-based input method of revenue recognition requires 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 estimated total costs of any contract are greater than the estimated net revenues of the contract, 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 and costs to complete contracts, including penalties, claims, change orders, performance incentives, anticipated losses, and others are recorded in the period in which revisions to estimates are identified and the amounts can be reasonably estimated.

Solar power projects

Sales of solar power projects are recognized at a point in time when customers obtain control of solar power projects. For sales of solar power projects 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 non-controlling interest we obtained, and defer any profit associated with the interest obtained.

Electricity revenue

Electricity revenue is generated primarily by our solar power plants under long-term PPAs and performance—based energy incentives. For electricity sold under PPAs, we recognize electricity revenue based on the price stated in the PPAs when electricity has been generated and transmitted to the grid. Performance-based energy incentives are awarded under certain state programs for the delivery of renewable electricity when the conditions attached to it have been met and there is reasonable assurance that the incentives will be received. During the years ended December 31, 2018 and 2019, we recognized performance-based energy incentives of \$4.7 million and \$3.9 million, respectively, related to electricity generated and recognized in revenue.

Warranty Costs

We warrant, for a period up to twelve years, that our solar products will be free from defects in materials and workmanship.

We also warrant that, for a period of 25 years, our standard polycrystallin modules will maintain the following performance levels:

- during the first year, the actual power output of the module will be no less than 97.5% of the labeled power output;

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- from the second year to the 24th year, the actual annual power output decline of the module will be no more than 0.7%; and
- by the end of the 25th year, the actual power output of the module will be no less than 80.7% of the labeled power output.

We have lengthened the warranty against decline in performance for our bifacial module and double glass module products to 30 years.

For solar power projects built by us, we provide a limited workmanship or balance of system warranty against defects in engineering design, installation and construction under normal use, operation and service conditions for a period of up to ten years following the energizing of the solar power project. In resolving claims under the workmanship or balance of system warranty, we have the option of remedying through repair, refurbishment or replacement of equipment. We have entered into similar workmanship warranties with our suppliers to back up our warranties.

We maintain warranty reserves to cover potential liabilities that could arise under these guarantees and warranties. Due to limited warranty claims to date, we accrue the estimated costs of warranties based on an assessment of our competitors' and our own actual claim history, industry-standard accelerated testing, estimates of failure rates from our quality review, and other assumptions that we believe to be reasonable under the circumstances. Actual warranty costs are accumulated and charged against the accrued warranty liability. To the extent that accrual for warranty costs differs from the estimates, we will prospectively revise our accrual rate. We currently record a 1.0% warranty provision against our revenue for sales of solar power products.

We have entered into agreements with a group of insurance companies with high credit ratings to back up our warranties. Under the terms of the insurance policies, which are designed to match the terms of our solar module product warranty policy, the insurance companies are obliged to reimburse us, subject to certain maximum claim limits and certain deductibles, for the actual product warranty costs that we incur under the terms of our solar module product warranty policy. We record the insurance premiums initially as prepaid expenses and amortize them over the respective policy period of one year.

The warranty obligations that we record relate to defects that existed when a product was sold to the customer. The event that we are insured against under our insurance policies is the sale of a defective product. Accordingly, we view the insured loss attributable to the shipment of defective products covered under our warranty as analogous to potential claims, or claims that have been incurred as of the product shipment date, but not yet reported. We expect to recover all or part of the cost of our obligations with respect to the defective products through insurance claims. Therefore, our accounting policy is to record an asset for the amount determined to be probable of recovery from the insurance claims (not to exceed the amount of the total losses incurred), consistent with the guidance set forth at ASC 410-30.

We consider the following factors in determining whether an insurance receivable that is probable and recoverability can be reasonably estimated:

- reputation and credit rating of the insurance company; and
- comparison of the solar module product warranty policy against the terms of the insurance policies (to ensure valid warranty claims submitted by customers will be covered by the policy and therefore reimbursed by the insurance companies).

With respect to specific claims submitted, written communications with the insurance company are monitored to ensure the claim has been promptly submitted to and accepted by the insurance company, and reimbursements have been subsequently collected. The successfully processed claims provide further evidence that the insurance policies are functioning as anticipated.

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To the extent uncertainties regarding the solvency of insurance carriers or the legal sufficiency of insurance claims (including if they became subject to litigation) were to arise, we would establish a provision for uncollectible amounts based on the specific facts and circumstances. To date, no provision has been determined to be necessary. If an accrual for warranty costs differs from the estimates and we prospectively change our accrual rate, this may result in a change to the amount expected to be recovered from insurance.

As the warranty obligation and related recovery asset do not meet the criteria for offsetting, the gross amounts are reported in our consolidated balance sheets. The asset is expected to be realized over the life of the warranty obligation, which is 25 or 30 years and is treated as a non-current asset consistent with the underlying warranty obligation. When a specific claim is submitted, and the corresponding insurance proceeds will be collected within twelve months of the balance sheet date, we will reclassify that portion of the receivable as being current. The insurance receivable amounts were \$75.6 million and \$79.9 million at the end of 2018 and 2019, respectively, and were included as a component of other non-current assets.

We made downward adjustments to our accrued warranty costs of \$9.3 million and \$1.4 million and other non-current assets of \$5.6 million and \$0.8 million, for the years ended December 31, 2018 and 2019, respectively, to reflect the general declining trend of the average selling price of solar modules, which is a primary input into the estimated warranty costs. Accrued warranty costs (net effect of adjustments) of \$13.2 million and \$28.0 million are included in cost of revenues for the years ended December 31, 2018 and 2019, respectively.

Income Taxes

Deferred income taxes are recognized for temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, net tax loss carry-forwards and credits using the enacted tax rates expected to apply to taxable income in the periods in which the deferred tax liability or asset is expected to be settled or realized. Deferred tax assets are reduced by a valuation allowance when it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible for tax purposes. We have recognized a valuation allowance of \$76.5 million and \$70.6 million as of December 31, 2018 and 2019, respectively.

Current income taxes are provided for in accordance with the laws of the relevant taxing authorities.

Income tax expense includes (a) deferred tax expense, which generally represents the net change in the deferred tax asset or liability balance during the year plus any change in valuation allowances; (b) current tax expense, which represents the amount of tax currently payable to or receivable from a taxing authority; and (c) non-current tax expense, which represents the increases and decreases in amounts related to uncertain tax positions from prior periods and not settled with cash or other tax attributes. We only recognize tax benefits related to uncertain tax positions when such positions are more likely than not of being sustained upon examination. For such positions, the amount of tax benefit that we recognize is the largest amount of tax benefit that is more than fifty percent likely of being sustained upon the ultimate settlement of such uncertain tax position. We record penalties and interests associated with the uncertain tax positions as a component of income tax expense.

We use the flow-through method to account for investment tax credits earned on qualifying projects placed into service. Under this method the investment tax credits are recognized as a reduction to income tax expense in the year the credit arises. The use of the flow-through method also results in a basis difference from the recognition of a deferred tax liability and an immediate income tax expense for reduced future tax depreciation of the related assets. Such basis differences are accounted for pursuant to the income statement method.

Recently Issued Accounting Pronouncements

See note 2(aj) Recently issued accounting pronouncements in the notes to our consolidated financial statements, included herein.

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Results of Operations

The following table sets forth a summary, for the periods indicated, of our consolidated results of operations and each item expressed as a percentage of our total net revenues. Our historical results presented below are not necessarily indicative of the results that may be expected for any future period.

	For the years ended December 31,			
	2018		2019	
	(in thousands of \$, except percentages)			
Net revenues	3,744,512	100.0	3,200,583	100.0
	\$	%		%
MSS segment	2,413,889	64.5	2,582,635	80.7
		%		%
Energy segment	1,575,594	42.1	719,445	22.5
		%		%
Elimination	(244,971)	(6.6)	(101,497)	(3.2)
		%		%
Cost of revenues	2,969,430	79.3	2,482,086	77.6
		%		%
MSS segment	1,923,131	51.4	1,934,062	60.4
		%		%
Energy segment	1,302,779	34.8	635,716	19.9
		%		%
Elimination	(256,480)	(6.9)	(87,692)	(2.7)
		%		%
Gross profit	775,082	20.7	718,497	22.4
		%		%
MSS segment	490,758	13.1	648,573	20.3
		%		%
Energy segment	272,815	7.3	83,729	2.6
		%		%
Elimination	11,509	0.3	(13,805)	(0.4)
		%		%
Operating expenses:				
Selling expenses	165,402	4.4	180,326	5.6
		%		%
General and administrative expenses	245,376	6.6	242,783	7.6
		%		%
Research and development expenses	44,193	1.2	47,045	1.5
		%		%
Other operating income, net	(44,546)	(1.2)	(10,536)	(0.3)
		%		%

Total operating expenses	410,425	11.0	459,618	14.4
		%		%
Income from operations	364,657	9.7	258,879	8.1
Other income (expenses)		%		%
Interest expense	(106,032)	(2.8)	(81,326)	(2.5)
		%		%
Interest income	11,207	0.3	12,039	0.4
		%		%
Loss on change in fair value of derivatives, net	(19,230)	(0.5)	(22,218)	(0.7)
		%		%
Foreign exchange gain	6,529	0.2	10,370	0.3
		%		%
Investment income	41,361	1.1	1,929	0.1
		%		%
Other income (expenses), net	(66,165)	(1.8)	(79,206)	(2.5)
		%		%
Income before income taxes and equity in earnings of unconsolidated investees	298,492	8.0	179,673	5.6
		%		%
Income tax expense	(61,969)	(1.7)	(42,066)	(1.3)
		%		%
Equity in earnings of unconsolidated investees	5,908	0.2	28,948	0.9
		%		%
Net income	242,431	6.5	166,555	5.2
		%		%
Less: Net income (loss) attributable to non-controlling interests	5,361	0.2	(5,030)	(0.2)
		%		%
Net income attributable to Canadian Solar Inc.	237,070	6.3	171,585	5.4
		%		%

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Net Revenues. Our total net revenues decreased by \$543.9 million, or 14.5%, from \$3,744.5 million for the year ended December 31, 2018 to \$3,200.6 million for the year ended December 31, 2019. The decrease was primarily due to a decrease in revenue contribution from the sale of solar power projects and a decrease in the average selling price of our solar modules, partially offset by higher solar module shipments recognized in revenue from our MSS segment (from 5,916 MW to 7,980 MW), and increased revenue contribution from beyond-module sales. For the year ended December 31, 2019, Asia contributed 31.8%, the Americas contributed 43.8%, and Europe and others accounted for 24.4% of our net revenues. Our top five customers by revenues collectively accounted for 24.2% of our net revenues for the year ended December 31, 2019.

- *MSS Segment.* Revenues generated by our MSS segment increased by \$168.7 million, or 7.0%, from \$2,413.9 million for the year ended December 31, 2018 to \$2,582.6 million for the year ended December 31, 2019. \$330.5 million of the increased revenues was attributable to a 15.2% increase in volume of shipments of our solar modules and offset by \$352.8 million attributable to a 14.1% decline in the average selling price of our solar modules. In addition, our beyond-pure-module-sales revenues including sales of system kits, EPC services, inverters and O&M services, generated by our MSS segment increased by 115.8% year-over-year, from \$170.6 million in 2018 to \$368.1 million in 2019. We see these beyond-pure-module-sales revenues as an important item for us going forward. They accounted for 14.3% of MSS revenues in 2019, up from 7.1% in 2018. We expect them to increase in the future.

Our total solar module shipments recognized in revenue at MSS segment for the year ended December 31, 2019 were 7,980 MW, an increase of 34.9% from 5,916 MW for the year ended December 31, 2018. The increase was primarily due to an increase in sales in our key geographical regions, particularly the American markets where sales increased by 1,202 MW from 1,271 MW for the year ended December 31, 2018 to 2,473 MW for the year ended December 31, 2019, mainly as a result of higher shipments to customers in Brazil and the U.S. markets. Shipments to European markets increased by 383 MW and shipments to other regions increased by 479 MW, principally as a result of increased sales to the Australia market. Shipments to Asian markets decreased by 121 MW, from 2,973 MW for the year ended December 31, 2018 to 2,852 MW for the year ended December 31, 2019.

The average selling price of our solar modules declined from \$0.34 for the year ended December 31, 2018 to \$0.29 for the year ended December 31, 2019. The decline was primarily due to the supply of solar products exceeding demand and a change in the geographic mix of sales.

- *Energy Segment.* Revenues generated by our energy segment decreased by \$856.1 million, or 54.3%, from \$1,575.6 million for the year ended December 31, 2018 to \$719.4 million for the year ended December 31, 2019. This decrease was primarily due to a decrease of \$874.4 million in sales of solar power projects (\$418.4 million in the U.S., \$213.2 million in China, \$172.3 million in Japan, and \$64.6 million in the United Kingdom), partially offset by an increase of \$73.1 in sales of solar power projects in Mexico.

Cost of Revenues. Our total cost of revenues decreased by \$487.3 million, or 16.4%, from \$2,969.4 million for the year ended December 31, 2018 to \$2,482.1 million for the year ended December 31, 2019. The decrease was primarily due to lower solar power project sales and lower solar module manufacturing costs, partially offset by an increased solar module shipments. Total cost of revenues as a percentage of total net revenues decreased from 79.3% for the year ended December 31, 2018 to 77.6% for the year ended December 31, 2019.

- *MSS Segment.* Cost of revenues of our MSS segment increased by \$10.9 million, or 0.6%, from \$1,923.1 million for the year ended December 31, 2018 to \$1,934.1 million for the year ended December 31, 2019. The increase was primarily due to increased solar module shipments, partially offset by lower module manufacturing costs. Our module manufacturing cost in China, including purchased polysilicon, wafers and cells, decreased to \$0.19 per watt in December 2019.

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For the year ended December 31, 2019, we booked the benefits of antidumping and countervailing duty provision reversals of \$52.3 million, primarily associated with prior years' module sales based on the updated rates arising from the administrative reviews carried out by the U.S. Department of Commerce.

- Energy Segment. Cost of revenues incurred by our energy segment decreased by \$667.1 million, or 51.2%, from \$1,302.8 million for the year ended December 31, 2018 to \$635.7 million for the year ended December 31, 2019. The decrease was primarily due to lower solar power project sales.

Gross Profit.

As a result of the foregoing, our total gross profit decreased by \$56.6 million, or 7.3%, from \$775.1 million for the year ended December 31, 2018 to \$718.5 million for the year ended December 31, 2019. Our total gross margin increased from 20.7% for the year ended December 31, 2018 to 22.4% for the year ended December 31, 2019.

- MSS Segment

Gross profit for our MSS segment increased by \$157.8 million, or 32.2%, from \$490.8 million for the year ended December 31, 2018 to \$648.6 million for the year ended December 31, 2019, primarily due to a decrease in our solar module manufacturing costs, an increase in solar module shipments and an increase in beyond-pure-module-sales revenues, partially offset by a decrease in the average selling price of our solar modules. Gross margin increased from 20.3% for the year ended December 31, 2018 to 25.1% for the year ended December 31, 2019, primarily due to a decrease in our solar module manufacturing cost and increased beyond-pure-module-sales revenues which have a higher gross margin, partially offset by a decrease in the average selling price of our solar modules.

- Energy Segment

Gross profit for our energy segment decreased by \$189.1 million, or 69.3%, from \$272.8 million for the year ended December 31, 2018 to \$83.7 million for the year ended December 31, 2019, primarily due to a decrease in sales of solar power projects. Gross margin decreased from 17.3% for the year ended December 31, 2018 to 11.6% for the year ended December 31, 2019, primarily due to a higher proportion of sales of low margin solar power projects in 2019.

Operating Expenses.

Our operating expenses increased by \$49.2 million, or 12.0%, from \$410.4 million for the year ended December 31, 2018 to \$459.6 million for the year ended December 31, 2019. Operating expenses as a percentage of our total net revenues increased from 11.0% for the year ended December 31, 2018 to 14.4% for the year ended December 31, 2019.

Selling Expenses.

Our selling expenses increased by \$14.9 million, or 9.0%, from \$165.4 million for the year ended December 31, 2018 to \$180.3 million for the year ended December 31, 2019. The increase was primarily due to increase of \$18.2 million in shipping and handling expenses which was in line with increase in our module shipments and \$1.2 million in labor cost, partially offset by a decrease of \$2.4 million in various professional fees and \$1.9 million decrease in external sales commission. Selling expenses as a percentage of our net total revenues increased from 4.4% for the year ended December 31, 2018 to 5.6% for the year ended December 31, 2019.

General and Administrative Expenses.

Our general and administrative expenses decreased by \$2.6 million, or 1.1%, from \$245.4 million for the year ended December 31, 2018 to \$242.8 million for the year ended December 31, 2019. The decrease was primarily due to a decrease of \$9.7 million in impairment charge related to certain manufacturing assets, \$2.2 million in labor cost and \$1.6 million in bad debt provision, partially offset by an increase of \$6 million settlement expense with one customer in U.S. and a reversal of \$4.5 million in other payables in 2018. General and administrative expenses as a percentage of our total net revenues increased from 6.6% for the year ended December 31, 2018 to 7.6% for the year ended December 31, 2019.

Research and Development Expenses.

Our research and development expenses increased by \$2.9 million, or 6.5%, from \$44.2 million for the year ended December 31, 2018 to \$47.0 million for the year ended December 31, 2019. Research and development expenses as a percentage of our total net revenues were 1.2% for the year ended December 31, 2018 and 1.5% for the year ended December 31, 2019.

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Other Operating Income, Net.

Our other operating income, net, decreased by \$34.0 million, or 76.3%, from \$44.5 million for the year ended December 31, 2018 to \$10.5 million for the year ended December 31, 2019. The decrease was primarily due to a decrease of \$34.4 million of net gain on disposal of solar power system, a decrease of \$0.9 million in government grants, as well as an increase of \$1.4 million of net loss on disposal of property, plant and equipment.

Income from Operations.

As a result of the foregoing, income from operations decreased by \$105.8 million, or 29.0%, from \$364.7 million for the year ended December 31, 2018 to \$258.9 million for the year ended December 31, 2019.

Interest Expense, Net.

Our interest expense, net, decreased by \$25.5 million, or 26.9%, from \$94.8 million for the year ended December 31, 2018 to \$69.3 million for the year ended December 31, 2019. Interest expense decreased by \$24.7 million, or 23.3%, from \$106.0 million for the year ended December 31, 2018 to \$81.3 million for the year ended December 31, 2019. The decrease was primarily due to repayment of debt with relatively higher interest rates and significant decrease of borrowings in the fourth quarter of 2018. Interest income slightly increased by \$0.8 million, or 7.4%, from \$11.2 million for the year ended December 31, 2018 to \$12.0 million for the year ended December 31, 2019.

Loss on Change in Fair Value of Derivatives, Net.

We recorded a loss of \$22.2 million on change in fair value of derivatives for the year ended December 31, 2019, compared to a loss of \$19.2 million for the year ended December 31, 2018. The loss recorded for the year ended December 31, 2019 was due to a loss of \$21.3 million on change in fair value of foreign currency derivatives and a loss of \$0.9 million on change in fair value of interest rate swap. The loss on change in fair value of foreign currency derivatives for the year ended December 31, 2019 was attributable to a loss on foreign currency forward and option contracts that we purchased to hedge part of the fluctuation of exchange rates for a variety of foreign currencies.

Foreign Exchange Gain/(Loss).

We recorded a foreign exchange gain of \$10.4 million for the year ended December 31, 2019, compared to a foreign exchange gain of \$6.5 million for the year ended December 31, 2018. The gain for the year ended December 31, 2019 was primarily due to the depreciation of Renminbi against the U.S. dollars, partially offset by appreciation of Canadian dollars and Thailand baht against U.S. dollars and depreciation of Euros against U.S. dollars.

Investment Income.

We recorded investment income of \$1.9 million for the year ended December 31, 2019, compared to investment income of \$41.4 million for the year ended December 31, 2018. We recorded investment income of \$40.4 million from the sale of non-controlling interests in the Tranquillity and Garland projects in the U.S. and the Pirapora project portfolio in Brazil in 2018. We did not have similar transactions in 2019.

Income Tax Expense.

We recorded an income tax expense of \$42.1 million for the year ended December 31, 2019, compared to an income tax expense of \$62.0 million for the year ended December 31, 2018. The decrease of \$19.9 million was primarily due to a decrease in the income before tax for the year ended December 31, 2019. Our effective tax rate, or ETR, was 20.2% in 2019.

Equity in Earnings of Unconsolidated Investees.

Our share of the earnings of unconsolidated investees was a net gain of \$28.9 million for the year ended December 31, 2019, compared to a net gain of \$5.9 million for the year ended December 31, 2018. The increase was primarily due to recognition of \$23.3 million share of the equity income of the Roserock project in which we have 49% equity interest.

Net Income/(Loss) Attributable to Non-Controlling Interest.

The net income (loss) attributable to non-controlling interest is the share of net income (loss) attributable to the interests of non-controlling shareholders in certain of our subsidiaries in China, Indonesia and Australia.

Net Income Attributable to Canadian Solar Inc.

As a result of the foregoing, we recorded net income of \$171.6 million for the year ended December 31, 2019, which was a decrease of \$65.5 million, or 27.6%, compared to our net income of \$237.1 million for the year ended December 31, 2018.

B. Liquidity and Capital Resources

Cash Flows and Working Capital

We are required to make prepayments to some suppliers, primarily suppliers of machinery, silicon raw materials, solar ingots, wafers and cells. Even though we require some customers to make partial prepayments, there is typically a lag between the time we make our prepayments for silicon raw materials and the time our customers make their prepayments.

Our energy segment required significant working capital and capital expenditure financing in 2019 and is expected to continue to do so in the future. The time cycles of our solar power project development and operation can vary substantially and take many years. As a result, we may need to make significant up-front investments of resources before the collection of any cash from the sale or operation of these projects. These investments include payment of interconnection and other deposits, posting of letters of credit, and incurring engineering, permitting, legal and other expenses. We may have to use part of our existing bank facilities to finance the construction of these solar power projects. Depending on the size and number of solar power projects that we are developing and self-financing, our liquidity requirements could be significant. Delays in constructing or completing the sale of any of our solar power projects which we are self-financing could also impact our liquidity.

In 2019, we financed our operations primarily through short-term and long-term borrowings. As of December 31, 2019, we had \$668.8 million in cash and cash equivalents and \$536.7 million in restricted cash. Our cash and cash equivalents consist primarily of cash on hand, bank balances and demand deposits, which are unrestricted as to withdrawal and use, and have original maturities of three months or less. In 2019, our restricted cash was mainly used as collateral to secure bank acceptances and borrowings.

As of March 31, 2020, we had contractual credit facilities with an aggregate limit of approximately \$2,331.5 million. In addition, we had uncommitted credit facilities of approximately \$545.5 million.

As of March 31, 2020, we had approximately \$665.8 million of long-term borrowings, of which \$555.4 million was secured by restricted cash, equity, accounts receivable, inventories, project assets and property, plant and equipment; and \$910.3 million of short-term borrowings, of which \$691.2 million was secured by restricted cash, equity, accounts receivable, inventories, project assets, land use right, and property, plant and equipment; and \$183.1 million of long-term borrowings on project assets-current, which was fully secured by project assets.

The long-term borrowings will mature during the period from the second quarter of 2021 to the first quarter of 2040 and bear interest ranging from 1.09% to 7.78% per annum.

The long-term borrowings on project assets - current have maturity dates ranging from the third quarter of 2030 to the fourth quarter of 2037, which are reclassified as current liabilities because these borrowings are associated with certain solar power projects that are expected to be sold in 2020, and bear interest ranging from 1.05% to 10.50% per annum.

The short-term borrowings will mature during the period from the second quarter of 2020 to the first quarter of 2021 and bear interest ranging from nil to 7.50% per annum. The credit facilities contain no specific extension terms but, historically, we have been able to obtain new short-term borrowings with similar terms shortly before they mature.

In January 2016, we signed a \$60.0 million loan facility agreement with International Finance Corporation, or IFC, a member of World Bank Group to fund the construction of our solar cell and module production facilities in Vietnam and other countries approved by IFC. The loan facility expires in June 2020. On the same day, we signed a subscription agreement with IFC pursuant to which IFC agreed to subscribe for 529,661 of our common shares at \$18.88 per share. The subscription was completed in February 2016 and the net proceeds of approximately \$10.0 million have been used for the construction, operation and general corporate purpose of our solar cell and module production facilities in countries approved by IFC. The facility has been fully drawn and the outstanding balance as of March 31, 2020 was \$17.5 million.

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In 2016, we entered into a financing agreement with the Export Development Canada, or EDC, pursuant to which EDC agreed to provide bank guarantees or letters of credit of up to \$100 million to support our global project development. Royal Bank of Canada and Toronto Branch of China Construction Bank Corporation serve as fronting banks for the facility. In September 2018, we renewed the agreement with EDC and increased the facility amount to \$125 million with a more focused support for project development activities in North America, Latin America, Europe, Asia and Australia. In September 2019, Credit Agricole Corporate and Investment Bank (Canada Branch) agreed to join as one of the fronting banks of EDC guarantee and to offer an uncommitted line of credit not exceeding \$15 million for general corporate purposes.

In 2016, we obtained a syndicated three-year loan facility of JPY9.6 billion (\$85.2 million) with Sumitomo Mitsui Banking Corporation, or SMBC, acting as the lead arranger and 13 other participating financial institutions. In September 2018, the facility agreement was renewed and extended to JPY10.7 billion (\$97.5 million) with 10 participating financial institutions led by SMBC. In February 2020, the facility agreement was renewed to JPY11.0 billion (\$101.2 million). The facility is unsecured and loan proceeds may be used to develop our solar project pipeline in Japan and for general corporate working capital purposes.

In December 2016, we secured senior and subordinate non-recourse term loan facilities of JPY14.9 billion (\$132.2 million) to finance the construction and operation of a 55 MWp solar power plant in the Yamaguchi prefecture, Japan. The facilities were arranged by Hanwha Asset Management and have a maturity of 17 years. The project reached COD in May 2018. In February 2020, we completed the sale of project to Hana Financial Investment, a subsidiary of Hana Financial Group, and the loan was assumed by the buyer.

In January 2017, we obtained a five-year syndicated credit facility of \$210 million with the Siam Commercial Bank Public Company Limited, or SCB, acting as the lead arranger and China Minsheng Banking Corporation Ltd, as one of the lenders. As of March 31, 2020, \$122.9 million of the facility has been used to finance the construction of our solar cell and module manufacturing facilities in Thailand. Under the same facility agreement, we obtained a working capital facility of THB3.54 billion (\$119.0 million) from SCB to support the operations of our manufacturing company in Thailand and \$61.0 million was drawn as of March 31, 2020.

In March 2017, we entered into a three-year credit agreement of JPY4.0 billion (\$35.5 million) with Sumitomo Mitsui Finance and Leasing Company, Limited, or SMFL, a member of Sumitomo Mitsui Financial Group. The facility received commitments from five finance leasing institutions. In April 2019, we renewed the agreement with a syndicate of four finance leasing institutions led by SMFL and expanded the facility to JPY5.35 billion (\$48.0 million). In September 2019, we further expanded the facility to JPY6.85 billion (\$63.0 million) and the facility will mature in March 2022. As of March 31, 2020, JPY4.4 billion (\$40.7 million) was utilized in the development of our solar power projects in Japan.

In April 2017, we completed our second non-recourse project bond placement of JPY5.4 billion (\$47.9 million) with Goldman Sachs Japan Co., Ltd. to finance the construction of the 19.05 MWp Gunma Aramaki solar power project in Japan. The project bond has a dual-tenor maturity of 1.5 years and 20.3 years, representing the initial and extended tenor respectively, within a single-tranche of bond. The bond pays a fixed coupon of 1.2875% per annum during the initial tenor and, if extended at our option, 1.3588% per annum thereafter. The project reached COD in December 2017.

In May 2017, we secured a five-year non-recourse project financing of AUD65 million (\$50.8 million) with Bank of Tokyo-Mitsubishi UFJ, Ltd. and Clean Energy Finance Corporation for two solar farm power projects, the 17 MW Longreach project and the 30 MW Oakey 1 project, both in Queensland, Australia. In October 2017, we entered into a binding contract with Foresight Solar Fund Limited, or Foresight, pursuant to which Foresight agreed to acquire 49% interests in Longreach and Oakey. The sale of 49% interests was completed in the first quarter of 2018 and we have an option and intend to sell the remaining 51% interests to Foresight within three years after project COD. The Longreach project and the Oakey 1 project reached COD in November 2019 and February 2020, respectively.

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In March 2018, we secured a non-recourse 18.5 year term facility of JPY16 billion (\$142.0 million) from Shinsei Bank, Limited to finance the construction of our 53.4 MWp Oita Hijimachi solar power project in Japan. The project reached COD in October 2019.

In December 2018, we secured a non-recourse project financing of \$50 million for our 100.1 MWp solar power project in Cafayate, Salta Province, Argentina. The financing package, arranged by CAF—Development Bank of Latin America, consists of CAF A-loan of \$30 million with a 15-year tenor, a parallel loan of \$15 million from the Argentinian Development Bank of Investment and Foreign Trade with a 15-year tenor, and another parallel loan of \$5 million from the Bank of the City of Buenos Aires (Banco de la Ciudad) with a 10-year tenor. The project reached COD in the third quarter of 2019 and \$1 million was drawn as of March 31, 2020.

In January 2019, we secured a 295 million Brazilian reais (\$76.0 million) financing from Banco do Nordeste S.A. or BNB, for the 112 MWp Salgueiro solar power project in the northeast state of Pernambuco, Brazil. The financing package provides comprehensive limited-recourse construction and non-recourse operations debt funding over a 20-year tenor based on the concessionary Constitutional Funds Interest Rate (TFC) in Brazil. In August 2019, we closed the sale of 80% interests in a 482.6 MWp portfolio of solar power projects in Brazil, including Salgueiro project, Francisco Sa project and Jaiba project and Lavras project, to Nebras Power Investment B.V., a Dutch affiliate of Nebras Q.P.S.C. As of March 31, 2020, we secured project financing and PPAs for all portfolio projects, which has commenced construction or will commence construction in the second quarter of 2020.

In April 2019, we secured a \$50 million letter of credit facility from a multinational financial services firm, Natixis Bank, to support the development of our utility-scale solar projects across the U.S. and Canada. The facility size may be increased with participation from other banking partners that are commitment to the North American renewable energy market.

In May 2019, we secured a \$50 million term loan from Credit Suisse AG, Singapore Branch, one of the world's leading financial services providers, to support the development of international solar project pipeline and for general corporate purposes. In March 2020, we expanded the facility to \$80 million. The term loan is expected to mature in April 2021.

In March 2020, we secured a bilateral Revolving Facility of Euro55.0 million (\$61.7 million) with Intesa Sanpaolo to fund a 151 MWp portfolio of 12 solar projects in Italy, located across different municipalities in Sicily, Apulia and Lazio. The first project is expected to commence construction in the third quarter of 2020.

We often offer credit terms to our customers ranging from 30 days up to 90 days with small advance payments ranging from 5% to 20% of the sale prices. The prepayments are recorded as current liabilities under advances from customers, and amounted to \$39.0 million and \$134.8 million as of December 31, 2018 and 2019, respectively. As the market demand for our products has changed and as we have diversified our geographical markets, we have increased and may continue to increase our credit term sales to certain creditworthy customers after careful review of their credit standings and acceptance of export credit insurance by Sinasure, or other risk mitigation channels such as local credit insurance or factoring.

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The following table sets forth a summary of our cash flows for the periods indicated:

	<u>As of December 31,</u>	
	<u>2018</u>	<u>2019</u>
	<u>(in thousands of \$)</u>	
Net cash provided by operating activities	216,280	600,111
Net cash provided by (used in) investing activities	29,071	(294,102)
Net cash used in financing activities	(463,613)	(34,614)
Net increase (decrease) in cash, cash equivalents and restricted cash	(256,987)	264,430
Less: net decrease in cash and cash equivalents classified within assets held-for-sale	(7,843)	—
Cash, cash equivalents and restricted cash at the beginning of the year	1,190,134	940,990
Cash, cash equivalents and restricted cash at the end of the year	940,990	1,205,420

Operating Activities

Net cash provided by operating activities was \$600.1 million in 2019, compared to net cash provided by operating activities of \$216.3 million in 2018. The improved operating cash flow in 2019 was primarily due to our enhanced working capital management with respect to accounts receivable and accounts payable, as well as increase in advance payments received from module customers, partially offset by increase in inventories.

Investing Activities

Net cash used in investing activities was \$294.1 million in 2019, compared to net cash provided by investing activities of \$29.1 million in 2018. The change was primarily due to \$336.1 million decrease in proceeds from disposal of investment in affiliates (i.e., our 49% shareholding in Tranquillity and Garland projects) and \$17.7 million decrease in proceeds from disposal of solar power systems during 2019, partially offset by a decrease in payments of \$25.1 million for purchase of property, plant and equipment.

Financing Activities

Net cash used in financing activities was \$34.6 million in 2019, compared to net cash used in financing activities of \$463.6 million in 2018. The change was primarily due to \$555.5 million net decrease in borrowings along with projects sold in 2018, partially offset by \$127.5 million payments to repurchase of convertible notes in 2019.

As of December 31, 2019, we had total outstanding credit facilities of \$2,838.3 million, of which \$728.8 million were undrawn and available. We believe that our current cash and cash equivalents, anticipated cash flow from operations and existing banking facilities will be sufficient to meet our anticipated cash needs, including our cash needs for working capital and capital expenditures, for the 12 months ending December 31, 2020. We may, however, require additional cash due to changing business conditions or other future developments, including any investments or acquisitions we may decide to pursue.

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As of December 31, 2019, we had outstanding short-term borrowings of \$754.6 million with Chinese banks. Between January 1, 2020 and March 31, 2020, we obtained new borrowings of \$248.2 million from Chinese banks, including \$91.4 million with due dates beyond December 31, 2020. Also, between January 1, 2020 and March 31, 2020, we renewed existing bank facilities of \$400.4 million from Chinese banks with due dates beyond December 31, 2020. The availability of commercial loans from Chinese commercial banks may be affected by administrative policies of the PRC government, which in turn may affect our plans for business expansion. If our existing cash or the availability of commercial bank borrowings is insufficient to meet our requirements, we may seek to sell additional equity securities or debt securities or borrow from other sources. We cannot assure that financing will be available in the amounts we need or on terms acceptable to us, if at all. The issuance of additional equity securities, including convertible debt securities, would dilute the holdings of our shareholders. The incurrence of debt would divert cash for working capital and capital expenditures to service debt obligations and could result in operating and financial covenants that restrict our operations and our ability to pay dividends to our shareholders. If we are unable to obtain additional equity or debt financing as required, our business operations and prospects may suffer.

Capital Expenditures

We made capital expenditures of \$316.3 million and \$291.2 million in 2018 and 2019, respectively. Our capital expenditures were primarily to maintain and increase our ingot, wafer, cell and module manufacturing capacity and to develop solar power systems. As of December 31, 2019, our commitments for the purchase of property, plant and equipment were \$12.0 million.

Restricted Net Assets

Our PRC subsidiaries are required under PRC laws and regulations to make appropriations from net income as determined under accounting principles generally accepted in the PRC, or PRC GAAP, to non-distributable reserves, which include a general reserve, staff welfare and bonus reserve. The general reserve is required to be made at not less than 10% of the profit after tax as determined under PRC GAAP. The boards of directors of our PRC subsidiaries determine the staff welfare and bonus reserves. The general reserves are used to offset future extraordinary losses. Our PRC subsidiaries may, upon a resolution of their boards of directors, convert their general reserves into capital. The staff welfare and bonus reserves are used for the collective welfare of the employees of the PRC subsidiaries. In addition to their general reserves, our PRC subsidiaries are required to obtain approval from the local government authorities prior to decreasing and distributing any registered share capital to their shareholders. Accordingly, both the appropriations to general reserve and the registered share capital of our PRC subsidiaries are considered as restricted net assets. These restricted net assets amounted to \$486.6 million and \$497.2 million as of December 31, 2018 and 2019, respectively.

Our operations in China are subject to certain restrictions on the transfer and use of cash within our company. Transfers of cash between our PRC subsidiaries and the Canadian parent company are restricted to normal trade business payments and any further capital contribution from the Canadian parent company may only be made under China's existing foreign currency regulations. Foreign exchange transactions by our PRC subsidiaries under most capital accounts continue to be subject to significant foreign exchange controls and require the approval of or registration with PRC governmental authorities. In particular, if we finance our PRC subsidiaries by means of additional capital contributions, certain government authorities, including the Ministry of Commerce or its local counterparts, must approve these capital contributions. These limitations could affect the ability of our Chinese subsidiaries to obtain foreign exchange through equity financing.

As of December 31, 2019, \$625.9 million of undistributed earnings in our PRC subsidiaries are considered to be indefinitely reinvested so that no provision of withholding taxes has been provided in our consolidated financial statements. Our PRC subsidiaries are required to make appropriations of at least 10% of net income, as determined under PRC GAAP, to a non-distributable general reserve. After making this appropriation, the balance of the undistributed earnings is distributable. Should our PRC subsidiaries subsequently distribute their distributable earnings, they are subject to applicable withholding taxes to the PRC State Administration of Tax.

C. Research and Development

We have four research and development centers with state-of-the-art equipment: the Center for Solar Cell Research, the Center for Module Development, the Center for System Product and the Center for Photovoltaic Testing and Reliability Analysis. The Center for Solar Cell Research is focused on developing new high efficiency solar cells and advanced solar cell processing technologies. The Center for Module Development is focused on module innovations, developing new module designs for different markets and application. The Center for System Product aims to develop high quality and low cost off-grid products like total kits, energy storage system, as well as smart grid. It also provides system performance evaluation and LCOE benchmarking. The Center for Photovoltaic Testing and Reliability Analysis has been accredited and operating according to ISO/IEC17025 standard since 2009 and is focused on solar module and module components reliability testing and qualification, and solar module performance analysis. It actively participates in and contributes to IEC standard development on solar modules, such as IEC 62804 test method on PID and has been qualified by VDE, CSA, Intertek and TUV Rheinland in their Test Data Acceptance Programs.

As of December 31, 2019, we had approximately 515 employees engaged in research, product development and engineering.

Our research and development activities are generally focused on the following areas:

- developing novel multi crystalline casting and CZ mono pulling technologies to improve the ingot quality with reduced cost;
- continuously improving solar cell conversion efficiency and developing new structures and technologies for higher efficiencies;
- developing modules with improved design and assembly methods to have higher power output;
- improving manufacturing yield and reliability of solar modules and reducing manufacturing costs;
- developing smart modules integrated with optimizer or micro-inverters;
- testing, data tracing and analysis for module performance and reliability;
- designing and developing customized solar modules and products to meet customer requirements; and
- developing new methods and equipment for analysis and quality control of incoming materials (such as polysilicon, wafers, cells and other module components).

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Going forward, we will focus on the following research and development initiatives which we believe will enhance our competitiveness:

- *High efficiency cells.*

Our R&D efforts enabled us to upgrade all of its solar cell production capacity to PERC (passivated emitter and rear cell) technology by the end of August, 2019. Relative to the older aluminum BSF (Back Surface Field) cell technology, PERC improved the power conversion efficiency by more than one percentage point for all three main cell products, namely P4 (multi PERC), P5 (PERC with casted mono) and Mono PERC. We have completed commercializing our in-house developed black silicon technology on multi wafers. This self-developed wet chemical texturing is a unique, IP-protected and cost-effective technology and significantly increases solar cell efficiency due to advanced light absorption and surface passivation. All of the P4 and P5 production capacity is equipped with our black silicon technology. We also developed advanced LID (Light Induced Degradation) and LeTID (Light and elevated Temperature Induced Degradation) mitigation technologies which enhanced our cell and module performances and stability. We have focused our research and development initiatives on N-type PASSCon cell, heterojunction (HJT) cell, and other technologies such as Perovskite. Within a span of nine months in 2019, we set three world records on the conversion efficiency of large area multi-crystalline solar cells. The first two records, 22.28% in April and 22.80% in September, were P5 PERC cells while the third record, 23.81% in December, was n-type P5 PASSCon cells. With these advanced technologies, we can significantly lower the LCOE on the system level and improve our products' market competitiveness.
- *Solar module manufacturing technologies.*

The continuous efforts from the two R&D centers, Module Development and Photovoltaic Testing and Reliability Analysis, have moved us to the forefront of module technology innovation. Since the opening of our Center of Photovoltaic Testing and Reliability Analysis, we have focused on developing state-of-the-art testing and diagnostic techniques which can improve solar module production yield, efficiency and reliability. We were the first to convert all our production lines to five bus-bar cells and modules. We were also the first to develop and mass-produce multi bus-bar (9BB) half-cut (Ku) modules in GW-scale which were later widely adopted by other manufacturers. We were among the first to mass-produce bifacial modules with significant reduction in LCOE. We also pioneered the introduction and volume production of cells and modules using 166mm wafers, which enabled us to surpass 400 watts with our P4 HiKu and BiHiKu. We have developed new technologies for PID-resistant and PID/LeTID mitigated modules, which have received certification from the TUV SUD and the VDE testing and certification institutes. Our BiKu, HiKu, BiHiKu, HiDM and other module technologies have improved the output power and module efficiency, and more importantly, improved energy yield, system performance and reliability.
- *Power system integration and solar application products.*

We have begun to explore power system integration products and have expanded our research and development efforts in solar application products and commercial sales of such products.
- *Solar power system development, energy storage system, off-grid power system, micro grid system and smart grid system.*

As we continue to move into the downstream energy segment, we have strengthened the capabilities of our engineering staff and increased investment in these areas.

D. Trend Information

Other than as disclosed elsewhere in this annual report on Form 20-F, we are not aware of any trends, uncertainties, demands, commitments or events that are reasonably likely to have a material adverse effect on our net revenues, income, profitability, liquidity or capital resources, or that caused the disclosed financial information to be not necessarily indicative of future operating results or financial conditions.

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E. Off Balance Sheet Arrangements

We have not entered into any derivative contracts that are indexed to our shares and classified as shareholder's equity, or that are not reflected in our consolidated financial statements. Furthermore, we do not have any retained or contingent interest in assets transferred to an unconsolidated entity that serves as credit, liquidity or market risk support to such entity. We do not have any variable interest in any unconsolidated entity that provides financing, liquidity, market risk or credit support to us or that engages in leasing, hedging or research and development services with us.

F. Tabular Disclosure of Contractual Obligations

Contractual Obligations and Commercial Commitments

The following table sets forth our contractual obligations and commercial commitments as of December 31, 2019:

	Payment Due by Period				
	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
	(In thousands of \$)				
Short-term debt obligations	1,219,293	1,219,293	—	—	—
Interest related to short-term debt obligations ⁽¹⁾	22,316	22,316	—	—	—
Operating lease obligations	40,911	18,143	17,646	3,618	1,504
Financing lease obligations	41,130	27,439	13,691	—	—
Purchase obligations ⁽²⁾	12,800	9,600	3,200	—	—
Long-term debt obligations ⁽³⁾	619,477	—	522,602	55,837	41,038
Interest related to long-term debt obligations ⁽⁴⁾	79,982	28,395	39,248	5,155	7,184
Financing liability	76,575	—	22,935	53,640	—
Interest related to financing liability	20,919	4,844	9,483	6,592	—
Total	2,133,403	1,330,030	628,805	124,842	49,726

(1) Interest rates range from 0% to 10.5% per annum for short-term debt obligations.

(2) Includes commitments to purchase property, plant and equipment of \$12.0 million, and service for solar power system of \$0.8 million.

(3) The maturity dates of long-term debt obligations are based on our estimate timing of the monetization of related projects.

(4) Interest rates range from 0.95% to 7.78% per annum for long-term debt obligations.

The above table excludes accrued warranty costs of \$55.9 million, liability for uncertain tax positions of \$15.4 million, deferred tax liabilities—non-current of \$56.5 million and loss contingency accruals of \$28.5 million as we are unable to reasonably estimate the timing of future payments of these liabilities. Other long-term liabilities of \$62.3 million were also excluded in the above table. For additional information, see the notes to our consolidated financial statements, included herein.



G. Safe Harbor

This annual report on Form 20-F contains forward-looking statements that relate to future events, including our future operating results, our prospects and our future financial performance and condition, results of operations, business strategy and financial needs, all of which are largely based on our current expectations and projections. These statements are made under the “safe harbor” provisions of the U.S. Private Securities Litigation Reform Act of 1995. You can identify these forward-looking statements by terminology such as “may,” “will,” “expect,” “anticipate,” “future,” “intend,” “plan,” “believe,” “estimate,” “is/are likely to” or similar expressions. Forward-looking statements involve inherent risks and uncertainties. These forward-looking statements include, among other things, statements relating to:

- our expectations regarding the worldwide supply and demand for solar power products and the market demand for our products;
- our beliefs regarding the importance of environmentally friendly power generation;
- our beliefs regarding the value of and ability to monetize our portfolio of solar power projects;
- our expectations regarding governmental support for solar power;
- our beliefs regarding the fluctuation in availability of silicon, solar wafers and solar cells;
- our beliefs regarding our ability to resolve our disputes with suppliers with respect to our long-term supply agreements;
- our beliefs regarding the continued growth of the solar power industry;
- our beliefs regarding the competitiveness of our solar module products;
- our expectations with respect to increased revenue growth and improved profitability;
- our expectations regarding the benefits to be derived from our supply chain management and vertical integration manufacturing strategy;
- our ability to continue developing our in-house solar components production capabilities and our expectations regarding the timing and production capacity of our internal manufacturing programs;
- our ability to secure adequate silicon and solar cells to support our solar module production;
- our beliefs regarding the effects of environmental regulation;
- our beliefs regarding the changing competitive landscape in the solar power industry;
- our future business development, results of operations and financial condition;
- competition from other manufacturers of solar power products and conventional energy suppliers;
- our ability to expand our products and services and to successfully execute plans for our energy segment;
- our ability to develop, build and sell solar power projects in Canada, the U.S., Japan, China, Brazil, Mexico, the United Kingdom, Australia and elsewhere; and
- our beliefs with respect to the outcome of the investigations and litigation to which we are a party.

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Known and unknown risks, uncertainties and other factors may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by forward-looking statements. See “Item 3. Key Information—D. Risk Factors” for a discussion of some risk factors that may affect our business and results of operations. These risks are not exhaustive. Other sections of this annual report may include additional factors that could adversely influence our business and financial performance. Moreover, because we operate in an emerging and evolving industry, new risk factors may emerge from time to time. We cannot predict all risk factors, nor can we assess the impact of these factors on our business or the extent to which any factor, or combination of factors, may cause actual result to differ materially from those expressed or implied in any forward-looking statement. We do not undertake any obligation to update or revise the forward-looking statements except as required under applicable law.

ITEM 6. DIRECTORS, SENIOR MANAGEMENT AND EMPLOYEES

A. Directors and Senior Management

The following table sets forth information regarding our directors, strategic advisor and executive officers as of the date of this annual report on Form 20-F.

<u>Name</u>	<u>Age</u>	<u>Position/Title</u>
Shawn (Xiaohua) Qu	56	Chairman of the Board, President and Chief Executive Officer
Robert McDermott	78	Lead Independent Director
Harry E. Ruda	61	Independent Director
Andrew (Luen Cheung) Wong	62	Independent Director
Arthur (Lap Tat) Wong	60	Independent Director
Lauren C. Templeton	44	Independent Director
Karl E. Olsoni	62	Strategic Advisor
Yan Zhuang	56	Acting Chief Executive Officer, Senior Vice President, Chief Commercial Officer and President of Modules and Systems Solutions Business
Huifeng Chang	54	Senior Vice President and Chief Financial Officer
Guangchun Zhang	62	Senior Vice President and Chief Operations Officer
Jianyi Zhang	62	Senior Vice President, General Counsel and Chief Compliance Officer
Guoqiang Xing	56	Senior Vice President and Chief Technology Officer

Directors

Dr. Shawn (Xiaohua) Qu has served as our chairman, president and chief executive officer since founding our company in October 2001. Through his leadership, we became a public listed company on the Nasdaq in 2006 and have since firmly established ourselves among the top ranked manufacturers of solar PV products globally. Prior to founding Canadian Solar, Dr. Shawn Qu held various positions in product engineering, business development and strategic planning at ATS Automation Tooling Systems, Inc., or ATS, and its solar subsidiary Photowatt International S.A. Prior to ATS, Dr. Shawn Qu was a research scientist at Ontario Power Generation where he worked as a process leader in its solar product commercialization team. In 2011, Dr. Shawn Qu became a visiting professor at Tsinghua University, one of the most prestigious universities in China. Dr. Shawn Qu has published research articles in academic journals including IEEE Quantum Electronics, Applied Physics Letter and Physical Review. He received a Ph.D. in material sciences in 1995 from the University of Toronto, focusing on semiconductor super lattice and optical effects. He also holds a Master of Science in physics from University of Manitoba and a Bachelor of Science in applied physics from Tsinghua University in Beijing.

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Mr. Robert McDermott has served as lead independent director of our company since August 2006. Mr. McDermott is a corporate director and consultant. Before July 2011, he was a partner with McMillan LLP, a business law firm based in Canada, where he practiced business law, with an emphasis on mergers and acquisitions, securities and corporate finance, and advised boards and special committees of public companies on corporate governance matters. Mr. McDermott was admitted to the Ontario Bar in Canada in 1968. He has a Juris Doctor degree from the University of Toronto in 1966 and a Bachelor of Arts degree from the University of Western Ontario in 1963.

Dr. Harry E. Ruda has served as an independent director of our company since July 2011. He is the Director of the Centre for Advanced Nanotechnology, the Stanley Meek Chair in Nanotechnology and Professor of Applied Science and Engineering at the University of Toronto, Canada. From 1982 to 1984, he developed one of the first theories for electron transport in selectively doped two-dimensional electron gas heterostructures, while working as an IBM post-doctoral fellow. From 1984 to 1989, he was a senior scientist at 3M Corporation, developing some of the first models for electronic transport and optical properties of wide bandgap II-VI semiconductors. Dr. Ruda joined the faculty of the University of Toronto in 1989 in the Materials Science and Engineering and Electrical and Computer Engineering Departments. His research interests focus on the fabrication and modeling of semiconductor nanostructures with applications in the fields of optoelectronics, energy and sensing. Dr. Ruda was one of the founders of a Canadian National Centre of Excellence in Photonics. He has served on the National Science and Engineering Council of Canada and on other government panels, including those of the Department of Energy, Environmental Protection Agency, National Science Foundation in the U.S. and the Royal Academy of Engineering and Engineering Physical Sciences Research Council in the United Kingdom. Dr. Ruda is a Fellow of the Royal Society of Canada, a Fellow of the Institute of Physics, a Fellow of the Institute of Nanotechnology, and a Fellow of the Canadian Academy of Engineering. He obtained his Ph.D. in semiconductor physics from the Massachusetts Institute of Technology in 1982.

Mr. Andrew (Luen Cheung) Wong has served as an independent director of our company since August 2014. He has also served as a director of Chubb Life Insurance Company Ltd. since 2008, and is an independent director and the vice-chairman of Huazhong In-vehicle Holdings Company Limited, which is listed in Hong Kong Stock Exchange. Previously, Mr. Wong served as a director and a member of the audit committee, nomination and remuneration committee of China CITIC Bank Corporation Limited, a company listed on The Stock Exchange of Hong Kong, between 2013 and 2018. Mr. Wong was the director of Intime Retail (Group) Co. Ltd., a company listed on The Stock Exchange of Hong Kong, between 2013 and 2014, and was the director and a member of audit committee, risk management committee, nomination and remuneration committee of China Minseng Bank, a company listed on The Stock Exchange of Hong Kong, from 2006 to 2012. From 1982 to 2006, Mr. Wong held senior positions at the Royal Bank of Canada, the Union Bank of Switzerland, Citicorp International Limited, a merchant banking arm of Citibank, Hang Seng Bank Limited and DBS Bank Limited, Hong Kong. Mr. Wong was awarded the National Excellent Independent Director by the Shanghai Stock Exchange in 2010 and received the Medal of Honour (Hong Kong SAR) from the Hong Kong SAR Government in 2011. Mr. Wong obtained his Bachelor of Social Sciences (Honours) degree from the University of Hong Kong in 1980 and a Master of Philosophy degree from Hong Kong Buddhist College in 1982.

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Mr. Arthur (Lap Tat) Wong has served as an independent director of our company since March, 2019. Mr. Wong currently serves as an independent director and chair of the audit committee of the following companies: Tarena International, Inc., an provider of professional education services in China (NASDAQ: TEDU); Daqo New Energy Corp., a polysilicon manufacturer (NYSE: DQ); and China Maple Leaf Educational Systems Limited, an operator of international schools in China (HKSE: 1317). From 1982 to 2008, Mr. Wong held various positions with Deloitte Touche Tohmatsu (Deloitte) in Hong Kong, San Jose and Beijing, with his last position as a partner in Deloitte's Beijing office. He subsequently served as the Chief Financial Officer of the following companies: Asia New Energy Holdings Pte. Ltd, a manufacturer of fertilizer, chemicals and new energy products, from June 2008 to December 2009; Nobao Renewable Energy Holding Ltd., a renewable energy company, from March 2010 to November 2010; GreenTree Inns Hotel Management Group, Inc., an economy hotel chain, from March 2011 to May 2012; and Beijing Radio Cultural Transmission Company Limited, a music production and music data management service company, from January 2013 to November 2018. Mr. Wong received a Higher Diploma in Accountancy from Hong Kong Polytechnic University in November 1982 and a Bachelor of Science degree in Applied Economics from University of San Francisco in December 1988. He is a fellow of the Hong Kong Institute of Certified Public Accountants; a fellow of the Association of Chartered Certified Accountants; and a member of the American Institute of Certified Public Accountants.

Ms. Lauren C. Templeton has served as an independent director of our company since January 2020. Ms. Templeton is the founder and President of Templeton & Phillips Capital Management, LLC, a global investing boutique located in Chattanooga, Tennessee. She is also an independent director and member of the Audit Committee of Fairfax Financial Holdings Limited, a financial holding company engaged in property and casualty insurance and reinsurance and associated investment management, and its publicly-traded subsidiary, Fairfax India Holdings Corporation. Ms. Templeton serves on a number of non-profit organizations, including the John Templeton Foundation, the Templeton World Charities Foundation and the Templeton Religion Trust. She also serves on the Board of Trustees at the Baylor School, the Board of Trustees at the Bright School and the Board of Overseers at the Atlas Economic Research Foundation. Ms. Templeton is the former President of the Southeastern Hedge Fund Association, based in Atlanta, Georgia. She is also the co-author of "Investing the Templeton Way: The Market Beating Strategies of Value Investing's Legendary Bargain Hunter", which has been translated into nine languages. Ms. Templeton holds a Bachelor of Arts Degree in Economics from the University of the South, Sewanee.

Mr. Karl E. Olsoni has served as a strategic advisor to board of directors of our company since January 2020. Mr. Olsoni is currently an Operating Partner with Quinbrook Infrastructure Partners, an infrastructure fund manager investing in clean energy infrastructure in the United States, the United Kingdom and Australia. He is also a Partner with the kRoad group of companies which invest in battery storage, waste transformation and e-mobility. He previously served as Managing Director of the Clean Energy and Infrastructure team at Capital Dynamics where he and his partners raised and invested approximately \$1 billion in clean energy infrastructure projects in the United States, the United Kingdom and Australia. Mr. Olsoni has more than 30 years of international energy sector experience. He was formerly Chief Financial Officer and Senior Vice President of PPM Energy Inc. (now Iberdrola Renewables/Avangrid), a US-based energy company, and Chief Financial Officer of Koch Materials, Inc., a unit of the Koch Industries, Inc., which marketed heavy petroleum products in the United States, China, Mexico and Brazil. Before that, he spent 16 years with the Southern Company where, among other things, he was part of the original management team that built the Southern Company's independent power and merchant energy business (Southern Energy, Inc., later Mirant, Inc.) into one of the largest independent power producers in the world. Mr. Olsoni holds a Bachelor of Arts degree in Economics from George Washington University and an MBA from the College of William and Mary.

Executive Officers

Mr. Yan Zhuang has served as our acting Chief Executive Officer since May 2019. He also served as our chief commercial officer since May 2012 and our senior vice president of global sales and marketing since July 2011, and prior to that as our vice president of global sales and marketing since June 2009. He was an independent director of our company from September 2007 to June 2009. Mr. Zhuang has worked in corporate branding, sales and marketing positions with, or provided consulting services to, a variety of multinational companies for over 15 years. In 2008, he founded and became a director of INS Research and Consulting. Mr. Zhuang was the head of Asia for Hands-on Mobile, Inc., a global media and entertainment company with operations in China, South Korea and India, from 2006 to 2007. He previously served as our senior vice president of business operations and marketing in Asia. Before joining Hands-on Mobile, Inc., he held various marketing and business operation positions with Motorola Inc., including as its Asia Pacific regional director of marketing planning and consumer insight. Prior to that, he was a marketing consultant in Canada and China. Mr. Zhuang holds a bachelor's degree in electrical engineering from Northern Jiaotong University, China, a Master of Science degree in applied statistics from the University of Alberta, Canada and a Master of Science degree in marketing management from the University of Guelph, Canada.

Dr. Huifeng Chang has served as our senior vice president and chief financial officer in May 2016. He has 17 years of experience in capital markets, financial investment and risk management. Before joining us, Dr. Chang was the co-head of Sales & Trading at the U.S. subsidiary of China International Capital Corp (CICC) from 2010 to 2015. Prior to that, he was the CEO of CSOP Asset Management based in Hong Kong from early 2008 to 2010, investing funds from China in the international markets. From 2000 to 2008, Dr. Chang was vice president and an equity proprietary trader at Citigroup Equity Proprietary Investments in New York. Before going to New York, Dr. Chang worked at Kamakura Corp in Hawaii as a risk consultant to banks in Asia. He received a Ph.D. in soil physics and MBA from University of Hawaii in the early 1990s, M.S. degree from Academia Sinica in 1987 and B.S. degree from Nanjing Agricultural University in 1984.

Mr. Guangchun Zhang has served as our chief operations officer since December 2012 and has over 18 years of experience in the PV industry. Prior to joining us, Mr. Zhang worked for Suntech Power Holdings Co., Ltd, as senior vice president for research and development and industrialization of manufacturing technology since December 2005. Prior to joining Suntech, Mr. Zhang previously worked at the Centre for Photovoltaic Engineering at the University of New South Wales in Australia and Pacific Solar Pty. Limited from June 1994 to November 2005. Mr. Zhang was an associate professor in Shandong Technology University in China from February 1982 to May 1994. Mr. Zhang received his bachelor degree in 1982 from the School of Electronic Engineering at Shandong Industrial Institute.

Mr. Jianyi Zhang joined us at the end of February 2016 as senior vice president and chief legal officer, and was appointed as chief compliance officer in May 2016. After graduation from Washington University School of Law, Mr. Zhang worked at Troutman Sanders LLP as an associate from June 1993 to September 1994. Thereafter, he formed a law firm Su & Zhang in Los Angeles, California. He rejoined Troutman Sanders LLP as an associate in April 1995, became a partner in September of 1999 and worked in that position until December 2001. From January 2002 to June 2005, Mr. Zhang worked at Walmart Stores, Inc. first as a senior corporate counsel II and then as senior assistant general counsel. From July 2005 to February 2016, he served, consecutively, as senior advisor to Chinese law firms of Jingtian & Gongcheng Law Firm, Runbo Law Firm, East Associates Law Firm and East & Concord Partners in Beijing. Mr. Jianyi Zhang received his B.A. degree and M.A. degree from the University of Helsinki, Finland in 1982 and 1983, respectively. After graduation from the University of Helsinki in 1983, Mr. Zhang worked at the Chinese Foreign Ministry until September 1989. Thereafter, he went to study at Washington University School of Law in St. Louis, Missouri and received his J.D. degree in 1992.

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Dr. Guoqiang Xing serves as senior vice president and chief technology officer. He joined us in November 2014 as corporate vice president of technology. He has over 22 years of research and development experience in photovoltaic and semiconductor industries. From September 2009 to October 2014, he was the chief technology officer of Hareon Solar, a company listed on the Shanghai Stock Exchange. He was also employed by JA Solar, a company listed on the NASDAQ Stock Market, as the R&D director from January 2008 to August 2009. His experience in the semiconductor industry includes serving as (a) a R&D advanced process director at HHNEC, a company based in Shanghai, from 2005 to 2008, (b) a R&D advanced process director at Semiconductor Manufacturing International, a company listed on the Hong Kong Stock Exchange, from 2002 to 2005, and (c) a member of technical staff at Kilby Center, Texas Instruments, a company listed on the New York Stock Exchange, in Dallas, Texas from 1995 to 2002. He received his Bachelor of Science degree in Physics from Peking University in 1984 and his Ph.D. in Physical Chemistry from Rice University, Houston, Texas in 1993. He was a postdoctoral research scientist in the Chemistry Department at Columbia University from 1993 to 1995.

Duties of Directors

Under the CBCA, our directors are required to manage, or to supervise the management of, the business and affairs of our company. They have a duty of loyalty to act honestly and in good faith with a view to our best interests. They also have a duty to exercise the care, diligence and skill that a reasonably prudent person would exercise in comparable circumstances. A shareholder has the right to seek damages if a duty owed by our directors is breached.

The functions and powers of our board of directors include:

- convening shareholder meetings and reporting to shareholders at such meetings;
- declaring dividends and authorizing other distributions to shareholders;
- appointing officers and determining the term of office of officers;
- exercising the borrowing powers of our company and mortgaging the property of our company; and
- approving the issuance of shares.

B. Compensation of Directors and Executive Officers

Cash Compensation

We paid our directors and executive officers aggregate cash remuneration, including salaries, bonuses and benefits in kind, of approximately \$7.2 million for 2019. Of this amount, we paid approximately \$0.6 million to our five independent directors and approximately \$6.6 million to our executive officers. The total amount set aside or accrued by us and our subsidiaries to provide pension, retirement or similar benefits for our directors and executive officers was approximately \$0.1 million in 2019.

Share Incentive Plan

In March 2006, we adopted a share incentive plan, or the Plan.

The purpose of the Plan is to promote the success and enhance the value of our company by linking the personal interests of the directors, employees and consultants to those of the shareholders and providing the directors, employees and consultants with an incentive for outstanding performance to generate superior returns to the shareholders. The Plan is also intended to motivate, attract and retain the services of the directors, employees and consultants upon whose judgment, interest and effort the successful conduct of our operations is largely dependent.

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In September 2010, the shareholders approved an amendment to the Plan to increase the maximum number of common shares which may be issued pursuant to all awards of restricted shares, options and restricted share units under the Plan to the sum of (i) 2,330,000 plus (ii) the sum of (a) 1% of the number of our outstanding common shares on the first day of each of 2007, 2008 and 2009 plus (b) 2.5% of our outstanding common shares on the first day of each calendar year after 2009. As of March 31, 2020, the maximum number of common shares which may be issued pursuant to all awards of restricted shares, options and restricted share units under the Plan was 17,453,000 common shares, of which 566,190 restricted shares, 3,284,393 options, and 6,114,136 restricted share units (in each case net of forfeitures) have been awarded, leaving 7,488,281 common shares available to be issued.

The following describes the principal terms of the Plan.

Types of Awards.

We may make the following types of awards under the Plan:

- restricted shares, which are common shares that are subject to certain restrictions and may be subject to risk of forfeiture or repurchase;
- options, which entitle the holder to purchase our common shares; and
- restricted share units, which entitle the holder to receive our common shares.

Plan Administration.

The Compensation Committee of our board of directors administers the Plan, except with respect to awards made to our non-employee directors, where the entire board of directors administers the Plan. The Compensation Committee or the full board of directors, as appropriate, determines the provisions, terms, and conditions of each award.

Award Agreement.

Awards are evidenced by an award agreement that sets forth the terms, conditions and limitations for each award.

Eligibility.

We may grant awards to employees, directors and consultants of our company or any of our related entities, which include our subsidiaries and any entities in which we hold a substantial ownership interest. We may, however, grant options that are intended to qualify as incentive share options only to our employees.

Acceleration of Awards upon Corporate Transactions.

Outstanding awards will accelerate upon a change-of-control where the successor entity does not assume our outstanding awards. In such event, each outstanding award will become fully vested and immediately exercisable, the transfer restrictions on the awards will be released and the repurchase or forfeiture rights will terminate immediately before the date of the change-of-control transaction.

Exercise Price and Term of Options.

In general, the Compensation Committee determines the exercise price of an option and sets out the price in the award agreement. The exercise price may be a fixed or variable price related to the fair market value of our common shares. If we grant an incentive share option to an employee who, at the time of that grant, owns shares representing more than 10% of the voting power of all classes of our share capital, the exercise price cannot be less than 110% of the fair market value of our common shares on the date of that grant and the share option is exercisable for no more than five years from the date of that grant.

The term of an award may not exceed ten years from the date of the grant.

Vesting Schedule.

In general, the Compensation Committee determines the vesting schedule.

[Table of Contents](#)**Restricted Shares**

The following table summarizes, as of March 31, 2020, the restricted shares that we had granted under the Plan to our employees and certain individuals as a group. We have not granted any restricted shares to our directors and executive officers. The restricted shares granted in May 2006 vested over a two-year period beginning in March 2006. The vesting periods for all other restricted shares are indicated in the notes below.

<u>Name</u>	<u>Restricted Shares Granted</u>	<u>Restricted Shares Vested</u>	<u>Restricted Shares Forfeited</u>	<u>Date of Grant</u>
Employees				
Twelve individuals as a group	330,860	330,860	—	May 30, 2006
Hanbing Zhang ⁽¹⁾	116,500 ⁽²⁾	116,500	—	July 28, 2006
	447,360	447,360	—	
Employees as a group				
Other Individuals				
One individual	2,330 ⁽³⁾	2,330	—	May 30, 2006
One individual	116,500 ⁽⁴⁾	116,500	—	June 30, 2006
	118,830	118,830	—	
Other Individuals as a group				
	566,190	566,190	—	
Total Restricted Shares				

(1) The wife of Dr. Shawn Qu.

(2) Vest over a four-year period from the date of grant.

(3) Vest on accelerated termination.

(4) Vest over a two-year period from the date of grant.

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Options

The following table summarizes, as of March 31, 2020, the options that we had granted under the Plan to our directors and certain other individuals. The options granted to our independent directors vest immediately. Unless otherwise noted, all other options granted vest over a four-year period (one-quarter on each anniversary date) from the date of grant, and exercise prices are equal to the average of the trading prices of the common shares for the five trading days preceding the date of grant.

Name	Common Shares Underlying Options Granted	Common Shares Underlying Options Exercised	Common Shares Underlying Options Forfeited	Common Shares Underlying Options Outstanding	Exercise Price (\$ per Share)	Date of Grant	Date of Expiration
Directors:							
Shawn (Xiaohua) Qu	20,000	20,000	—	—	3.18	March 12, 2009	—
	25,000	—	—	25,000	11.33	August 27, 2010	August 26, 2020
	18,779	—	—	18,779	9.33	May 20, 2011	May 19, 2021
Robert McDermott	46,600 ⁽¹⁾	46,600	—	—	15.00 ⁽³⁾	August 8, 2006	—
	23,300 ⁽²⁾	23,300	—	—	9.88	July 1, 2007	—
	23,300 ⁽²⁾	—	23,300	—	41.75 ⁽⁴⁾	June 26, 2008	—
	23,300 ⁽²⁾	23,300	—	—	13.75 ⁽⁴⁾	June 29, 2009	—
	23,300 ⁽²⁾	—	—	23,300	12.09 ⁽⁴⁾	September 20, 2010	September 19, 2020
	23,300 ⁽²⁾	23,300	—	—	9.81 ⁽⁴⁾	June 27, 2011	—
	23,300 ⁽²⁾	23,300	—	—	3.03 ⁽⁴⁾	June 11, 2012	—
	23,300 ⁽²⁾	23,300	—	—	8.29 ⁽⁴⁾	June 7, 2013	—
Harry E. Ruda	23,300 ⁽²⁾	23,300	—	—	8.31 ⁽⁴⁾	August 14, 2011	—
	23,300 ⁽²⁾	23,300	—	—	3.03 ⁽⁴⁾	June 11, 2012	—
	23,300 ⁽²⁾	23,300	—	—	8.29 ⁽⁴⁾	June 7, 2013	—
Directors as a Group	343,379	253,000	23,300	67,079			
Executive Officers:							
Yan Zhuang	23,300 ⁽²⁾	23,300	—	—	7.36	September 24, 2007	—
	23,300 ⁽²⁾	—	23,300	—	41.75	June 26, 2008	—
	80,000	80,000	—	—	9.37	May 23, 2009	—
	15,000	15,000	—	—	11.33	August 27, 2010	—
	11,268	11,268	—	—	9.33	May 20, 2011	—
Executive Officers as a Group	152,868	129,568	23,300	—			
Employees:							
Hanbing Zhang			—	—	4.29	July 28, 2006	—

	46,600	46,600					
	6,000	6,000	—	—	3.18	March 12, 2009	—
	12,000	—	—	12,000	11.33	August 27, 2010	August 26, 2020
	7,512	—	—	7,512	9.33	May 20, 2011	May 19, 2021
Other employees and certain individuals as a group	4,160,031	2,728,446	1,397,397	34,188	2.12 to 46.28	Various dates from May 30, 2006 to June 7, 2013	Various dates from May 29, 2016 to June 6, 2023
Total Options	4,728,390	3,163,614	1,443,997	120,779			

- (1) Vest in two equal installments, the first upon the date of grant and the second upon the first year anniversary of the date of grant as long as the director remains in service.
- (2) Vest immediately upon the date of grant.
- (3) The initial public offering price of the common shares.
- (4) Exercise price equal to the average of the trading prices of the common shares for the 20 trading days preceding the date of grant.

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Restricted Share Units

The following table summarizes, as of March 31, 2020, the restricted share units that we had granted under the Plan to our directors, executive officers and certain other individuals.

Name	Restricted Share Units Granted	Restricted Share Units Vested	Restricted Share Units Forfeited	Date of Grant	
Directors:					
Shawn (Xiaohua) Qu	6,154 ⁽¹⁾	6,154	—	May 8, 2011	
	13,706 ⁽²⁾	13,706	—	May 20, 2011	
	75,075 ⁽²⁾	75,075	—	March 16, 2012	
	67,024 ⁽²⁾	67,024	—	March 9, 2013	
	11,983 ⁽²⁾	11,983	—	May 4, 2014	
	8,274 ⁽²⁾	8,274	—	May 3, 2015	
	20,216 ⁽²⁾	15,162	—	July 8, 2016	
	121,951 ⁽³⁾	121,951	—	November 6, 2016	
	22,607 ⁽²⁾	11,303	—	May 17, 2017	
	77,289 ⁽³⁾	77,289	—	November 5, 2017	
	18,018 ⁽²⁾	4,504	—	May 13, 2018	
	83,805 ⁽³⁾	52,378	—	November 10, 2018	
	15,690 ⁽²⁾	—	—	May 13, 2019	
	26,691 ⁽³⁾	3,336	—	November 9, 2019	
	Robert McDermott	1,020	1,020	—	July 1, 2014
		800	800	—	October 1, 2014
1,274		1,274	—	January 1, 2015	
880		880	—	April 1, 2015	
993		993	—	July 1, 2015	
1,820		1,820	—	October 1, 2015	
1,033		1,033	—	January 1, 2016	
1,572		1,572	—	April 1, 2016	
2,051		2,051	—	July 1, 2016	
2,228		2,228	—	October 1, 2016	
2,411		2,411	—	January 1, 2017	
2,562		—	—	April 1, 2017	
1,901		—	—	July 1, 2017	
1,818	—	—	October 1, 2017		

	1,767	—	—	January 1, 2018
	1,802	—	—	April 1, 2018
	2,458	—	—	July 1, 2018
	2,056	—	—	October 1, 2018
	2,096	—	—	January 1, 2019
	1,623	—	—	April 1, 2019
	1,381	—	—	July 1, 2019
	1,486	—	—	October 1, 2019
	1,361	—	—	January 1, 2020

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Name	Restricted Share Units Granted	Restricted Share Units Vested	Restricted Share Units Forfeited	Date of Grant
Harry E. Ruda	1,020	1,020	—	July 1, 2014
	800	800	—	October 1, 2014
	1,274	1,274	—	January 1, 2015
	880	880	—	April 1, 2015
	993	993	—	July 1, 2015
	1,820	1,820	—	October 1, 2015
	1,033	1,033	—	January 1, 2016
	1,572	1,572	—	April 1, 2016
	2,051	2,051	—	July 1, 2016
	2,228	2,228	—	October 1, 2016
	2,411	2,411	—	January 1, 2017
	2,562	—	—	April 1, 2017
	1,901	—	—	July 1, 2017
	1,818	—	—	October 1, 2017
	1,767	—	—	January 1, 2018
	1,802	—	—	April 1, 2018
	2,458	—	—	July 1, 2018
	2,056	—	—	October 1, 2018
	2,096	—	—	January 1, 2019
	1,623	—	—	April 1, 2019
1,381	—	—	July 1, 2019	
1,486	—	—	October 1, 2019	
1,361	—	—	January 1, 2020	
Andrew (Luen Cheung) Wong	610	610	—	August 7, 2014
	800	800	—	October 1, 2014
	1,274	1,274	—	January 1, 2015
	880	880	—	April 1, 2015
	993	993	—	July 1, 2015
	1,820	1,820	—	October 1, 2015
	1,033	1,033	—	January 1, 2016
	1,572	1,572	—	April 1, 2016
	2,051	2,051	—	July 1, 2016
	2,228	2,228	—	October 1, 2016
	2,411	2,411	—	January 1, 2017

	2,562	—	—	April 1, 2017
	1,901	—	—	July 1, 2017
	1,818	—	—	October 1, 2017
	1,767	—	—	January 1, 2018
	1,802	—	—	April 1, 2018
	2,458	—	—	July 1, 2018
	2,056	—	—	October 1, 2018
	2,096	—	—	January 1, 2019
	1,623	—	—	April 1, 2019
	1,381	—	—	July 1, 2019
	1,486	—	—	October 1, 2019
	1,361	—	—	January 1, 2020
Arthur (Lap Tat) Wong	559	—	—	March 8, 2019
	1,623	—	—	April 1, 2019
	1,381	—	—	July 1, 2019
	1,486	—	—	October 1, 2019
	1,361	—	—	January 1, 2020
Lauren C. Templeton	1,361	—	—	January 1, 2020
Karl E. Olsoni	1,021	—	—	January 1, 2020
Directors as a group	692,044	515,975	—	

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Name	Restricted Share Units Granted	Restricted Share Units Vested	Restricted Share Units Forfeited	Date of Grant
Executive Officers				
Huifeng Chang	23,340 ⁽²⁾	23,340	—	May 8, 2016
	13,477 ⁽²⁾	10,108	—	July 8, 2016
	15,072 ⁽²⁾	7,536	—	May 17, 2017
	12,012 ⁽²⁾	3,003	—	May 13, 2018
	10,460 ⁽²⁾	—	—	May 13, 2019
	3,923 ⁽¹⁾	—	—	May 13, 2019
Guangchun Zhang	80,000 ⁽²⁾	80,000	—	March 9, 2013
	7,262 ⁽²⁾	7,262	—	May 4, 2014
	5,516 ⁽²⁾	5,516	—	May 3, 2015
	13,477 ⁽²⁾	10,108	—	July 8, 2016
	15,072 ⁽²⁾	7,536	—	May 17, 2017
	12,012 ⁽²⁾	3,003	—	May 13, 2018
Yan Zhuang	10,460 ⁽²⁾	—	—	May 13, 2019
	2,564 ⁽¹⁾	2,564	—	May 8, 2011
	8,224 ⁽²⁾	8,224	—	May 20, 2011
	45,045 ⁽²⁾	45,045	—	March 16, 2012
	40,214 ⁽²⁾	40,214	—	March 9, 2013
	7,988 ⁽²⁾	7,988	—	May 4, 2014
	5,516 ⁽²⁾	5,516	—	May 3, 2015
	13,477 ⁽²⁾	10,108	—	July 8, 2016
	15,072 ⁽²⁾	7,536	—	May 17, 2017
	12,012 ⁽²⁾	3,003	—	May 13, 2018
10,460 ⁽²⁾	—	—	May 13, 2019	
5,230 ⁽¹⁾	—	—	May 13, 2019	

	25,934 ⁽²⁾	25,934	—	May 8, 2016
Jianyi Zhang	13,477 ⁽²⁾	10,108	—	July 8, 2016
	15,072 ⁽²⁾	7,536	—	May 17, 2017
	12,012 ⁽²⁾	3,003	—	May 13, 2018
	10,460 ⁽²⁾	—	—	May 13, 2019
Guoqiang Xing	5,717 ⁽²⁾	5,717	—	December 26, 2014
	2,758 ⁽²⁾	2,758	—	May 3, 2015
	6,739 ⁽²⁾	5,054	—	July 8, 2016
	3,586 ⁽²⁾	2,689	—	May 17, 2017
	15,072 ⁽²⁾	7,536	—	May 17, 2017
	12,012 ⁽²⁾	3,003	—	May 13, 2018
	10,460 ⁽²⁾	—	—	May 13, 2019
Executive Officers as a group	521,184	360,948	—	

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Name	Restricted Share Units Granted	Restricted Share Units Vested	Restricted Share Units Forfeited	Date of Grant
Employees				
Hanbing Zhang	1,538 ⁽¹⁾	1,538	—	May 8, 2011
	5,482 ⁽²⁾	5,482	—	May 20, 2011
	21,021 ⁽²⁾	21,021	—	March 16, 2012
	18,767 ⁽²⁾	18,767	—	March 9, 2013
	2,796 ⁽²⁾	2,796	—	May 4, 2014
	2,344 ⁽²⁾	2,344	—	May 3, 2015
	4,717 ⁽²⁾	3,538	—	July 8, 2016
	5,275 ⁽²⁾	2,637	—	May 17, 2017
	4,204 ⁽²⁾	1,051	—	May 13, 2018
	3,661 ⁽²⁾	—	—	May 13, 2019
Other employees and certain individuals as a group	5,662,642 ⁽⁴⁾	3,573,858	1,372,709	Various dates from May 8, 2011 to November 10, 2018
	580,135 ⁽⁴⁾	11,013	38,965	Various dates from January 1, 2019 to March 21, 2020
Total Restricted Share Units	7,525,810	4,520,968	1,411,674	

- (1) Vest over a one-year period from the date of grant.
- (2) Vest over a four-year period from the date of grant.
- (3) Vest over an eight-quarter period from date of grant.
- (4) 13,844 restricted share units granted on May 8, 2011 vested over one-year period from the date of grant. 126,036 restricted share units granted on August 11, 2013 vested immediately upon the date of grant. The other restricted share units granted vest over a four-year period from the date of grant.

We grant each of our independent directors restricted share units quarterly in advance on the first day of July, October, January and April in each year of service. The number of restricted share units granted quarterly is determined by dividing \$30,000 by the average of the closing price of our common shares on each of the five trading days preceding the date of the grant. Each restricted share unit will entitle those directors to receive one of our common shares upon vesting. These restricted share units vest on the earlier of the date that the director ceases to be a member of our board of directors for any reason and three years after the grant date. We agree to issue common shares to those directors as soon as practicable, and in any event within 60 days, after the granted restricted share units vested.

C. Board Practices

In 2019, our board of directors held seven meetings and passed 40 resolutions by unanimous written consent.

Terms of Directors and Executive Officers

Our officers are appointed by and serve at the discretion of our board of directors. Our current directors have not been elected to serve for a specific term and, unless re-elected, hold office until the close of our next annual meeting of shareholders or until such time as their successors are elected or appointed.

Committees of the Board of Directors

Our board of directors has established an audit committee, a compensation committee, a nominating and corporate governance committee and a research and development committee.

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Audit Committee

Our audit committee consists of Messrs. McDermott, Ruda, Andrew (Luen Cheung) Wong, Arthur (Lap Tat) Wong and Ms. Templeton and is chaired by Mr. Arthur (Lap Tat) Wong. Mr. Arthur (Lap Tat) Wong qualifies as an “audit committee financial expert” as required by the SEC. Each of Messrs. McDermott, Ruda and Andrew (Luen Cheung) Wong and Ms. Templeton is “financially literate” as required by the Nasdaq rules. Each of the members of our audit committee satisfies the “independence” requirements of the Nasdaq corporate governance rules. The audit committee oversees our accounting and financial reporting processes and the audits of the financial statements of our company.

The audit committee is responsible for, among other things:

- selecting our independent auditors and pre-approving all auditing and non-auditing services permitted to be performed by our independent auditors;
- reviewing with our independent auditors any audit problems or difficulties and management’s responses;
- reviewing and approving all proposed related-party transactions, as defined in Item 404 of Regulation S-K under the Securities Act;
- discussing the annual audited financial statements with management and our independent auditors;
- reviewing major issues as to the adequacy of our internal controls and any special audit steps adopted in light of material control deficiencies;
- annually reviewing and reassessing the adequacy of our audit committee charter;
- such other matters that are specifically delegated to our audit committee by our board of directors from time to time;
- meeting separately and periodically with management and our internal and independent auditors; and
- reporting regularly to the full board of directors.

In 2019, our audit committee held five meetings, and did not pass any resolution by unanimous written consent.

Compensation Committee

Our compensation committee consists of Messrs. McDermott, Ruda, Andrew (Luen Cheung) Wong and Arthur (Lap Tat) Wong and Ms. Templeton and is chaired by Mr. Andrew (Luen Cheung) Wong. Each of the members of our compensation committee satisfies the “independence” requirements of the Nasdaq corporate governance rules. The compensation committee assists the board in reviewing and approving the compensation structure for our directors and executive officers, including all forms of compensation to be provided to our directors and executive officers. Members of the compensation committee are not prohibited from direct involvement in determining their own compensation. Our chief executive officer may not be present at any committee meeting during which his compensation is deliberated. The compensation committee is responsible for, among other things:

- reviewing and approving corporate goals and objectives relevant to the compensation of our chief executive officer, evaluating the performance of our chief executive officer in light of those goals and objectives, and setting the compensation level of our chief executive officer based on this evaluation;
- reviewing and approving the compensation arrangements for our other executive officers and our directors; and
- overseeing and periodically reviewing the operation of our employee benefits plans, including bonus, incentive compensation, stock option, pension and welfare plans.

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In 2019, our compensation committee held six meetings and passed five resolutions by unanimous written consent.

Nominating and Corporate Governance Committee

Our nominating and corporate governance committee consists of Messrs. McDermott, Ruda, Andrew (Luen Cheung) Wong and Arthur (Lap Tat) Wong and Ms. Templeton and is chaired by Mr. McDermott. Each of the members of our nominating and corporate governance committee satisfies the “independence” requirements of the Nasdaq corporate governance rules. The nominating and corporate governance committee assists the board of directors in identifying individuals qualified to become our directors and in determining the composition of the board and its committees. The nominating and corporate governance committee is responsible for, among other things:

- identifying and recommending to the board nominees for election or re-election to the board, or for appointment to fill any vacancy;
- reviewing annually with the board the current composition of the board in light of the characteristics of independence, age, skills, experience and availability of service to us;
- identifying and recommending to the board the directors to serve as members of the board’s committees;
- advising the board periodically with respect to significant developments in the law and practice of corporate governance as well as our compliance with applicable laws and regulations, and making recommendations to the board on all matters of corporate governance and on any corrective action to be taken; and
- monitoring compliance with our code of business conduct and ethics, including reviewing the adequacy and effectiveness of our procedures to ensure proper compliance.

In 2019, our nominating and corporate governance committee held four meetings and did not pass any resolution by unanimous written consent.

Research and Development Committee

Our research and development committee consists of Dr. Harry E. Ruda and Dr. Shawn Qu and is chaired by Dr. Ruda. Dr. Guoqiang Xing, our senior vice president and chief technical officer, is an advisory member of the committee. The research and development committee advises and assists the board of directors and management on matters relating to technology and technological innovation and development as it relates to our solar power business. The research and development committee is responsible for, among other things:

- reviewing, evaluating and advising the board of directors and management regarding the quality, scope, direction and effectiveness of our research and development programs and activities;
- reviewing, evaluating and advising the board of directors and management regarding our progress in achieving our research and development goals and objectives;
- reviewing, evaluating and making recommendations to the board of directors and management on our internal and external investments in science and technology;
- monitoring, identifying, evaluating and advising the board of directors and management regarding competing solar power technologies and new and emerging developments in solar power science and technology;
- reviewing, evaluating and advising the board of directors and our chief executive officer regarding the composition and quality of the research and development team; and
- providing general oversight of matters relating to the protection of our intellectual property.

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In 2019, our research and development committee held four meetings and did not pass any resolution by unanimous written consent.

Interested Transactions

Under the CBCA, a director or officer of a corporation who is a party to a material contract or transaction or proposed material contract or transaction with the corporation, or is a director or officer (or an individual acting in a similar capacity) of, or has a material interest in, any person who is party to such a contract or transaction, is required to disclose to the corporation in writing or request to have entered into the minutes of meetings of directors the nature and extent of his or her interest in accordance with the requirements of the CBCA. A director may vote on any resolution in respect of such contract or transaction only if the contract or transaction is: (a) one relating primarily to remuneration as a director, officer, employee or agent of the corporation or an affiliate; (b) one for indemnity or insurance in favor of directors and officers in compliance with the CBCA; or (c) one with an affiliate.

In 2019, we did not enter into any interested transactions other than those described in this “Item 6. Directors, Senior Management and Employees” and “Item 7. Major Shareholders and Related Party Transactions—B. Related Party Transactions.”

Remuneration and Borrowing

Our directors may determine the remuneration to be paid to them. The compensation committee will assist the directors in reviewing and approving the compensation structure for our directors. Our directors may, without authorization of the shareholders (a) borrow money on our credit, (b) issue, reissue, sell, pledge or hypothecate debt obligations of ours, (c) give a guarantee on our behalf to secure performance of an obligation of any person, and (d) mortgage, hypothecate, pledge or otherwise create a security interest in all or any property of ours, owned or subsequently acquired, to secure any obligation of ours.

Qualification

Each of our independent directors is asked to hold common shares and/or restricted share units having a value which is at least five times the director’s annual cash retainer and to satisfy this requirement before the later of July 1, 2017 and three years after he or she becomes a director.

Employment Agreements

We have entered into employment agreements with each of our executive officers.

All of the employment agreements with our executive officers are for an indefinite term. Under the employment agreements, we may terminate the employment of an executive officer at any time by giving written notice of termination to the executive officer. An executive officer may terminate his employment at any time by giving 30 days’ written notice of termination to us.

If we terminate the employment of an executive officer for any reason other than cause or disability, or the executive officer terminates his employment for good reason, in both cases other than within 12 months after a change of control, (a) the unvested RSUs held by the executive officer immediately before the date of termination of the employment that would otherwise vest within 12 months after the date of termination of the employment will be deemed to have vested immediately before the date of termination of the employment; (b) the executive officer is entitled to receive his target bonus for the year in which the date of termination of the employment occurs; and (c) the executive officer is entitled to continue to receive his base salary and benefits for a period of six plus N months following the date of termination of the employment provided that he continues to comply with his confidentiality, inventions, non-competition, non-solicitation and assistance obligations described below. “N” is the number of years (including part years) that the executive officer was employed by us and our subsidiaries during the period beginning on January 1, 2007 and ending on the date of termination of the Employment but not exceeding 12.

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If we terminate the employment of an executive officer for any reason other than cause or disability, or the executive officer terminates his employment for good reason, in both cases within 12 months after a change of control, (a) all unvested RSUs held by the executive officer immediately before the date of termination of the employment will be deemed to have vested immediately before the date of termination of the employment; (b) the executive officer is entitled to receive a lump sum amount equal to the sum of: (1) his target bonus for the year in which the date of termination of the employment occurs, (2) his annual base salary and (3) the estimated annual cost of his providing his benefits multiplied by a fraction, the numerator of which is 12 plus N and the denominator of which is 12.

Each executive officer has agreed: (a) not to disclose or use any of our confidential information, including trade secrets and information concerning our finances, employees, technology, processes, facilities, products, suppliers, customers and markets, except in the performance of his duties and responsibilities or as required pursuant to applicable law; (b) to disclose in confidence to us all inventions, designs and trade secrets which he may conceive, develop or reduce to practice during his employment and to assign all right, title and interest in them to us; (c) during and within one year after the termination of his employment, (1) not to communicate or have any other dealings with our customers or suppliers that would be likely to harm the business relationship between us and our suppliers; (2) not to provide services, whether as a director, officer, employee, independent contractor or otherwise, to a competitor; and (3) not to solicit, whether by offer of employment or otherwise, the services of any of our employees; and (d) at our request, to answer our requests for information about those aspects of our business and affairs in which he was involved and assist us in prosecuting or defending claims or responding to investigations or reviews by any regulatory authority or stock exchange in relation to events or occurrences that took place during the employment. "Competitor" is a person that, directly or indirectly, carries on business in any jurisdiction where we and our subsidiaries carry on business if that person or any subsidiary or division of that person generates more than 10% of its revenues from solar power products and services similar to those provided by the us and our subsidiaries.

Our compensation committee is required to approve the employment agreements entered into by us with our executive officers.

Director Agreements

We have entered into director agreements with our independent directors, pursuant to which we make payments in the form of an annual cash retainer, payable quarterly, and quarterly grants of restricted share units to our independent directors for their services. See "—B. Compensation of Directors and Executive Officers."

Indemnification of Directors and Officers

Under the CBCA and pursuant to our by-laws, we may indemnify any present or former director or officer or an individual who acts or has acted at our request as a director or officer, or an individual acting in a similar capacity, of another corporation or entity, against all costs, charges and expenses, including an amount paid to settle an action or satisfy a judgment, reasonably incurred by such individual in respect of any civil, criminal, administrative, investigative or other proceeding in which the individual is involved because of that association with us or other entity, provided that the director or officer acted honestly and in good faith with a view to our best interests, or, as the case may be, to the best interests of the other entity for which he or she acted as a director or officer or in a similar capacity at our request, and, in the case of a criminal or administrative action or proceeding that is enforced by a monetary penalty, had reasonable grounds for believing that his or her conduct was lawful. Such indemnification may be made in connection with a derivative action only with court approval. A director or officer is entitled to indemnification from us as a matter of right if the court or other competent authority has judged that he or she has not committed any fault or omitted to do anything that the individual ought to have done and fulfilled the conditions set forth above.

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We have entered into indemnity agreements with each of our directors agreeing to indemnify them, to the fullest extent permitted by law, against all liability, loss, harm damage cost or expense, reasonably incurred by the director in respect of any threatened, pending, ongoing or completed claim or civil, criminal, administrative, investigative or other action or proceeding made or commenced against him or in which he is or was involved by reason of the fact that he is or was a director of our company.

Our directors and officers are covered by directors' and officers' insurance policies.

D. Employees

As of December 31, 2017, 2018 and 2019, we had 12,129, 12,442 and 13,478 full-time employees, respectively. The following table sets forth the number of our employees categorized by our areas of operations and as a percentage of our workforce as of December 31, 2019.

	As of December 31, 2019	
	Number of Employees	Percentage of Total
Manufacturing	10,733	79.6 %
General and administrative	1,390	10.4 %
Research and development	515	3.8 %
Sales and marketing	840	6.2 %
Total	13,478	100 %

As of December 31, 2019, we had 2,708 employees at our facilities in Suzhou, 2,564 employees at our facilities in Changshu, 2,106 employees at our facilities in Luoyang, 2,560 employees at our facilities in Yancheng, 364 employees at our facilities in Baotou and 3,176 employees based in our facilities and offices in Canada, Japan, Australia, Singapore, South Korea, Hong Kong, Taiwan, India, Indonesia, Thailand, Vietnam, Brazil, United Arab Emirates, South Africa, the Americas and the EU (which includes Germany, Italy, Netherlands, Israel, United Kingdom and Spain). Our employees are not covered by any collective bargaining agreement. We consider our relations with our employees to be good. From time to time, we also employ or engage part-time employees or independent contractors to support our manufacturing, research and development and sales and marketing activities. We plan to hire additional employees as we expand.

Continuous learning is the cornerstone of our human capital development strategy. Employees across all functions and levels of us are offered participation in the CSI University program, which is designed to support their career development through an extensive suite of resources including classroom training, e-learning, coaching, mentoring and on-the-job training. We partner with professional consultants such as Development Dimensions International ("DDI") for establishing leadership standards and creating tailor-made development programs.

Training programs for junior positions are focused on developing technical and professional skills, including but not limited to areas such as project development, permitting, asset management, project finance, sales management, order management and operations, supply chain management, marketing, technical services and support, etc. This is complemented by a CSI Boot Camp, which is designed to develop soft skills and nurture a culture of continuous self and mutual learning.

For more senior-level employees, our in-house training program is more targeted on developing leadership and managerial skills. The Leadership Foundation Program focuses on executive strategy, effective decision-making, coaching for peak performance, delegation, and other leadership skills. Global workshops on key business topics such as PPA and storage are organized to help our leaders continue to learn. We also selectively sponsor key talents to attend top MBA programs. We regularly carry out global succession planning reviews to identify the high-potential talents and follows up with individual development plans for them.

We strive to create a culture of openness and transparency which values and promotes two-way communication between management and team members. Feedback is both encouraged and appreciated, as we consider it a key driver for employee engagement.

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E. Share Ownership

The following table sets forth information with respect to the beneficial ownership of our common shares as of March 31, 2020, the latest practicable date, by:

- each of our directors and executive officers; and
- each person known to us to own beneficially more than 5% of our common shares.

The calculations in the table below are based on the 59,041,687 common shares outstanding, as of March 31, 2020.

Beneficial ownership is determined in accordance with the rules and regulations of the SEC. In computing the number of shares beneficially owned by a person and the percentage ownership of that person, we have included shares that the person has the right to acquire within 60 days from March 31, 2020, including through the vesting of any restricted share unit, the exercise of any option, warrant or other right or the conversion of any other security. These shares, however, are not included in the computation of the percentage ownership of any other person.

	Shares Beneficially Owned ⁽¹⁾	
	Number	%
Directors and Executive Officers: ⁽²⁾		
Shawn (Xiaohua) Qu ⁽³⁾	13,964,711	23.6 %
Robert McDermott ⁽⁴⁾	42,484	*
Harry E. Ruda ⁽⁵⁾	37,484	*
Andrew Wong ⁽⁶⁾	9,243	*
Yan Zhuang ⁽⁷⁾	17,985	*
Huifeng Chang ⁽⁸⁾	17,641	*
Guangchun Zhang ⁽⁹⁾	12,755	*
Jianyi Zhang ⁽¹⁰⁾	30,951	*
Guoqiang Xing ⁽¹¹⁾	22,027	*
All Directors and Executive Officers as a Group	14,155,281	23.9 %
Principal Shareholders		
Lion Point Capital, L.P. ⁽¹²⁾	4,388,709	7.4 %
Schroder Investment Management Hong Kong ⁽¹³⁾	4,294,748	7.3 %
Morgan Stanley and Morgan Stanley Capital services LLC ⁽¹⁴⁾	3,528,037	6.0 %

* The person beneficially owns less than 1% of our outstanding shares.

- (1) Beneficial ownership is determined in accordance with Rule 13d-3 of the General Rules and Regulations under the Exchange Act, and includes voting or investment power with respect to the securities.
- (2) The business address of our directors and executive officers is 545 Speedvale Avenue West, Guelph, Ontario, Canada N1K 1E6.
- (3) Comprises 13,877,824 common shares directly held by Dr. Shawn Qu and Hanbing Zhang, the wife of Dr. Shawn Qu, 63,291 common shares issuable upon the exercise of options held by Dr. Shawn Qu and Ms. Zhang within 60 days from March 31, 2020 and 23,596 shares issuable upon vesting of restricted share units held by Dr. Shawn Qu and Ms. Zhang within 60 days from March 31, 2020.
- (4) Comprises 16,622 common shares directly held by Mr. McDermott, 23,300 common shares issuable upon exercise of options held by Mr. McDermott within 60 days from March 31, 2020 and 2,562 shares issuable upon vesting of restricted share units held by Mr. McDermott within 60 days from March 31, 2020.
- (5) Comprises 34,922 common shares directly held by Mr. Ruda and 2,562 common shares issuable upon vesting of restricted share units held by Mr. Ruda within 60 days from March 31, 2020.

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- (6) Comprises 6,681 common shares directly held by Mr. Wong and 2,562 shares issuable upon vesting of restricted share units held by Mr. Wong within 60 days from March 31, 2020.
- (7) Comprises 17,985 common shares issuable upon vesting of restricted share units held by Mr. Zhuang within 60 days from March 31, 2020.
- (8) Comprises 3,905 common shares directly held by Mr. Chang and 13,736 shares issuable upon vesting of restricted share units held by Mr. Chang within 60 days from March 31, 2020.
- (9) Comprises 12,755 common shares issuable upon vesting of restricted shares units held by Mr. Zhang within 60 days from March 31, 2020.
- (10) Comprises 18,196 common shares directly held by Mr. Zhang and 12,755 shares issuable upon vesting of restricted share units held by Mr. Zhang within 60 days from March 31, 2020.
- (11) Comprises 10,956 shares directly held by Mr. Xing and 11,071 shares issuable upon vesting of restricted share units held by Mr. Xing within 60 days from March 31, 2020.
- (12) Represents 4,388,709 common shares owned by Lion Point Capital, L.P. as reported in Form 13F-HR filed by Lion Point Capital, L.P. on February 14, 2020. The percentage of beneficial ownership was calculated based on the total number of our common shares as of March 31, 2020. Lion Point Capital, L.P. is a Delaware limited partnership with its business address at 250 West 55th Street, 33rd Floor, New York, New York 10019.
- (13) Represents 4,294,748 common shares held by Schroder Investment Management Hong Kong, as reported on Schedule 13G filed by Schroder Investment Management Hong Kong on February 13, 2020. The percentage of beneficial ownership was calculated based on the total number of our common shares as of March 31, 2020. The principal business address of Schroder Investment Management Hong Kong is Level 22, Two Pacific Place, 88 Queensway, Hong Kong.
- (14) Represents 3,528,037 common shares owned by Morgan Stanley and Morgan Stanley Capital services LLC as reported in Form 13G/A filed by Morgan Stanley and Morgan Stanley Capital services LLC on February 12, 2020. The percentage of beneficial ownership was calculated based on the total number of our common shares as of March 31, 2020. The principal business address of Morgan Stanley and Morgan Stanley Capital services LLC is 1585 Broadway New York, NY 10036.

None of our shareholders have different voting rights from other shareholders as of the date of this annual report on Form 20-F. We are currently not aware that we are directly or indirectly owned or controlled by another corporation, by any foreign government or by any other natural or legal person severally or jointly and we are currently not aware of any arrangement that may, at a subsequent date, result in a change of control of our company.

ITEM 7. MAJOR SHAREHOLDERS AND RELATED PARTY TRANSACTIONS

A. Major Shareholders

Please refer to “Item 6. Directors, Senior Management and Employees—E. Share Ownership.”

B. Related Party Transactions

Guarantees and Loans

Dr. Shawn Qu fully guaranteed one-year loan facilities from Chinese commercial banks of RMB1,346 million (\$206 million), RMB1,270 million (\$185 million) and RMB1,420 million (\$204 million) in 2017, 2018 and 2019, respectively. Amounts drawn down under the facilities as at December 31, 2017, 2018 and 2019 were \$135.2 million, \$156.0 million and \$82.9 million, respectively.

We granted 77,289, 83,805 and 26,691 restricted share units to Dr. Shawn Qu in 2017, 2018 and 2019, respectively, on account of his having guaranteed these loan facilities.

Sales and purchase contracts with affiliates

In 2019, we sold three solar power projects to CSIF, our 14.66% owned affiliate in Japan, in the amount of JPY5,889.0 million (\$53.9 million) recorded in revenue.

In 2019, we provided asset management services to CSIF in the amount of JPY281.1 million (\$2.6 million).

In 2019, we provided O&M services to CSIF in the amount of JPY223.6 million (\$2.1 million).

In 2019, we sold solar power products to ET Solutions South Africa 1 Pty, our 49% owned affiliate in South Africa, in the amount of ZAR586.8 million (\$41.0 million).

In 2019, we purchased raw materials from Suzhou iSilver Materials Co., Ltd., our 14.63% owned affiliate in China, in the amount of RMB350.6 million (\$50.4 million).

In 2019, we purchased equipment from Suzhou Kzone Equipment Technology Co., Ltd., our 32% owned affiliate in China, in the amount of RMB61.2 million (\$8.9 million).

Employment Agreements

See “Item 6. Directors, Senior Management and Employees—C. Board Practices—Employment Agreements.”

Share Incentive Plan

See “Item 6. Directors, Senior Management and Employees—B. Compensation of Directors and Executive Officers—Share-based Compensation—Share Incentive Plan.”

C. Interests of Experts and Counsel

Not applicable.

ITEM 8. FINANCIAL INFORMATION

A. Consolidated Statements and Other Financial Information

We have appended audited consolidated financial statements filed as part of this annual report.

Legal and Administrative Proceedings

Class Action Lawsuits

In January 2015, the plaintiff in a class action lawsuit filed against us and certain of our executive officers in the Ontario Superior Court of Justice obtained an order for class certification in respect of certain claims for which he had obtained leave in September 2014 to assert the statutory cause of action for misrepresentation under the Ontario Securities Act, for certain negligent misrepresentation claims and for oppression remedy claims advanced under the CBCA. The Court dismissed our application for leave to appeal and the class action is at the merits stage. The common issues trial is scheduled for November 2020. We believe the Ontario action is without merit and we are defending it vigorously.

Solar 1

On October 17, 2012, the United States Department of Commerce, or USDOC, issued final affirmative determinations with respect to its antidumping and countervailing duty investigations on crystalline silicon photovoltaic, or CSPV, cells, whether or not incorporated into modules, from China. On November 30, 2012, the U.S. International Trade Commission, or USITC, determined that imports of CSPV cells had caused material injury to the U.S. CSPV industry. The USITC's determination was subsequently affirmed by the U.S. Court of International Trade, or CIT, and the U.S. Court of Appeals for the Federal Circuit, or Federal Circuit.

As a result of these determinations, we were required to pay cash deposits on Chinese-origin CSPV cells imported into the U.S., whether or not incorporated into modules. The rates applicable to our company were 13.94% (antidumping duty) and 15.24% (countervailing duty). We paid all the cash deposits due under these determinations. Several parties challenged the determinations of the USITC in appeals to the CIT. On August 7, 2015, the CIT sustained the USITC's final determination and on January 22, 2018, the Federal Circuit upheld the CIT's decision. There was no further appeal to the U.S. Supreme Court and, therefore, this decision is final.

The rates at which duties will be assessed and payable are subject to administrative reviews.

The USDOC published the final results of the first administrative reviews in July 2015. As a result of these decisions, the duty rates applicable to us were revised to 9.67% (antidumping duty) and 20.94% (countervailing duty). The assessed rates were appealed to the CIT. The CIT affirmed the USDOC's countervailing duty rates, and no change was made to our countervailing duty rate. This decision by the CIT was not appealed to the Federal Circuit. The CIT likewise affirmed USDOC's antidumping duty rates, and no change was made to our antidumping duty rate. This decision by the CIT was, however, appealed to the Federal Circuit, which upheld the CIT's decision. There was no further appeal to the U.S. Supreme Court and, therefore, this decision is final.

The USDOC published the final results of the second administrative reviews in June 2016 (antidumping duty) and July 2016 (countervailing duty). As a result of these decisions, the antidumping duty rate applicable to us was reduced to 8.52% (from 9.67%) and then to 3.96% (from 8.52%). Because we were not subject to the second administrative review of the countervailing duty order, our countervailing duty rate remained at 20.94%. The antidumping duty rates were appealed to the CIT. The CIT affirmed the USDOC's second antidumping duty rate. This decision by the CIT was appealed to the Federal Circuit, with a decision expected in mid-2020.

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The USDOC published the final results of the third administrative reviews in June 2017 (antidumping duty) and July 2017 (countervailing duty), and later amended in October 2017. As result of these decisions, the duty rates applicable to us were changed to 13.07% (from 8.52%) (antidumping duty) and 18.16% (from 20.94%) (countervailing duty). The assessed rates were appealed to the CIT. The CIT has twice remanded the countervailing duty appeal to the USDOC to consider adjustments to our rate. The CIT will review any adjustments made by the USDOC to our rate and issue a ruling, which is expected later in 2020. The CIT has likewise twice remanded the antidumping duty appeal to the USDOC to consider adjustments to our rate. Pursuant to CIT's remand orders, the USDOC made redetermination. The antidumping duty rate applicable to our company was reduced to 4.12% (from 13.07%) and then further to 3.19% (from 4.12%). The countervailing duty rate was reduced to 7.36% (from 18.16%). These rates could be subject to additional judicial review.

The USDOC published the final results of the fourth administrative reviews in July 2018 (both antidumping duty and countervailing duty), with the countervailing duty rate later amended in October 2018. Because we were not subject to the fourth administrative review of the antidumping duty order, our antidumping duty rate remains at 13.07%. Because of these decisions, the countervailing duty rate applicable to us was reduced to 11.59% (from 18.16%). The countervailing duty rates were appealed to the CIT. The CIT has remanded the countervailing duty appeal to the USDOC to consider adjustments to our rate.

The USDOC published the final results of the fifth administrative reviews in July and August 2019. The antidumping duty rate applicable to us was lowered to 4.06% (from 13.07%). USDOC assessed a countervailing duty rate of 9.70% (from 11.59%). The countervailing duty final results were amended to correct ministerial errors in December 2019, but they resulted in no change to our 9.70% rate. The countervailing duty and antidumping duty rates were appealed to the CIT, which is likely to issue decisions in late 2020 or 2021.

The sixth administrative reviews are ongoing and are expected to conclude in mid-2020. The USDOC has assessed our company a preliminary antidumping duty rate of 60.94% (up from 4.06%). In the countervailing duty review, the USDOC has assessed our company a preliminary rate of 17.25% (up from 9.70%). The seventh antidumping duty and countervailing duty administrative reviews were initiated in February 2020 and are currently underway. The USDOC is likely to publish final results in these reviews in 2021. The final results of the sixth and seventh administrative reviews may result in duty rates that differ from the previous duty rates and cash deposit rates applicable to us. These duty rates could materially and adversely affect our U.S. import operations and increase our cost of selling into the U.S. market.

Between 2017 and 2019, the USDOC and USITC conducted five-year sunset reviews and determined to continue the Solar 1 antidumping and countervailing duty orders. In March 2018, the USDOC published the results of its expedited first sunset reviews and concluded that revocation of the Solar 1 orders would likely lead to a continuation or recurrence of dumping and a countervailable subsidy. We did not participate in USDOC's first sunset review. We did, however, participate in the USITC's first sunset review and requested that the Solar 1 duties be revoked. The USITC issued an affirmative determination in March 2019 declining to revoke the Solar 1 orders and finding that such revocation would be likely to lead to a continuation or recurrence of material injury to the U.S. industry within a reasonably foreseeable time. As a result, the Solar 1 orders remain in effect.

Solar 2

On December 31, 2013, SolarWorld Industries America, Inc. filed a new trade action with the USDOC and the USITC accusing Chinese producers of certain CSPV modules of dumping their products into the U.S. and of receiving countervailable subsidies from the Chinese authorities. This trade action also alleged that Taiwanese producers of certain CSPV cells and modules dumped their products into the U.S. Excluded from these new actions were those Chinese-origin solar products covered by the Solar 1 orders described above. We were identified as one of a number of Chinese producers exporting the Solar 2 subject goods to the U.S. market.

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“Chinese CSPV products subject to Solar 2 orders” refers to CSPV products manufactured in mainland China using non-Chinese (e.g., Taiwanese) CSPV cells and imported into the U.S. during the investigation or administrative review periods of Solar 2. “Taiwanese CSPV products subject to Solar 2 orders” refer to CSPV products manufactured outside of mainland China using Taiwanese CSPV cells and imported into the U.S. during the investigation or review periods of Solar 2.

On December 23, 2014, the USDOC issued final affirmative determinations with respect to its antidumping and countervailing duty investigation on these CSPV products. On January 21, 2015, the USITC determined that imports of these CSPV products had caused material injury to the U.S. CSPV industry. As a result of these determinations, we are required to pay cash deposits on these CSPV products, the rates of which applicable to our Chinese CSPV products were 30.06% (antidumping duty) and 38.43% (countervailing duty). The antidumping cash deposit rate applicable to our Taiwanese CSPV products subject to Solar 2 orders varied by solar cell producer. We paid all the cash deposits due under these determinations.

The USDOC’s determination and the assessed countervailing duty rates were appealed to the CIT and the Federal Circuit. In March 2019, the Federal Circuit affirmed the CIT’s decision confirming the USDOC’s determination but reduced our countervailing duty rate to 33.58% (from 38.43%). There was no further appeal to the U.S. Supreme Court and, therefore, this decision is final.

The rates at which duties will be assessed and payable are subject to administrative reviews.

The USDOC published the final results of the first administrative reviews in July 2017 (China and Taiwan antidumping duty orders) and September 2017 (China-only countervailing duty order). Because we were not subject to the first administrative reviews of the Chinese orders of Solar 2, our duty rates will remain at 30.06% (antidumping duty) and 33.58% (countervailing duty) for our Chinese CSPV products. Our antidumping duty rates for our Taiwanese CSPV products had ranged from 3.56% to 4.20%, until they were changed to 1.52% to 3.78% in June 2019.

The second administrative reviews for the Chinese antidumping and countervailing duty orders were rescinded, meaning that there is no change in the Chinese antidumping and countervailing duty rates applicable to our Chinese CSPV products 30.06% (antidumping duty) and 33.58% (countervailing duty). There is no countervailing duty order on Taiwan Solar 2 products. The USDOC published the final results of the second administrative review for the Taiwanese antidumping duty order (there is no countervailing duty order) in June 2018. The rate applicable to us is 1.33%. There is no ongoing litigation related to the Taiwanese antidumping duty rate.

We were not subject to the third administrative reviews of the Chinese orders and, therefore, our duty rates remained unchanged at 30.06% (antidumping duty) and 33.58% (countervailing duty) for our Chinese CSPV products. There is no countervailing duty order on Taiwan Solar 2 products. The third administrative review of the Taiwanese antidumping order concluded in mid-2019. The rate assessed to us was 4.39% (from 1.33%). There is no ongoing litigation related to the Taiwanese antidumping duty rate.

The USDOC rescinded the fourth administrative reviews of the Chinese antidumping duty and countervailing duty orders in late 2019. Our duty rates will remain unchanged at 30.06% (antidumping duty) and 33.58% (countervailing duty) for our Chinese CSPV products. The rate assessed to us in the fourth administrative review of the Taiwanese antidumping order was 2.57% (from 4.39%). The USDOC also found that certain Canadian Solar entities had no shipments during this period of this review.

We will not be subject to the fifth administrative review of the Chinese orders and, therefore, our duty rates will remain unchanged at 30.06% (antidumping duty) and 33.58% (countervailing duty) for our Chinese CSPV products. The USDOC is expected to initiate the fifth administrative review of the Taiwanese orders soon.

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The USDOC and USITC are currently conducting five-year sunset reviews to determine whether to continue the Solar 2 orders on CSPV products from China and Taiwan. The USDOC is conducting an expedited review, with its final results expected in May 2020. The USITC is currently assessing whether it will conduct an expedited or full sunset review, with a decision due on this issue in spring 2020. The USITC's sunset review will follow this preliminary decision

Section 201

On May 17, 2017, following receipt of a petition from Suniva, Inc., which was later joined by SolarWorld Americas, Inc., the USITC instituted a safeguard investigation to determine whether there were increased imports of CSPV products in such quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing like or directly competitive products. On September 22, 2017, the USITC determined that CSPV products are being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry.

On January 23, 2018, the President of the United States imposed a safeguard measure on imports of CSPV cells, whether or not partially or fully assembled into other products such as modules, consisting of (1) a tariff-rate quota for four years on imports of CSPV cells not partially or fully assembled into other products, with (a) an in-quota quantity of 2.5 gigawatts, and (b) a tariff rate applicable to over-quota CSPV cells of 30%, declining annually by five percentage points to 25% in the second year, 20% in the third year, and 15% in the fourth year; and (2) a 30% tariff for four years on CSPV modules, declining annually by five percentage points to 25% in the second year, 20% in the third year, and 15% in the fourth year. This safeguard measure, which became effective on February 7, 2018, applies to CSPV products imported from all countries, except for certain developing country members of the World Trade Organization.

The USITC conducted a midterm review of the safeguard order in early 2020, issuing its monitoring report in February 2020. Additionally, in March 2020, at the request of the Office of the U.S. Trade Representative (USTR), the USITC released a report regarding the probable economic effect on the domestic CSPV cell and module manufacturing industry of modifying the safeguard measure on CSPV products. The USITC found that increasing the tariff-rate quota on CSPV cells (an integral component of CSPV modules) would likely result in a substantial increase in U.S. module producers' production, capacity utilization, and employment. The President is required to consider the USITC's views but is not required to take any action. The President has the authority to reduce, modify, or terminate the safeguard measures if the President determines that (1) the effectiveness of the safeguard action has been impaired by changed economic circumstances, or (2) the domestic industry has not made adequate efforts to make a positive adjustment to import competition. Alternatively, if a majority of the domestic industry petitions the President that the domestic industry has made a positive adjustment to import competition, then the President may likewise reduce, modify, or terminate the safeguard measures. The President has not yet taken action following receipt of the USITC reports.

In addition, on June 13, 2019 and following an abbreviated public comment period, USTR granted an exclusion from the safeguard measure for bifacial solar panels comprising solely bifacial solar cells. On October 9, 2019, USTR determined to withdraw this exclusion, effective October 28, 2019. Invenenergy Renewables LLC contested USTR's withdrawal determination at the CIT and persuaded the Court to enjoin USTR's withdrawal due to procedural deficiencies. In early 2020, USTR conducted a renewed notice-and-comment process in order to withdraw the exclusion for bifacial solar panels. Subject to the CIT's further review, the exclusion could be terminated as soon as May 18, 2020.

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European Antidumping and Anti-Subsidy Investigations

On September 6, 2012, following a complaint lodged by EU ProSun, an ad-hoc industry association of EU CSPV module, cell and wafer manufacturers, the European Commission initiated an antidumping investigation concerning EU imports of CSPV modules and key components (i.e., cells and wafers) originating in China. On November 8, 2012, following a complaint lodged by the same parties, the European Commission initiated an anti-subsidy investigation on these same products. On December 6, 2013, the EU imposed definitive antidumping and countervailing measures on imports of CSPV modules and key components (i.e., cells and wafers) originating in or consigned from China. On March 3, 2017, the European Commission extended the antidumping and countervailing measures for 18 months on imports of CSPV modules and key components (i.e., cells and wafers) originating in or consigned from China. On September 16, 2017, the European Commission amended the form of the antidumping and countervailing measures for certain Chinese exporters (but not for Canadian Solar). On March 9, 2018, the antidumping and countervailing measures expired. As a result, since then, our CSPV modules and cells that originate in, or are consigned from, China, are no longer subject to antidumping or countervailing measures.

On February 28, 2014, we filed separate actions with the General Court of the EU for annulment of the regulation imposing the definitive antidumping measures and of the regulation imposing the definitive countervailing measures (case T-162/14 and joined cases T-158/14, T-161/14, and T-163/14). The General Court rejected these actions for annulment. On May 8, 2017, we appealed the judgements of the General Court before the Court of Justice of the EU (cases C-236/17 and C-237/17). On March 27, 2019, the Court of Justice rejected the appeals. There is no further action with regard to these matters.

Canadian Antidumping and Countervailing Duties Expiry Review

Background: On June 3, 2015, the Canada Border Services Agency (CBSA) released final determinations regarding the dumping and subsidization of solar modules and laminates originating from China. The CBSA determined that such goods were dumped and subsidized. The CBSA found Canadian Solar to be a “cooperative exporter” and, as such, ascertained a low (relative to other Chinese exporters) Canadian Solar-specific subsidies rate of RMB0.014 per Watt. On July 3, 2015 the Canadian International Trade Tribunal (CITT) determined that the Canadian industry was not negatively affected as a result of imported modules but was threatened with such negative impact. As a result of these findings, definitive duties were imposed on imports of Chinese solar modules into Canada starting on July 3, 2015. The CITT is required by law to review such finding every five (5) years lest the finding expire. The CITT’s finding expires on July 2, 2020.

Current Expiry Review: On April 1, 2020, the CITT initiated the preliminary stage of the expiry review regarding the above finding. Canadian Solar has responded to the CITT with its intent to participate in such review. The CITT will decide by May 21, 2020 based on responses to be received from domestic and Chinese producers whether the expiry review is warranted.

Regardless of the outcome, we do not believe there will be a material negative effect upon our results of operations because we have module manufacturing capacity in Ontario and do not rely on Chinese solar modules to serve our Canadian business.

Dividend Policy

We have never declared or paid any dividends on our common shares, nor do we have any present plan to declare or pay any dividends on our common shares in the foreseeable future. We currently intend to retain our available funds and any future earnings to operate and expand our business.

Our board of directors has complete discretion on whether to pay dividends, subject only to the requirements of the CBCA. Even if our board of directors decides to pay dividends, the form, frequency and amount will depend upon our future operations, earnings, capital requirements, surplus, general financial condition, contractual restrictions, and other factors that our board of directors may deem relevant.

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B. Significant Changes

We have not experienced any significant changes since the date of our audited consolidated financial statements included in this annual report.

ITEM 9. *THE OFFER AND LISTING*

A. Offering and Listing Details

Not applicable.

B. Plan of Distribution

Not applicable.

C. Markets

Our common shares have been listed on the Nasdaq since November 9, 2006 under the symbol “CSIQ.”

D. Selling Shareholders

Not applicable.

E. Dilution

Not applicable.

F. Expenses of the Issue

Not applicable.

ITEM 10. *ADDITIONAL INFORMATION*

A. Share Capital

Not applicable.

B. Memorandum and Articles of Association

We incorporate by reference into this annual report the description of our Amended Articles of Continuance, as amended, contained in our F-1 registration statement (File No. 333-138144), as amended, initially filed with the SEC on October 23, 2006.

C. Material Contracts

We have not entered into any material contracts other than in the ordinary course of business and other than those described in “Item 4. Information on the Company” or elsewhere in this annual report on Form 20-F.

D. Exchange Controls

See “Item 4. Information on the Company—B. Business Overview—Government Regulations—Foreign Currency Exchange” and “Item 4. Information on the Company—B. Business Overview—Government Regulations—Dividend Distribution.”

E. Taxation

Principal Canadian Federal Tax Considerations

General

The following is a summary of the principal Canadian federal income tax implications generally applicable to a U.S. Holder (defined below), who holds or acquires our common shares, or the Common Shares, and who, at all relevant times, for purposes of the Income Tax Act (Canada), or the Canadian Tax Act, (i) is the beneficial owner of such Common Shares; (ii) has not been, is not and will not be resident (or deemed to be resident) in Canada at any time while such U.S. Holder has held or holds the Common Shares; (iii) holds the Common Shares as capital property; (iv) deals at arm's length with and is not affiliated with us; (v) does not use or hold, and is not deemed to use or hold, the Common Shares in the course of carrying on a business in Canada; (vi) is not part of a transaction or event or series of transactions or events that includes the acquisition or holding of Common Shares so as to cause the foreign affiliate dumping rules in section 212.3 of the Canadian Tax Act to apply; (vii) is not a "specified shareholder" of us as defined subsection 18(5) of the Canadian Tax Act; (viii) is not a financial institution, specified financial institution, partnership or trust as defined in the Canadian Tax Act; (ix) is a resident of the United States for purposes of the Canada—United States Income Tax Convention (1980), or the Convention, and is fully entitled to the benefits of the Convention; and (x) has not, does not and will not have a fixed base or permanent establishment in Canada within the meaning of the Convention at any time when such U.S. Holder has held or holds the Common Shares, or a U.S. Holder. Special rules that are not addressed in this summary may apply to a U.S. Holder that is an insurer that carries on, or is deemed to carry on, an insurance business in Canada and elsewhere or that is an authorized foreign bank as defined in the Canadian Tax Act and such U.S. Holders should consult their own tax advisers.

This summary assumes that we are a resident of Canada for the purposes of the Canadian Tax Act. Should it be determined that we are not a resident of Canada for the purposes of the Canadian Tax Act by virtue of being resident in another country (such as the PRC) by virtue of the application of an income tax convention between Canada and that other country, the Canadian income tax consequences to a U.S. Holder will differ from those described herein and U.S. Holders should consult their own tax advisors.

This summary is based on the current provisions of the Canadian Tax Act, and the regulations thereunder, the Convention, and our counsel's understanding of the published administrative practices and policies of the Canada Revenue Agency, all in effect as of the date of this annual report on Form 20-F. This summary takes into account all specific proposals to amend the Canadian Tax Act or the regulations thereunder publicly announced by or on behalf of the Minister of Finance (Canada) prior to the date of this annual report on Form 20-F. No assurances can be given that such proposed amendments will be enacted in the form proposed, or at all. This is not an exhaustive summary of all potential Canadian federal income tax consequences to a U.S. Holder and this summary does not take into account or anticipate any other changes in law or administrative practices, whether by judicial, governmental or legislative action or decision, nor does it take into account provincial, territorial or foreign tax legislation or considerations, which may differ from the Canadian federal income tax considerations described herein.

The Canadian federal income tax consequences of purchasing, owning and disposing of Common Shares will depend on each U.S. Holder's particular situation. This summary is not intended to be a complete analysis of or description of all potential Canadian federal income tax consequences, and should not be construed to be, legal, business or tax advice directed at any particular U.S. Holder or prospective purchaser of Common Shares. Accordingly, U.S. Holders or prospective purchasers of Common Shares should consult their own tax advisors for advice with respect to the Canadian federal income tax consequences of an investment in Common Shares based on their own particular circumstances.

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Dividends

Amounts paid or credited, or deemed under the Canadian Tax Act to be paid or credited, on account or in lieu of payment of, or in satisfaction of, dividends to a U.S. Holder that has provided the requisite documentation regarding its entitlement to benefits under the Convention will be subject to Canadian non-resident withholding tax at the reduced rate of 15% under the Convention. This rate is further reduced to 5% in the case of a U.S. Holder that is a company for purposes of the Convention that owns at least 10% of our voting shares at the time the dividend is paid or deemed to be paid.

Disposition of Our Common Shares

A U.S. Holder will not be subject to income tax under the Canadian Tax Act in respect of any capital gain realized on a disposition or deemed disposition of its Common Shares unless, at the time of disposition, the Common Shares constitute “taxable Canadian property” of the U.S. Holder for the purposes of the Canadian Tax Act and the U.S. Holder is not otherwise entitled to an exemption under the Convention.

Generally, a Common Share owned by a U.S. Holder will not be taxable Canadian property of the U.S. Holder at a particular time provided that, at that time, the common shares of our company are listed on a designated stock exchange (which currently includes the Nasdaq), unless at any time in the previous 60 month period:

- the U.S. Holder and persons with whom the U.S. Holder does not deal at arm’s length alone or in any combination has owned 25% or more of the shares of any class or series of shares in the capital of our company, and
- more than 50% of the fair market value of the Common Shares is derived directly or indirectly from one or any combination of real or immovable property situated in Canada, Canadian resource properties, timber resource properties, and options in respect of, or interest in or rights in any such properties, whether or not such property exists; or
- the Common Shares are otherwise deemed under the Canadian Tax Act to be taxable Canadian property.

U.S. Holders for whom the Common Shares are, or may be, taxable Canadian property should consult their own tax advisors.

Canada—United States Income Tax Convention

The Convention includes a complex limitation on benefits provision. U.S. Holders are urged to consult their own tax advisors to determine their entitlement to benefits under the Convention.

United States Federal Income Taxation

The following discussion describes the material United States federal income tax consequences to a United States Holder (as defined below), under current law, of an investment in our common shares. This discussion is based on the federal income tax laws of the United States as of the date of this annual report on Form 20-F, including the United States Internal Revenue Code of 1986, as amended, or the Code, existing and proposed Treasury Regulations promulgated thereunder, judicial authority, published administrative positions of the United States Internal Revenue Service, or IRS, and other applicable authorities, all as of the date of this annual report on Form 20-F. All of the foregoing authorities are subject to change, which change could apply retroactively and could significantly affect the tax consequences described below. We have not sought any ruling from the IRS with respect to the statements made and the conclusions reached in the following discussion and there can be no assurance that the IRS or a court will agree with our statements and conclusions. Except as explicitly described below, this discussion does not address any reporting obligations that may be applicable to persons holding common shares through a bank, financial institution or other entity, or a branch thereof located, organized or resident outside the United States.

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This discussion applies only to a United States Holder (as defined below) that holds common shares as capital assets for United States federal income tax purposes (generally, property held for investment). The discussion neither addresses the tax consequences to any particular investor nor describes all of the tax consequences applicable to persons in special tax situations such as:

- banks and certain other financial institutions;
- insurance companies;
- regulated investment companies;
- real estate investment trusts;
- brokers or dealers in stocks and securities, or currencies;
- persons who use or are required to use a mark-to-market method of accounting;
- certain former citizens or residents of the United States subject to Section 877 of the Code;
- entities subject to the United States anti-inversion rules;
- tax-exempt organizations and entities;
- persons subject to the alternative minimum tax provisions of the Code;
- persons whose functional currency is other than the United States dollar;
- persons holding common shares as part of a straddle, hedging, conversion or integrated transaction;
- persons that actually or constructively own common shares representing 10% or more of our voting power or value;
- persons who acquired common shares pursuant to the exercise of an employee stock option or otherwise as compensation;
- partnerships or other pass-through entities, or persons holding common shares through such entities;
- persons required to accelerate the recognition of any item of gross income with respect to our common shares as a result of such income being recognized on an applicable financial statement; or
- persons that held, directly, indirectly or by attribution, common shares or other ownership interest in us prior to our initial public offering.

This discussion, moreover, does not address the United States federal estate, gift, Medicare, and alternative minimum tax considerations, or any state, local and non-United States tax considerations, relating to the ownership and disposition of our common shares. Except as specifically described below, this discussion does not address any tax consequences or reporting obligations that may be applicable to persons holding common shares through a bank, financial institution or other entity, or a branch thereof, located, organized or resident outside the United States.

If a partnership (including an entity or arrangement treated as a partnership for United States federal income tax purposes) holds the common shares, the tax treatment of a partner in the partnership generally will depend upon the status of the partner and the activities of the partnership. A partnership or partner in a partnership holding common shares should consult its own tax advisors regarding the tax consequences of investing in and holding the common shares.

THE FOLLOWING DISCUSSION IS FOR INFORMATIONAL PURPOSES ONLY AND IS NOT A SUBSTITUTE FOR CAREFUL TAX PLANNING AND ADVICE. HOLDERS SHOULD CONSULT THEIR OWN TAX ADVISORS WITH RESPECT TO THE APPLICATION OF THE UNITED STATES FEDERAL INCOME TAX LAWS TO THEIR PARTICULAR SITUATIONS, AS WELL AS ANY TAX CONSEQUENCES ARISING UNDER THE FEDERAL ESTATE OR GIFT TAX LAWS OR THE LAWS OF ANY STATE, LOCAL OR NON-UNITED STATES TAXING JURISDICTION OR UNDER ANY APPLICABLE TAX TREATY.

For purposes of the discussion below, a “United States Holder” is a beneficial owner of the common shares that is, for United States federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation (or other entity treated as a corporation for United States federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate, the income of which is subject to United States federal income taxation regardless of its source; or
- a trust, if (i) a court within the United States is able to exercise primary jurisdiction over its administration and one or more United States persons have the authority to control all of its substantial decisions or (ii) in the case of a trust that was treated as a domestic trust under the law in effect before 1997, a valid election is in place under applicable Treasury Regulations to treat such trust as a domestic trust.

Dividends and Other Distributions on the Common Shares

Subject to the passive foreign investment company rules discussed below, the gross amount of any distribution that we make to you with respect to the common shares (including any amounts withheld to reflect Canadian or PRC withholding taxes) will be taxable as a dividend, to the extent paid out of our current or accumulated earnings and profits, as determined under United States federal income tax principles. Such income (including any withheld taxes) will be includable in your gross income on the day actually or constructively received by you. Because we do not intend to determine our earnings and profits on the basis of United States federal income tax principles, any distribution paid generally will be reported as a “dividend” for United States federal income tax purposes. Such dividends will not be eligible for the dividends-received deduction allowed to qualifying corporations under the Code.

Dividends received by a non-corporate United States Holder may qualify for the lower rates of tax applicable to “qualified dividend income,” if the dividends are paid by a “qualified foreign corporation” and other conditions discussed below are met. A non-United States corporation is treated as a qualified foreign corporation (a) with respect to dividends paid by that corporation on shares that are readily tradable on an established securities market in the United States or (b) if such non-United States corporation is eligible for the benefits of a qualifying income tax treaty with the United States that includes an exchange of information program. However, we will not be treated as a qualified foreign corporation if we are a passive foreign investment company in the taxable year in which the dividend is paid or the preceding taxable year.

Under a published IRS Notice, common shares are considered to be readily tradable on an established securities market in the United States if they are listed on the Nasdaq, as our common shares are. In addition, we may be eligible for the benefits of the income tax treaty between the United States and Canada, or, if we are treated as a PRC resident enterprise under the PRC tax law (see “—People’s Republic of China Taxation”) then we may be eligible for the benefits of the income tax treaty between the United States and the PRC. If we are eligible for such benefits, then dividends that we pay on our common shares would, subject to applicable limitations, be eligible for the reduced rates of taxation.

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Even if dividends would be treated as paid by a qualified foreign corporation, a non-corporate United States Holder will not be eligible for reduced rates of taxation if it does not hold our common shares for more than 60 days during the 121-day period beginning 60 days before the ex-dividend date or if the United States Holder elects to treat the dividend income as “investment income” pursuant to Section 163(d)(4) of the Code. In addition, the rate reduction will not apply to dividends of a qualified foreign corporation if the non-corporate United States Holder receiving the dividend is obligated to make related payments with respect to positions in substantially similar or related property.

You should consult your own tax advisors regarding the availability of the lower tax rates applicable to qualified dividend income for any dividends that we pay with respect to the common shares, as well as the effect of any change in applicable law after the date of this annual report on Form 20-F.

Any Canadian or PRC withholding taxes imposed on dividends paid to you with respect to the common shares generally will be treated as foreign taxes eligible for credit against your United States federal income tax liability, subject to the various limitations and disallowance rules that apply to foreign tax credits generally. For purposes of calculating the foreign tax credit, dividends paid to you with respect to the common shares will be treated as income from sources outside the United States and generally will constitute passive category income. The rules relating to the determination of the foreign tax credit are complex, and you should consult your tax advisors regarding the availability of a foreign tax credit in your particular circumstances.

The amount of any dividend paid in currency other than the United States dollar will be the dividend’s United States dollar value calculated by reference to the exchange rate in effect on the date of receipt, regardless of whether the payment is in fact converted into United States dollars. A United States Holder may have foreign currency gain or loss, which will be ordinary gain or loss, if any dividend is converted into United States dollars after the date of receipt.

Disposition of the Common Shares

You will recognize gain or loss on a sale or exchange of the common shares in an amount equal to the difference between the amount realized on the sale or exchange and your tax basis in the common shares. Subject to the discussion under “—Passive Foreign Investment Company” below, such gain or loss generally will be capital gain or loss. Capital gains of a non-corporate United States Holder, including an individual that has held the common share for more than one year, currently are eligible for reduced tax rates. The deductibility of capital losses is subject to limitations.

Any gain or loss that you recognize on a disposition of the common shares generally will be treated as United States-source income or loss for foreign tax credit limitation purposes. However, if we are treated as a PRC resident enterprise for PRC tax purposes and PRC tax is imposed on gain from the disposition of the common shares (see “—People’s Republic of China Taxation”) then a United States Holder that is eligible for the benefits of the income tax treaty between the United States and the PRC may elect to treat the gain as PRC-source income for foreign tax credit purposes. If such an election is made, the gain so treated will be treated as a separate class or “basket” of income for foreign tax credit purposes. You should consult your tax advisors regarding the proper treatment of gain or loss, as well as the availability of a foreign tax credit, in your particular circumstances.

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A United States Holder that receives currency other than the United States dollar upon the sale or other disposition of common shares will realize an amount equal to the United States dollar value of the foreign currency on the date of such sale or other disposition or, if the common shares are traded on an established securities market, in the case of cash basis and electing accrual basis taxpayers, the settlement date. If a United States Holder is not able to treat the settlement date as the realization date, the United States Holder will recognize currency gain or loss if the United States dollar value of the currency received on the settlement date differs from the amount realized. A United States Holder will have a tax basis in the currency received equal to the United States dollar amount at the spot rate on the settlement date. Generally, any gain or loss realized by a United States Holder on a subsequent conversion or disposition of such currency will be United States source ordinary income or loss.

Passive Foreign Investment Company

Based on the current value of our assets and the composition of our income and assets, we do not believe we were a passive foreign investment company, or PFIC, for United States federal income tax purposes for our taxable year ended December 31, 2019. However, because our PFIC status for our current taxable year ending December 31, 2020 or any future taxable year may depend, in part, on the manner in which we operate our renewable energy generation assets, we cannot assure you that we will not be a PFIC for our current taxable year ending December 31, 2020 or any future taxable year. The determination of PFIC status is based on an annual determination that cannot be made until the close of a taxable year, involves extensive factual investigation, including ascertaining the fair market value of all of our assets on a quarterly basis and the character of each item of income that we earn, and is subject to uncertainty in several respects. In particular, the application of the PFIC rules to certain of our business lines is complex and unclear, and we cannot guarantee that the United States Internal Revenue Service, or IRS, will agree with any positions that we ultimately take. Accordingly, we cannot assure you that we will not be treated as a PFIC for any taxable year or that the IRS will not take a contrary position.

A non-United States corporation such as ourselves will be treated as a PFIC, for United States federal income tax purposes for any taxable year if, applying applicable look-through rules, either:

- at least 75% of its gross income for such year is passive income; or
- at least 50% of the value of its assets (determined based on a quarterly average) during such year is attributable to assets that produce or are held for the production of passive income.

For this purpose, passive income generally includes dividends, interest, royalties, rents (other than certain royalties and rents derived in the active conduct of a trade or business and not derived from a related person) and net gains from transactions involving commodities. There are exceptions for income derived in the conduct of certain active businesses, including for income earned from commodities transactions. There is authority to suggest that income earned from our electricity generation business may qualify under the active business exception, but this authority is unclear. We will be treated as owning a proportionate share of the assets and earning a proportionate share of the income of any other corporation in which we own, directly or indirectly, more than 25% by value of the stock. If the percentage of our assets treated as producing passive income increases, we may be more likely to be a PFIC for the current or one or more future taxable years.

Changes in the composition of our income or composition of our assets may cause us to be more likely to be a PFIC. The determination of whether we will be a PFIC for any taxable year also may depend in part upon the value of our goodwill and other unbooked intangibles not reflected on our balance sheet (which may be determined based upon the market value of the common shares from time to time, which may be volatile). Among other matters, if our market capitalization declines, we may be a PFIC because our liquid assets and cash (which are for this purpose considered assets that produce passive income) may then represent a greater percentage of our overall assets. Further, while we believe our classification methodology and valuation approach (including, if relevant, any approach taken with respect to our market capitalization) is reasonable, it is possible that the IRS may challenge our classification or valuation of our goodwill and other unbooked intangibles.

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If we are a PFIC for any taxable year during which you hold common shares, we will continue to be treated as a PFIC with respect to you for all succeeding years during which you hold common shares, unless we were to cease to be a PFIC and you make a “deemed sale” election with respect to the common shares. If such election is made, you will be deemed to have sold the common shares you hold at their fair market value and any gain from such deemed sale would be subject to the rules described in the following two paragraphs. After the deemed sale election, so long as we do not become a PFIC in a subsequent taxable year, your common shares with respect to which such election was made will not be treated as shares in a PFIC and, as a result, you will not be subject to the rules described below with respect to any “excess distribution” you receive from us or any gain from an actual sale or other disposition of the common shares. You are strongly urged to consult your tax advisors as to the possibility and consequences of making a deemed sale election if we are and then cease to be a PFIC and such an election becomes available to you.

If we are a PFIC for any taxable year during which you hold common shares, then, unless you make a “mark-to-market” election (as discussed below), you generally will be subject to special and adverse tax rules with respect to any “excess distribution” that you receive from us and any gain that you recognize from a sale or other disposition, including a pledge, of the common shares. For this purpose, distributions that you receive in a taxable year that are greater than 125% of the average annual distributions that you received during the shorter of the three preceding taxable years or your holding period for the common shares will be treated as an excess distribution. Under these rules:

- the excess distribution or recognized gain will be allocated ratably over your holding period for the common shares;
- the amount of the excess distribution or recognized gain allocated to the taxable year of distribution or gain, and to any taxable years in your holding period prior to the first taxable year in which we were treated as a PFIC, will be treated as ordinary income; and
- the amount of the excess distribution or recognized gain allocated to each other taxable year will be subject to the highest tax rate in effect for individuals or corporations, as applicable, for each such year and the resulting tax will be subject to the interest charge generally applicable to underpayments of tax.

If we are a PFIC for any taxable year during which you hold common shares and any of our non-United States subsidiaries or other corporate entities in which we directly or indirectly own equity interests is also a PFIC, you would be treated as owning a proportionate amount (by value) of the shares of each such non-United States entity classified as a PFIC (each such entity, a lower-tier PFIC) for purposes of the application of these rules. You should consult your own tax advisor regarding the application of the PFIC rules to any of our lower tier PFICs.

If we are a PFIC for any taxable year during which you hold common shares, then in lieu of being subject to the tax and interest-charge rules discussed above, you may make an election to include gain on the common shares as ordinary income under a mark-to-market method, provided that the common shares constitute “marketable stock.” Marketable stock is stock that is regularly traded on a qualified exchange or other market, as defined in applicable Treasury regulations. Our common shares are listed on the Nasdaq, which is a qualified exchange or other market for these purposes. Consequently, as long as the common shares are regularly traded, and you are a holder of common shares, we expect that the mark-to-market election would be available to you, if we became a PFIC but no assurances are given in this regard.

Because a mark-to-market election cannot be made for any lower-tier PFICs that we may own, if we were a PFIC for any taxable year, a United States Holder that makes the mark-to-market election may continue to be subject to the tax and interest charges under the general PFIC rules with respect to such United States Holder’s indirect interest in any investments held by us that are treated as an equity interest in a PFIC for United States federal income tax purposes.

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In certain circumstances, a shareholder in a PFIC may avoid the adverse tax and interest-charge regime described above by making a “qualified electing fund” election to include in income its share of the corporation’s income on a current basis. However, you may make a qualified electing fund election with respect to your common shares only if we agree to furnish you annually with a PFIC annual information statement as specified in the applicable Treasury regulations. We currently do not intend to prepare or provide the information that would enable you to make a qualified electing fund election.

A United States Holder that holds the common shares in any year in which we are classified as a PFIC will be required to file an annual report containing such information as the United States Treasury Department may require. You should consult your own tax advisor regarding the application of the PFIC rules to your ownership and disposition of the common shares and the availability, application and consequences of the active business exception and the elections discussed above.

Information Reporting and Backup Withholding

Information reporting to the IRS and backup withholding generally will apply to dividends in respect of our common shares, and the proceeds from the sale or exchange of our common shares, that are paid to you within the United States (and in certain cases, outside the United States), unless you furnish a correct taxpayer identification number and make any other required certification, generally on IRS Form W-9 or you otherwise establish an exemption from information reporting and backup withholding. Backup withholding is not an additional tax. Amounts withheld as backup withholding generally are allowed as a credit against your United States federal income tax liability, and you may be entitled to obtain a refund of any excess amounts withheld under the backup withholding rules if you file an appropriate claim for refund with the IRS and furnish any required information in a timely manner.

United States Holders should consult their tax advisors regarding the application of the information reporting and backup withholding rules.

Information with Respect to Foreign Financial Assets

United States Holders who are individuals (and certain entities closely held by individuals) generally will be required to report our name, address and such information relating to an interest in the common shares as is necessary to identify the class or issue of which your common shares are a part. These requirements are subject to exceptions, including an exception for common shares held in accounts maintained by certain financial institutions and an exception applicable if the aggregate value of all “specified foreign financial assets” (as defined in the Code) does not exceed \$50,000.

United States Holders should consult their tax advisors regarding the application of these information reporting rules.

People's Republic of China Taxation

Under the EIT Law, which took effect as of January 1, 2008 and amended on February 24, 2017 and December 29, 2018, enterprises established under the laws of non-PRC jurisdictions but whose “de facto management body” is located in China are considered “resident enterprises” for PRC tax purposes. Under the implementation regulations issued by the State Council relating to the EIT Law, “de facto management bodies” are defined as the bodies that have material and overall management and control over the business, personnel, accounts and properties of an enterprise. The Circular on Identification of China-controlled Overseas-registered Enterprises as Resident Enterprises on the Basis of Actual Management Organization, or Circular 82, further provides certain specific criteria for determining whether the “de facto management body” of a PRC-controlled offshore incorporated enterprise is located in the PRC. The criteria include whether (a) the premises where the senior management and the senior management bodies responsible for the routine production and business management of the enterprise perform their functions are mainly located within the PRC, (b) decisions relating to the enterprise’s financial and human resource matters are made or subject to approval by organizations or personnel in the PRC, (c) the enterprise’s primary assets, accounting books and records, company seals, and board and shareholders’ meeting minutes are located or maintained in the PRC and (d) 50% or more of voting board members or senior executives of the enterprise habitually reside in the PRC. Although the Circular 82 only applies to offshore enterprises controlled by enterprises or enterprise group located within the PRC, the determining criteria set forth in the Circular 82 may reflect the tax authorities’ general position on how the “de facto management body” test may be applied in determining the tax resident status of offshore enterprises. As the tax resident status of an enterprise is subject to the determination by the PRC tax authorities, uncertainties remain with respect to the interpretation of the term “de facto management body” as applicable to us.

Under the EIT Law and its implementation regulations, dividends paid to a non-PRC investor are generally subject to a 10% PRC withholding tax, if such dividends are derived from sources within China and the non-PRC investor is considered to be a non-resident enterprise without any establishment or place within China or if the dividends paid have no connection with the non-PRC investor’s establishment or place within China, unless such tax is eliminated or reduced under an applicable tax treaty. Similarly, any gain realized on the transfer of shares or convertible notes by such investor is also subject to a 10% PRC withholding tax if such gain is regarded as income derived from sources within China, unless such tax is eliminated or reduced under an applicable tax treaty.

The implementation regulations of the EIT Law provide that (a) if the enterprise that distributes dividends is domiciled in the PRC, or (b) if gains are realized from transferring equity interests of enterprises domiciled in the PRC, then such dividends or capital gains shall be treated as China-sourced income. Currently there are no detailed rules applicable to us that govern the procedures and specific criteria for determining the meaning of being “domiciled” in the PRC. As such, it is not clear how the concept of domicile will be interpreted under the EIT Law. Domicile may be interpreted as the jurisdiction where the enterprise is incorporated or where the enterprise is a tax resident.

As a result, if we are considered a PRC “resident enterprise” for tax purpose, it is possible that the dividends we pay with respect to our common shares to non-PRC enterprises, or the gain non-PRC enterprises may realize from the transfer of our common shares or our convertible notes, would be treated as income derived from sources within China and be subject to the PRC withholding tax at a rate of 10% or a lower applicable treaty rate for enterprises.

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Under the IIT Law, individual income tax is payable on PRC-source dividend income. The implementation regulations of the IIT Law provide that income from dividends derived from companies, enterprises and other economic organizations in China as well as income realized from transfer of properties in China is considered derived from sources inside China, regardless of whether the place of payment was inside China. Therefore, if we are treated as a company in China for tax purposes, any dividends we pay to our non-PRC individual shareholders as well as any gains realized by our non-PRC individual shareholders or our non-PRC individual note holders from the transfer of our common shares or our convertible notes may be regarded as China-sourced income and, consequently, be subject to PRC withholding tax at a rate of up to 20% or a lower applicable treaty rate for individuals.

F. Dividends and Paying Agents

Not applicable.

G. Statement by Experts

Not applicable.

H. Documents on Display

We previously filed with the SEC our registration statements on Form F-1 (File Number 333-138144), initially filed on October 23, 2006, and registration statements on Form F-3 (File Number 333-208828), initially filed on January 4, 2016.

We are subject to the periodic reporting and other informational requirements of the Exchange Act. Under the Exchange Act, we are required to file reports and other information with the SEC. Specifically, we are required to file annually a Form 20-F within four months after the end of each fiscal year for fiscal years ending on or after December 15, 2011. Copies of reports and other information, when so filed, may be inspected without charge and may be obtained at prescribed rates at the public reference facilities maintained by the Securities and Exchange Commission at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. The public may obtain information regarding the Washington, D.C. Public Reference Room by calling the Commission at 1-800-SEC-0330. The SEC also maintains a web site at www.sec.gov that contains reports, proxy and information statements, and other information regarding registrants that make electronic filings with the SEC using its EDGAR system. As a foreign private issuer, we are exempt from the rules under the Exchange Act prescribing the furnishing and content of quarterly reports and proxy statements, and officers, directors and principal shareholders are exempt from the reporting and short-swing profit recovery provisions contained in Section 16 of the Exchange Act.

Our financial statements have been prepared in accordance with U.S. GAAP.

We will furnish our shareholders with annual reports, which will include a review of operations and annual audited consolidated financial statements prepared in conformity with U.S. GAAP.

I. Subsidiary Information

For a listing of our major subsidiaries, see “Item 4. Information on the Company—C. Organizational Structure.”

ITEM 11. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Exchange Risk

Our business transactions are carried out in various currencies. The majority of our sales in 2019 are denominated in U.S. dollars, Japanese yen and Euros, with the remainder in other currencies such as Renminbi, Australian dollars, Brazilian reals and South African rand, while a substantial portion of our costs and expenses are denominated in Renminbi and U.S. dollars. From time to time, we enter into loan arrangements with commercial banks that are denominated primarily in Renminbi, U.S. dollars and Japanese yen. These transactions involve sales, purchases, borrowings, and investments in currencies other than the functional currencies of different companies in CSI. Therefore, fluctuations in currency exchange rates could have a significant impact on the cash flows we expect to receive or pay. The fluctuations in exchange rates could cause us significant foreign currency transaction risk. We recorded a foreign exchange gain of \$6.5 million and \$10.4 million in 2018 and 2019, respectively. We cannot predict the impact of future exchange rate fluctuations on our results of operations and may incur net foreign currency losses in the future.

Since 2008, we have hedged part of our foreign currency exposures against the U.S. dollar using foreign currency forward or option contracts in order to limit our exposure to fluctuations in foreign exchange rates. We incurred a loss on change in foreign currency derivatives of \$18.4 million in 2018 and a loss on change in foreign currency derivatives of \$21.3 million in 2019. The gains or losses on change in foreign currency derivatives are related to our hedging program.

As of December 31, 2019, we had approximately \$350 million equivalent of monetary net liabilities balances denominated in various transactional currencies. A 10% appreciation or depreciation of these transactional currencies against their corresponding functional currencies would have an impact of approximately \$35 million on our foreign exchange loss or gain, excluding the effect of our hedging activities.

In addition, our financial statements are presented in U.S. dollars, while some of our subsidiaries use different functional currencies, such as the Renminbi, Euros, Canadian dollars, British pounds and Japanese yen. The value of your investment in our common shares would be affected by the foreign currency translation risk resulted from the fluctuation between the U.S. dollar and functional currencies of our subsidiaries. To the extent we hold assets denominated in currencies other than U.S. dollars, any appreciation of such currencies against the U.S. dollars will likely result in an exchange gain while any depreciation will likely result in an exchange loss when we convert the value of these assets into U.S. dollar equivalent amounts. On the other hand, to the extent we have liabilities denominated in currencies other than U.S. dollars, any appreciation of such currencies against the U.S. dollar will likely result in an exchange loss while any depreciation will likely result in an exchange gain when we convert the value of these liabilities into U.S. dollar equivalent amounts.

As we continue to expand our business into new markets, particularly emerging markets, our total foreign currency exchange risk could increase significantly.

These and other effects on our financial conditions resulting from the unfavorable changes in foreign currency exchange rates could have a material adverse effect on the market price of our common shares, the dividends we may pay in the future, and your investment.

Interest Rate Risk

Our exposure to interest rate risk primarily relates to interest expense under our short-term and long-term bank borrowings, as well as interest income generated by excess cash invested in demand deposits and liquid investments with original maturities of three months or less. Such interest-earning instruments carry a degree of interest rate risk. We used derivative financial instruments to manage some of our interest risk exposure. We have not been exposed nor do we anticipate being exposed to material risks due to changes in interest rates. However, our future interest expense may increase due to changes in market interest rates.

ITEM 12. DESCRIPTION OF SECURITIES OTHER THAN EQUITY SECURITIES

Not applicable.

PART II

ITEM 13. DEFAULTS, DIVIDEND ARREARAGES AND DELINQUENCIES

None of these events occurred in any of the years ended December 31, 2017, 2018 and 2019.

ITEM 14. MATERIAL MODIFICATIONS TO THE RIGHTS OF SECURITY HOLDERS AND USE OF PROCEEDS

A.-D. Material Modifications to the Rights of Security Holders

See “Item 10. Additional Information—B. Memorandum and Articles of Association” for a description of the rights of shareholders, which remain unchanged.

E. Use of Proceeds

Not applicable.

ITEM 15. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

Our management, with the participation of our chief executive officer and chief financial officer, has performed an evaluation of the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act) as of the end of the period covered by this report, as required by Rule 13a-15(b) under the Exchange Act. Based upon that evaluation, our management has concluded that, as of the end of the period covered by this annual report, our disclosure controls and procedures were effective in ensuring that the information required to be disclosed by us in the reports that we file or submit under the Exchange Act was recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms, and that the information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our chief executive officer and chief financial officer, to allow timely decisions regarding required disclosures.

Management’s Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such item is defined in Rules 13a-15(f) under the Exchange Act, for our company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements in accordance with generally accepted accounting principles and includes those policies and procedures that (a) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of a company’s assets; (b) provide reasonable assurance that transactions are recorded as necessary to permit preparation of consolidated financial statements in accordance with generally accepted accounting principles, and that a company’s receipts and expenditures are being made only in accordance with authorizations of a company’s management and directors; and (c) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of a company’s assets that could have a material effect on the consolidated 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.

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As required by Section 404 of the Sarbanes-Oxley Act of 2002 and related rules as promulgated by the Securities and Exchange Commission, our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019 using criteria established in Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2019.

Deloitte Touche Tohmatsu Certified Public Accountants LLP, an independent registered public accounting firm, who audited our consolidated financial statements for the year ended December 31, 2019, has also audited the effectiveness of internal control over financial reporting as of December 31, 2019.

Report of the Independent Registered Public Accounting Firm

To the shareholders and the Board of Directors of Canadian Solar Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Canadian Solar Inc. and subsidiaries (the “Company”) as of December 31, 2019, 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 Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control—Integrated Framework (2013) issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended December 31, 2019, of the Company and our report dated April 28, 2020, expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) 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/ Deloitte Touche Tohmatsu Certified Public Accountants LLP
Shanghai, China
April 28, 2020

Changes in Internal Controls

Management has evaluated, with the participation of our chief executive officer and chief financial officer, whether any changes in our internal control over financial reporting that occurred during our last fiscal year have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Based on the evaluation we conducted, management has concluded that no such changes occurred during the period covered by this annual report on Form 20-F.

ITEM 16A. AUDIT COMMITTEE FINANCIAL EXPERT

Our board of directors has determined that Arthur (Lap Tat) Wong qualifies as an "audit committee financial expert" as defined in Item 16A of Form 20-F. Each of the members of the audit committee is an "independent director" as defined in the Nasdaq Marketplace Rules.

ITEM 16B. CODE OF ETHICS

Our board of directors has adopted a code of ethics that applies to our directors, officers, employees and agents, including certain provisions that specifically apply to our chief executive officer, chief financial officer, chief operations officer, chief technology officer, vice presidents and any other persons who perform similar functions for us. We have posted our code of business conduct on our website www.canadiansolar.com. We hereby undertake to provide to any person without charge, a copy of our code of business conduct and ethics within ten working days after we receive such person's written request.

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ITEM 16C. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table sets forth the aggregate fees by categories specified below in connection with certain professional services rendered by Deloitte Touche Tohmatsu Certified Public Accountants LLP, our principal external auditors, for the periods indicated. We did not pay any other fees to our auditors during the periods indicated below.

	For the Years Ended December 31,	
	2018	2019
Audit fees ⁽¹⁾	\$ 1,770,000	\$ 1,830,000
Audit related fees ⁽²⁾	\$ 603,544	\$ 512,862
Tax fees ⁽³⁾	\$ 44,954	\$ 116,132
All other fees ⁽⁴⁾	\$ 216,723	\$ 544,709

(1) "Audit fees" means the aggregate fees billed for professional services rendered by our principal auditors for the annual audit of our consolidated financial statements.

(2) "Audit related fees" represents the aggregate fees billed for assurance and related services by our principal auditors that are reasonably related to the performance of the audit or review of our consolidated financial statements and are not reported as audit fees. These include professional services rendered in connection with bond and equity offerings, statutory audits of our subsidiary companies, quarterly reviews and other related services. In 2018, "Audit related fees" included approximately \$0.6 million for the statutory audits of our subsidiary companies. In 2019, "Audit related fees" included approximately \$0.5 million for the statutory audits of our subsidiary companies.

(3) "Tax fees" of 2018 and 2019 were for services rendered by our principal accountants for tax compliance, tax advice and tax planning.

(4) "All other fees", refers to the consulting service for business optimization services.

The policy of our audit committee is to pre-approve all audit and non-audit services provided by Deloitte Touche Tohmatsu Certified Public Accountants LLP, including audit services, audit-related services, tax services and other services as described above, other than those for *de minimis* services which are approved by the Audit Committee prior to the completion of the audit. We have a written policy on the engagement of an external auditor.

ITEM 16D. EXEMPTIONS FROM THE LISTING STANDARDS FOR AUDIT COMMITTEES

Not applicable.

ITEM 16E. PURCHASES OF EQUITY SECURITIES BY THE ISSUER AND AFFILIATED PURCHASERS

On December 19, 2019, we announced a \$150 million share repurchase program for a six-month period beginning December 9, 2019 and ending June 8, 2020. We have partially executed the program as of the date of this report. The exact timing and amount of the repurchase was or will be determined by our management, based on market conditions, share price and other factors, and was or will be subject to the restrictions relating to volume, price and timing under applicable law, including Rule 10b-18 under the Securities Exchange Act of 1934. We repurchased 990,846 shares in total so far under this share repurchase plan. These repurchased shares have been cancelled and retired.

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The following table sets forth information about our purchase of outstanding treasury stocks from December 9, 2019 to the date of this annual report:

<u>Period</u>	<u>(a) Total Number of Treasury Stocks Purchased</u>	<u>(b) Average Price Paid Per Treasury Stocks \$</u>	<u>(c) Total Number of Treasury Stocks Purchased as Part of Publicly Announced Plans or Programs</u>	<u>(d) Maximum Approximate Dollar Value of Treasury Stocks That May Yet Be Purchased Under the Plans or Program US\$ in thousands</u>
December 2019	609,516	19.43	609,516	138,154
January 2020	91,424	21.88	91,424	136,154
March 2020	289,906	13.67	289,906	132,191
Total	<u>990,846</u>	<u>17.97</u>	<u>990,846</u>	<u>132,191</u>

ITEM 16F. CHANGE IN REGISTRANT'S CERTIFYING ACCOUNTANT

Not applicable.

ITEM 16G. CORPORATE GOVERNANCE

None.

ITEM 16H. MINE SAFETY DISCLOSURE

Not applicable.

PART III**ITEM 17. FINANCIAL STATEMENTS**

We have elected to provide financial statements pursuant to Item 18.

ITEM 18. FINANCIAL STATEMENTS

The consolidated financial statements of Canadian Solar Inc. are included at the end of this annual report.

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ITEM 19. EXHIBITS

Exhibit Number	Description of Document
1.1	Amended Articles of Continuance (incorporated by reference to Exhibit 3.2 of our registration statement on Form F-1 (File No. 333-138144), as amended, initially filed with the SEC on October 23, 2006)
2.1	Registrant's Specimen Certificate for Common Shares (incorporated by reference to Exhibit 4.11 from our F-1 registration statement (File No. 333-138144), as amended, initially filed with the Commission on October 23, 2006)
2.2*	Description of Securities of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934
4.1	Amended and Restated Share Incentive Plan of the Registrant, effective on May 8, 2011 (incorporated by reference to Exhibit 4.1 of our annual report on Form 20-F for the year ended December 31, 2016 (File No. 001-33107), initially filed with the SEC on April 27, 2017)
4.2	Form of Director Indemnity Agreement (incorporated by reference to Exhibit 4.1 of our annual report on Form 20-F for the year ended December 31, 2008 (File No. 001-33107), as amended, initially filed with the SEC on June 8, 2009)
4.3	Employment Agreement between the Registrant and Dr. Shawn Qu (incorporated by reference to Exhibit 10.2 of our registration statement on Form F-1 (File No. 333-138144), as amended, initially filed with the SEC on October 23, 2006)
4.4	Form of Employment Agreement between the Registrant and its executive officers (incorporated by reference to Exhibit 4.7 of our annual report on Form 20-F for the year ended December 31, 2010 (File No. 001-33107), as amended, initially filed with the SEC on May 17, 2011)
8.1*	List of Major Subsidiaries
12.1*	CEO Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
12.2*	CFO Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
13.1**	CEO Certification Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
13.2**	CFO Certification Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
15.1*	Consent of Deloitte Touche Tohmatsu Certified Public Accountants LLP
101*	Financial information from registrant for the year ended December 31, 2019 formatted in eXtensible Business Reporting Language (XBRL): (i) Consolidated Balance Sheets as of December 31, 2018 and 2019; (ii) Consolidated Statements of Operations for the Years Ended December 31, 2017, 2018 and 2019; (iii) Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2017, 2018 and 2019; (iv) Consolidated Statements of Changes in Equity for the Years Ended December 31, 2017, 2018 and 2019; (v) Consolidated Statements of Cash Flows for the Years Ended December 31, 2017, 2018 and 2019; (vi) Notes to Consolidated Financial Statements; and (vii) Additional Information—Financial Statements Schedule I
104*	Cover Page Interactive Data File (embedded within the Inline XBRL document)

* Filed herewith.

** Furnished herewith.

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

CANADIAN SOLAR INC.

By: /s/ Shawn (Xiaohua) Qu

Name: Shawn (Xiaohua) Qu

Title: Chairman, President and
Chief Executive Officer

By: /s/ Huifeng Chang

Name: Huifeng Chang

Title: Senior Vice President and
Chief Financial Officer

Date: April 28, 2020

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of Canadian Solar Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Canadian Solar Inc. and subsidiaries (the “Company”) as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive income, changes in shareholders’ equity, and cash flows, for each of the three years in the period ended December 31, 2019, the related notes and the financial statement schedule included as Schedule I (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated April 28, 2020, expressed an unqualified opinion on the Company’s internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matters or on the accounts or disclosures to which it relates.

Revenue Recognition -sales of solar power projects - Refer to Note 2 (w) to the financial statements

Critical Audit Matter Description

The Company recognizes revenue from the sale of a solar power project at the point in time when a customer obtains control of the solar power project. The dollar amount of revenues from the sale of solar power projects is \$668,476 thousand for the year ended December 31, 2019. The solar power projects are often held in separate legal entities which are formed for the special purpose of constructing the solar power projects, which the Company refers to as "project companies". Management of the Company uses its judgment to determine whether deconsolidation of the project companies is appropriate upon transfer of equity interest to the customers, to identify performance obligations, and to estimate the variable consideration if any, as part of the transaction price.

We identified revenue recognition for sales of solar power projects as a critical audit matter because of the judgments necessary for management to determine whether it may derecognize the project companies according to Accounting Standard Codification ("ASC") 810-10, to identify performance obligations, and to estimate the variable consideration as part of transaction price according to ASC 606. This requires a high degree of auditor judgment when performing audit procedures to evaluate management's conclusion of the aforementioned judgmental areas.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to management's conclusion of de-recognition of the project companies, identification of performance obligations and estimation of variable consideration included the following, among others:

- We tested the effectiveness of controls over revenue recognition for sales of solar power projects, including management's controls over the conclusion with respect to de-recognition of the project companies, identification of performance obligations and estimation of variable consideration.
- We selected a sample of solar power project sales and performed the following:
 - Evaluated whether the fact pattern within the contracts and other relevant documents were properly included in management's assessment in accordance with ASC 810-10.
 - Evaluated management's accounting analysis in terms of whether the identification of performance obligations, and determination of transaction price, including estimation of variable consideration, if any, is conducted in accordance with ASC 606.
 - Tested the mathematical accuracy of management's calculation of revenue for each performance obligation that can be recognized in a given period.

/s/ Deloitte Touche Tohmatsu Certified Public Accountants LLP

Shanghai China

April 28, 2020

We have served as the Company's auditor since 2006.

**CANADIAN SOLAR INC.
CONSOLIDATED BALANCE SHEETS**

	December 31, 2018	December 31, 2019
	(In Thousands of U.S. Dollars, except share data)	
ASSETS		
(Including balances in variable interest entities, see Note 10)		
Current assets:		
Cash and cash equivalents	444,298	668,770
Restricted cash	480,976	526,723
Accounts receivable trade, net of allowance of \$32,733 and \$29,545 as of December 31, 2018 and 2019, respectively	498,231	436,815
Accounts receivable, unbilled	38	15,256
Amounts due from related parties	16,740	31,232
Inventories	262,022	554,070
Value added tax recoverable	107,222	108,920
Advances to suppliers, net of allowance of \$5,702 and \$7,222 as of December 31, 2018 and 2019, respectively	37,011	47,978
Derivative assets	4,761	5,547
Project assets	933,563	604,083
Prepaid expenses and other current assets	289,459	253,542
Total current assets	3,074,321	3,252,936
Restricted cash	15,716	9,927
Property, plant and equipment, net	884,986	1,046,035
Solar power systems, net	54,898	52,957
Deferred tax assets, net	121,087	153,963
Advances to suppliers, net of allowance of \$15,224 and \$13,059 as of December 31, 2018 and 2019, respectively	48,908	40,897
Prepaid land use rights	65,718	60,836
Investments in affiliates	126,095	152,828
Intangible assets, net	14,903	22,791
Goodwill	1,005	—
Derivative assets	3,216	—
Project assets	352,200	483,051
Right-of-use assets	—	37,733
Other non-current assets	129,605	153,253
TOTAL ASSETS	4,892,658	5,467,207
LIABILITIES AND EQUITY		
(Including balances in variable interest entities, see Note 10)		
Current liabilities:		
Short-term borrowings, including long-term borrowings - current portion	1,027,927	933,120
Long-term borrowings on project assets — current	265,770	286,173
Accounts payable	379,462	585,601
Short-term notes payable	369,722	544,991
Amounts due to related parties	16,847	10,077
Other payables	408,013	446,454
Convertible notes	127,428	—
Advances from customers	39,024	134,806
Derivative liabilities	13,698	10,481
Operating lease liabilities	—	18,767
Tax equity liabilities	158,496	—
Other current liabilities	141,970	121,527
Total current liabilities	2,948,357	3,091,997
Accrued warranty costs	50,605	55,878
Long-term borrowings	393,614	619,477
Amounts due to related parties	568	—
Derivative liabilities	—	1,841
Liability for uncertain tax positions	20,128	15,353
Deferred tax liabilities	35,698	56,463
Loss contingency accruals	24,608	28,513
Operating lease liabilities	—	20,718
Financing liabilities	77,835	76,575
Other non-current liabilities	68,400	75,334
TOTAL LIABILITIES	3,619,813	4,042,149
Commitments and contingencies (Note 21)		
Equity:		
Common shares – no par value: unlimited authorized shares, 59,180,624 and 59,371,684 shares issued and outstanding at December 31, 2018 and 2019, respectively	702,931	703,806
Treasury stock, at cost, nil and 609,516 common shares as of December 31, 2018 and 2019, respectively	—	(11,845)
Additional paid-in capital	10,675	17,179
Retained earnings	622,016	793,601
Accumulated other comprehensive loss	(110,149)	(109,607)
Total Canadian Solar Inc. shareholders' equity	1,225,473	1,393,134
Non-controlling interests in subsidiaries	47,372	31,924
TOTAL EQUITY	1,272,845	1,425,058
TOTAL LIABILITIES AND EQUITY	4,892,658	5,467,207

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars, except share and per share data)		
Net revenues:			
—Non-related parties	3,221,928	3,624,687	3,101,113
—Related parties	168,465	119,825	99,470
Total net revenues	<u>3,390,393</u>	<u>3,744,512</u>	<u>3,200,583</u>
Cost of revenues:			
—Non-related parties	2,641,583	2,894,611	2,424,476
—Related parties	111,212	74,819	57,610
Total cost of revenues	<u>2,752,795</u>	<u>2,969,430</u>	<u>2,482,086</u>
Gross profit	<u>637,598</u>	<u>775,082</u>	<u>718,497</u>
Operating expenses:			
Selling expenses	156,032	165,402	180,326
General and administrative expenses	230,998	245,376	242,783
Research and development expenses	28,777	44,193	47,045
Other operating income, net	(47,554)	(44,546)	(10,536)
Total operating expenses, net	<u>368,253</u>	<u>410,425</u>	<u>459,618</u>
Income from operations	<u>269,345</u>	<u>364,657</u>	<u>258,879</u>
Other income (expenses):			
Interest expense	(117,971)	(106,032)	(81,326)
Interest income	10,477	11,207	12,039
Loss on change in fair value of derivatives, net	(272)	(19,230)	(22,218)
Foreign exchange gain (loss)	(23,449)	6,529	10,370
Investment income (loss)	(3,607)	41,361	1,929
Other expenses, net	<u>(134,822)</u>	<u>(66,165)</u>	<u>(79,206)</u>
Income before income taxes and equity in earnings of unconsolidated investees	134,523	298,492	179,673
Income tax expense	(40,951)	(61,969)	(42,066)
Equity in earnings of unconsolidated investees	9,411	5,908	28,948
Net income	<u>102,983</u>	<u>242,431</u>	<u>166,555</u>
Less: net income (loss) attributable to non-controlling interests	3,411	5,361	(5,030)
Net income attributable to Canadian Solar Inc.	<u>99,572</u>	<u>237,070</u>	<u>171,585</u>
Earnings per share — basic	\$ 1.71	\$ 4.02	\$ 2.88
Shares used in computation — basic	58,167,004	58,914,540	59,633,855
Earnings per share — diluted	\$ 1.69	\$ 3.88	\$ 2.83
Shares used in computation — diluted	61,548,158	62,291,670	60,777,696

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Net income	102,983	242,431	166,555
Other comprehensive income (loss) (net of tax of nil):			
Foreign currency translation adjustment	39,305	(50,577)	319
Gain (loss) on commodity hedge	(1,844)	953	—
Gain (loss) on interest rate swap	(246)	5,141	(5,847)
De-recognition of commodity hedge and interest rate swap	—	(8,752)	—
Comprehensive income	<u>140,198</u>	<u>189,196</u>	<u>161,027</u>
Less: comprehensive income (loss) attributable to non-controlling interests	2,846	8,241	(11,100)
Comprehensive income attributable to Canadian Solar Inc.	<u>137,352</u>	<u>180,955</u>	<u>172,127</u>

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY

	Common Shares		Treasury Stock		Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (loss)	Earnings Attributable to Canadian Solar Inc.	Non-Controlling Interests	Total Equity
	Number	\$	Number	\$	\$	\$	\$	\$	\$	\$
	(In Thousands of U.S. Dollars, except share data)									
Balance at January 1, 2017	57,830,149	701,283	—	—	(8,897)	284,109	(91,814)	884,681	14,709	899,390
Net income	—	—	—	—	—	99,572	—	99,572	3,411	102,983
Foreign currency translation adjustment	—	—	—	—	—	—	39,870	39,870	(565)	39,305
Acquisition of subsidiaries	—	—	—	—	—	—	—	—	9,994	9,994
Share-based compensation	—	—	—	—	9,314	—	—	9,314	—	9,314
Exercise of share options	666,536	879	—	—	—	—	—	879	—	879
Fair value change on derivatives	—	—	—	—	—	—	(2,090)	(2,090)	—	(2,090)
Balance at December 31, 2017	58,496,685	702,162	—	—	417	383,681	(54,034)	1,032,226	27,549	1,059,775
Net income	—	—	—	—	—	237,070	—	237,070	5,361	242,431
Foreign currency translation adjustment	—	—	—	—	—	—	(53,457)	(53,457)	2,880	(50,577)
Cumulative-effect adjustment for the adoption of ASU 2014-09	—	—	—	—	—	1,265	—	1,265	—	1,265
Acquisition of subsidiaries	—	—	—	—	—	—	—	—	7,703	7,703
Acquisition non-controlling interest's ownership	—	—	—	—	—	—	—	—	(6,591)	(6,591)
Transfer of equity interest in subsidiaries to non-controlling shareholders	—	—	—	—	—	—	—	—	10,470	10,470
Share-based compensation	—	—	—	—	10,258	—	—	10,258	—	10,258
Exercise of share options	683,939	769	—	—	—	—	—	769	—	769
De-recognition of derivatives	—	—	—	—	—	—	(8,752)	(8,752)	—	(8,752)
Fair value change on derivatives	—	—	—	—	—	—	6,094	6,094	—	6,094
Balance at December 31, 2018	59,180,624	702,931	—	—	10,675	622,016	(110,149)	1,225,473	47,372	1,272,845
Net income (loss)	—	—	—	—	—	171,585	—	171,585	(5,030)	166,555
Foreign currency translation adjustment	—	—	—	—	—	—	6,389	6,389	(6,070)	319
Acquisition non-controlling interest's ownership	—	—	—	—	—	(4,178)	—	(4,178)	(9,998)	(14,176)
Repurchase of treasury stock ⁽¹⁾	(609,516)	—	609,516	(11,845)	—	—	—	(11,845)	—	(11,845)
Share-based compensation	—	—	—	—	10,682	—	—	10,682	—	10,682
Exercise of share options	800,576	875	—	—	—	—	—	875	—	875
Proceeds from non-controlling interests	—	—	—	—	—	—	—	—	5,650	5,650
Fair value change on derivatives	—	—	—	—	—	—	(5,847)	(5,847)	—	(5,847)
Balance at December 31, 2019	59,371,684	703,806	609,516	(11,845)	17,179	793,601	(109,607)	1,393,134	31,924	1,425,058

(1) Following the share repurchase plan authorized by the Board Directors on December 9, 2019, the Company repurchased 609,516 outstanding shares with total costs of \$11,845 in December 2019.

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Operating activities:			
Net income	102,983	242,431	166,555
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	99,273	129,256	159,723
Loss on disposal of property, plant and equipment	13,976	2,565	1,227
Gain on disposal of solar power systems	(27,803)	(36,098)	(1,666)
Gain on disposal of investment in affiliates	—	(47,102)	(1,928)
Impairment loss of property, plant and equipment	11,626	30,968	21,866
Impairment loss of project assets	—	9,016	20,194
Impairment loss of investment	3,686	5,738	—
Loss on change in fair value of derivatives, net	272	19,230	22,218
Equity in earnings of unconsolidated investees	(9,411)	(5,908)	(28,948)
Allowance for doubtful accounts	7,265	2,812	1,250
Non-cash operating lease expenses	—	—	14,318
Write-down of inventories	17,820	14,646	19,447
Share-based compensation	9,314	10,258	10,682
Unrealized gain (loss) from sales to affiliates	13,065	(13,573)	6,194
Changes in operating assets and liabilities:			
Accounts receivable trade	46,337	(179,607)	51,670
Accounts receivable, unbilled	2,345	1,158	(15,268)
Amounts due from related parties	(10,089)	9,237	(17,347)
Inventories	(49,024)	55,408	(312,781)
Value added tax recoverable	(38,190)	(9,206)	(849)
Advances to suppliers	(15,990)	29,001	(27,066)
Project assets	(128,982)	(30,501)	28,527
Prepaid expenses and other current assets	(49,813)	(2,208)	33,283
Other non-current assets	(23,795)	9,387	(24,037)
Accounts payable	(27,758)	47,756	209,175
Short-term notes payable	243,685	(173,148)	185,827
Amounts due to related parties	33,908	10,467	(5,798)
Other payables	(5,889)	39,791	42,810
Advances from customers	(44,985)	(11,225)	96,115
Operating lease liabilities	—	—	(12,566)
Other liabilities	(18,774)	(29,691)	(10,851)
Accrued warranty costs	(6,726)	(3,563)	4,624
Prepaid land use rights	(30,087)	6,557	2,622
Goodwill	1,369	5,243	1,005
Liability for uncertain tax positions	833	10,863	(4,775)
Deferred taxes	84,939	37,591	(12,455)
Net settlement of derivatives	(1,460)	28,731	(27,012)
Loss contingency accruals	—	—	4,126
Net cash provided by operating activities	<u>203,920</u>	<u>216,280</u>	<u>600,111</u>

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS - (Continued)

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Investing activities:			
Investments in affiliates	(92,925)	(11,036)	(7,684)
Return of investment from affiliates	4,233	816	3,012
Proceeds from disposal of investment in affiliates	—	337,773	1,649
Purchase of property, plant and equipment and intangible assets	(276,978)	(316,282)	(291,182)
Purchase of solar power systems	(33,697)	—	—
Proceeds from disposal of solar power systems	128,768	17,800	103
Proceeds from insurance claim	43,930	—	—
Acquisition of subsidiaries, net of cash paid	(12,561)	—	—
Net cash provided by (used in) investing activities	<u>(239,230)</u>	<u>29,071</u>	<u>(294,102)</u>
Financing activities:			
Proceeds from short-term borrowings	1,646,910	1,430,708	1,257,009
Repayment of short-term borrowings	(2,068,069)	(2,368,967)	(1,649,721)
Proceeds from long-term borrowings	690,841	382,831	530,990
Acquisition of non-controlling interests	—	(6,591)	(14,176)
Proceeds from non-controlling interests	—	10,470	11,488
Proceeds from third party financing liabilities	12,243	119,095	3,000
Proceeds from sales-leaseback arrangement	61,142	35,944	9,044
Distributions to tax equity investors	(9,582)	(3,013)	(1,120)
Repayment of finance lease obligation	(30,128)	(64,859)	(42,658)
Repayment of short-term commercial paper	(138,953)	—	—
Payments for repurchase of convertible notes	—	—	(127,500)
Proceeds from exercise of stock options	879	769	875
Payments for repurchase of treasury stock	—	—	(11,845)
Net cash provided by (used in) financing activities	<u>165,283</u>	<u>(463,613)</u>	<u>(34,614)</u>
Effect of exchange rate changes	51,342	(38,725)	(6,965)
Net increase (decrease) in cash, cash equivalents and restricted cash	<u>181,315</u>	<u>(256,987)</u>	<u>264,430</u>
Cash, cash equivalents and restricted cash at the beginning of the year	<u>1,007,700</u>	<u>1,190,134</u>	<u>940,990</u>
Less: net decrease in cash, cash equivalents and restricted cash classified within assets held-for-sale	<u>(1,119)</u>	<u>(7,843)</u>	<u>—</u>
Cash, cash equivalents and restricted cash at the end of the year	<u>1,190,134</u>	<u>940,990</u>	<u>1,205,420</u>
Supplemental disclosure of cash flow information:			
Interest paid (net of amounts capitalized)	113,513	103,236	85,362
Income taxes paid	45,483	32,135	40,454
Supplemental schedule of non-cash activities:			
Reclassification of solar power systems to project assets	4,782	—	—
Property, plant and equipment costs included in other payables	153,017	228,970	244,483

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the balance sheets that sum to the total of the same such amounts shown in the statements of cash flows.

	Years Ended December 31,	
	2018	2019
	(In Thousands of U.S. Dollars)	
Cash and cash equivalents	444,298	668,770
Restricted cash — current	480,976	526,723
Restricted cash — non-current	15,716	9,927
Total cash and cash equivalents, and restricted cash shown in the statements of cash flows	<u>940,990</u>	<u>1,205,420</u>

See notes to consolidated financial statements.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
FOR THE YEARS ENDED DECEMBER 31, 2017, 2018 and 2019
(In Thousands of U.S. Dollars, unless otherwise indicated)

1. ORGANIZATION AND PRINCIPAL ACTIVITIES

Canadian Solar Inc. (“CSI”) was incorporated pursuant to the laws of the Province of Ontario in October 2001, and changed its jurisdiction by continuing under the Canadian federal corporate statute, the Canada Business Corporations Act, or CBCA, effective June 1, 2006.

CSI and its subsidiaries (collectively, the “Company”) design, develop, and manufacture solar wafers, cells and solar power products. In recent years, the Company has increased investment in, and management attention on its total solutions business, which primarily consists of solar power project development and sale, EPC and development services, O&M services, operating solar power projects and sales of electricity, and sales of solar system kits. As of December 31, 2019, major subsidiaries of CSI are included in Appendix 1.

2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES

(a) Basis of presentation

The consolidated financial statements of the Company have been prepared in accordance with U.S. generally accepted accounting principles (“U.S. GAAP”).

(b) Basis of consolidation

The consolidated financial statements include the financial statements of the Company and its subsidiaries in which it has a controlling financial interest or variable interest entities (“VIEs”) for which the Company is a primary beneficiary.

A controlling financial interest is typically determined when a company holds a majority of the voting equity interest in an entity. All intercompany balances and transactions between the Company and its subsidiaries have been eliminated in consolidation.

The Company consolidates VIEs when the Company is the primary beneficiary. VIEs are entities that lack sufficient equity to finance their activities without additional financial support from other parties or whose equity holders, as a group, lack one or more of the following characteristics: (a) direct or indirect ability to make decisions; (b) obligation to absorb expected losses; or (c) right to receive expected residual returns. VIEs must be evaluated quantitatively and qualitatively to determine the primary beneficiary, which is the reporting entity that has (a) the power to direct activities of a VIE that most significantly impact the VIEs economic performance and (b) the obligation to absorb losses of the VIE that could potentially be significant to the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE. The primary beneficiary is required to consolidate the VIE for financial reporting purposes. A VIE can have only one primary beneficiary, but may not have a primary beneficiary if no party meets the criteria described above.

When evaluating whether the Company is the primary beneficiary of a VIE, and must therefore consolidate the entity, the Company performs a qualitative analysis that considers the design of the VIE, the nature of its involvement and the variable interests held by other parties. If that evaluation is inconclusive as to which party absorbs a majority of the entity’s expected losses or residual returns, a quantitative analysis is performed to determine the primary beneficiary.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
FOR THE YEARS ENDED DECEMBER 31, 2017, 2018 and 2019
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

For the Company's consolidated VIEs, the Company has presented in note 10, to the extent material, the assets of its consolidated VIEs that can only be used to settle specific obligations of the consolidated VIE, and the liabilities of its consolidated VIEs for which creditors do not have recourse to its general assets outside of the consolidated VIE. All intercompany accounts and transactions between the Company and its consolidated VIEs have been eliminated in consolidation.

(c) Use of estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires the Company to make estimates and assumptions that affect reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Significant accounting estimates reflected in the Company's consolidated financial statements include revenue recognition for sales of solar power projects, EPC and development services accounted for under a cost-based input method, allowance for doubtful accounts receivable and advances to suppliers, valuation of inventories and provision for firm purchase commitments, provision for contingent liability, impairment of long-lived assets and project assets, the estimated useful lives of long-lived assets, determination of assets retirement obligation ("ARO"), discount rates used to measure operating lease liabilities, accrual for warranty and the recognition of the benefit from the purchased warranty insurance, fair value estimate of financial instruments including warrants and other types of derivative, accrual for uncertain tax positions, valuation allowances for deferred tax assets, applying acquisition method of accounting to business acquisitions and the grant-date fair value of share-based compensation awards and related forfeiture rates.

(d) Cash and cash equivalents and restricted cash

Cash and cash equivalents are stated at cost, which approximates fair value. Cash and cash equivalents consist of cash on hand and demand deposits, which are unrestricted as to withdrawal and use, and have original maturities of three months or less when acquired.

Restricted cash represents amounts held by banks, which are not available for the Company's general use, as security for issuance of letters of credit, short-term notes payable and bank borrowings. Upon maturity of the letters of credit, repayment of short-term notes payable or bank borrowings, the deposits are released by the bank and become available for general use by the Company.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(e) *Accounts receivable, unbilled*

Accounts receivable, unbilled represents a contract asset for revenue that has been recognized in advance of billing the customer. The Company uses a cost-based input method to recognize revenue from EPC and development services when all relevant revenue recognition criteria have been met. Under this accounting method, revenue may be recognized in advance of billing the customer, which results in the recording of accounts receivable, unbilled. Once the Company meets the billing criteria under such contract, the rights to consideration becomes unconditional, it bills the customer and reclassifies the unbilled balance to accounts receivable trade. Billing requirements vary by contract, but are generally structured around completion of certain construction milestones.

(f) *Allowance for doubtful receivables*

The Company began purchasing insurance from China Export & Credit Insurance Corporation ("Sinasure") since 2009 for certain of its accounts receivable trade in order to reduce its exposure to bad debt loss. The Company provides an allowance for accounts receivable trade using primarily a specific identification methodology. An allowance is recorded based on the likelihood of collection from the specific customer regardless whether such account is covered by Sinasure. At the time the claim is made to Sinasure, the Company records a receivable from Sinasure equal to the expected recovery up to the amount of the specific allowance. The Company had recorded a receivable from Sinasure in prepaid expenses and other current assets of \$164 and \$166 as of December 31, 2018 and 2019, respectively and a corresponding reduction in bad debt expense.

(g) *Advances to suppliers*

The Company makes prepayments to certain suppliers and such amounts are recorded in advances to suppliers in the consolidated balance sheets. Advances to suppliers expected to be utilized within twelve months as of each balance sheet date are recorded as current assets and the portion expected to be utilized after twelve months are classified as non-current assets in the consolidated balance sheets.

(h) *Inventories*

Inventories are stated at the lower of cost or net realizable value. Cost is determined by the weighted-average method. Cost of inventories consists of direct materials and, where applicable, direct labor costs, tolling costs and those overhead costs that have been incurred in bringing the inventories to their present location and condition.

Adjustments are recorded to write down the cost of obsolete and excess inventories to the estimated net realizable value based on historical and forecast demand.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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(In
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(i) Project assets

Project assets consist primarily of capitalized costs relating to solar power projects in various stages of development prior to the intended sale of the solar power projects to a third party. These costs include certain acquisition costs, land costs and costs for developing and constructing a solar power system. Development costs can include legal, consulting, permitting, and other similar costs. Construction costs can include execution of field construction, installation of solar equipment, solar modules and related equipment. Interest costs incurred on debt during the construction phase and all deferred financing costs amortized during the construction phase are also capitalized within project assets.

Solar power projects are preliminarily classified as project assets unless the Company has intention not to sell them to third parties. In that case, they will be classified as solar power systems on the balance sheet. During the development phase, solar power projects are accounted for in accordance with the recognition, initial measurement and subsequent measurement subtopics of ASC 970- 360, as they are considered in substance real estates. The costs to construct solar power projects are presented as operating activities or investing activities in the consolidated statement of cash flows, if they are related to project assets or solar power systems, respectively. While the solar power projects are in the development phase, they are generally classified as non-current assets, unless it is anticipated that the sale will occur within one year. Appropriateness of the classification of the solar power projects is assessed based on the circumstances on each balance sheet date. Solar power projects that the Company intends to sell within one year, which meet the criteria of ASC 360, are classified as project assets-current. Solar power projects that the Company intends to hold and operate to generate electricity are still classified as solar power systems.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

The Company reviews project assets for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. The Company considers 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. The Company considers 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. The Company examines a number of factors to determine if the project will be recoverable, the most notable of which include whether there are any changes in environmental, ecological, permitting, market pricing or regulatory conditions that 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, the Company impairs the respective project assets and adjusts the carrying value to the estimated recoverable amount, with the resulting impairment recorded within operations.

Project assets are often held in separate legal entities which are formed for the special purpose of constructing the project assets, which the Company refers to as “project companies”. The Company consolidates project companies as described in note 2 (b) above. The cash paid to the non-controlling interest in connection with disposal of such project companies was recorded as a financing activity in the consolidated statement of cash flows.

The Company does not depreciate the project assets. Any revenue generated from a solar power system connected to the grid would be considered incidental revenue and accounted for as a reduction of the capitalized project costs for development. If circumstances change, and the Company will begin to operate the project assets for the purpose of generating income from the sale of electricity, the project assets will be reclassified to solar power systems.

(j) Business combination

Business combinations are recorded using the acquisition method of accounting and, accordingly, the acquired assets and liabilities are recorded at their fair market value at the date of acquisition. Any excess of acquisition cost over the fair value of the acquired assets and liabilities, including identifiable intangible assets, is recorded as goodwill. The Company charges acquisition related costs that are not part of the purchase price consideration to general and administrative expenses as they are incurred. These costs typically include transaction and integration costs, such as legal, accounting, and other professional fees.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(k) Assets acquisition

When the Company acquires other entities, if the assets acquired and liabilities assumed do not constitute a business, the transaction is accounted for as an asset acquisition. Assets are recognized based on the cost, which generally includes the transaction costs of the asset acquisition, and no gain or loss is recognized unless the fair value of noncash assets given as consideration differs from the assets' carrying amounts on the Company's books. If the consideration given is not in the form of cash (that is, in the form of noncash assets, liabilities incurred, or equity interests issued), measurement is based on either the cost to the acquiring entity or the fair value of the assets (or net assets) acquired, whichever is more clearly evident and, thus, more reliably measurable. The cost of a group of assets acquired in an asset acquisition is allocated to the individual assets acquired or liabilities assumed based on their relative fair value and does not give rise to goodwill.

(l) Property, plant and equipment

Property, plant and equipment is recorded at cost less accumulated depreciation. The cost of property, plant and equipment comprises its purchase price and any directly attributable costs, including interest costs capitalized during the period the asset is brought to its working condition and location for its intended use. The Company expenses repair and maintenance costs as incurred.

Depreciation is computed on a straight-line basis over the following estimated useful lives:

Buildings	20 years
Leasehold improvements	Over the shorter of the lease term or their estimated useful lives
Machinery	5 -10 years
Furniture, fixtures and equipment	5 years
Motor vehicles	5 years

Costs incurred in constructing new facilities, including progress payments, capitalized interests and other costs relating to the construction, are capitalized and transferred to property, plant and equipment on completion and depreciation commences from that time.

For property, plant and equipment that has been placed into service, but is subsequently idled temporarily, the Company continues to record depreciation expense during the idle period. The Company adjusts the estimated useful life of the idled assets if the estimated useful life has changed.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(m) Solar power systems

Solar power systems are comprised of ground-mounted projects and roof top systems that the Company intends to hold for use. The solar power systems are stated at cost less accumulated depreciation. The cost consists primarily of direct costs incurred in various stages of development prior to the commencement of operations. For a self-developed solar power system, the actual cost capitalized is the amount of the expenditure incurred for the application of the feed-in tariff (“FIT”) or other similar contracts, permits, consents, construction costs, interest costs capitalized, and other costs capitalized. For a solar power system acquired from third parties, the initial costs include the consideration transferred and certain direct acquisition costs. Expenditures for major additions and improvements are capitalized and minor replacements, maintenance, and repairs are charged to expense as incurred.

When solar power systems is retired, or otherwise disposed of, the cost and accumulated depreciation is removed from the balance sheets and any resulting gain or loss is included in the results of operations for the respective period. Depreciation is recognized using the straight-line method over the estimated useful lives of the solar power systems of 20 to 25 years.

(n) Intangible assets

Intangible assets primarily represent the technical know-how and computer software purchased from third parties. Intangible assets are recorded at fair value at the time of acquisition less accumulated amortization, if applicable. Amortization is recorded according to the following table on a straight-line basis for all intangible assets:

Technical know-how	10 years
Computer software	1 -10 years

(o) Prepaid land use rights

Prepaid land use rights, in substance right-of-use assets recorded according to ASC 842 from January 1, 2019, represent amounts paid for the use right of lands located in China (“PRC”) and Japan. Amounts are charged to earnings ratably over the lease periods of 20 to 50 years.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(p) Investments in affiliates

The Company uses the equity method of accounting for the investments. The Company records the equity method investments at historical cost and subsequently adjusts the carrying amount each period for share of the earnings or losses of the investee and other adjustments required by the equity method of accounting. Dividends received from the equity method investments are recorded as reductions in the cost of such investments. The amount associated with the share of earnings are considered as return of investment, and the rest received amount are considered as return on investment.

Investments are evaluated for impairment when facts or circumstances indicate that the fair value of the investment is less than its carrying value. An impairment is recognized when a decline in fair value is determined to be other-than-temporary. The Company reviews several factors to determine whether a loss is other-than-temporary. These factors include, but are not limited to, the: (i) nature of the investment; (ii) cause and duration of the impairment; (iii) extent to which fair value is less than cost; (iv) financial conditions and near term prospects of the affiliates; and (v) ability to hold the security for a period of time sufficient to allow for any anticipated recovery in fair value. During the years ended December 31, 2017, 2018 and 2019, the Company recorded \$3,686, \$5,738 and nil impairment charges on its investments, respectively.

(q) Impairment of long-lived assets

The Company assesses the recoverability of the carrying value of long-lived assets when an indicator of impairment has been identified. The Company reviews the long-lived assets each reporting period to assess whether impairment indicators are present. For purposes of recognition and measurement of an impairment loss, a long-lived asset or assets is 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. For long-lived assets, when impairment indicators are present, the Company compares 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. Assessments also consider changes in asset group utilization, including the temporary idling of capacity and the expected timing of placing this capacity back into production. If the sum of the expected undiscounted cash flows is less than the carrying amount of the assets, the Company will recognize an impairment loss based on the fair value of the assets. The Company recorded impairment charges for long-lived assets of \$11,626, \$30,968 and \$21,866 for the years ended December 31, 2017, 2018 and 2019, respectively.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(r) Interest capitalization

The Company capitalizes interest costs as part of the historical costs of acquiring or constructing certain assets during the period of time required to get the assets ready for their intended use or sell the asset to a customer. The Company capitalizes interest costs to the extent that expenditures to acquire, construct, or develop an asset have occurred and interest costs have been incurred. Interest capitalized for property, plant and equipment, or solar power systems is depreciated over the estimated useful life of the related asset, as the qualifying asset is placed into service. The interest capitalized for project assets forms part of the cost of revenues when such project assets are sold and all revenue recognition criteria are met. Interest capitalization ceases once a project is substantially complete or no longer undergoing construction activities to prepare it for its intended use.

(s) Assets retirement obligation

Certain jurisdictions in which the Company's project assets are located or certain land lease agreements require the removal of the solar power systems when the project is decommissioned. Assets retirement obligation ("ARO") for the estimated costs of decommissioning associated with long-lived assets at a future date are accounted for in accordance with ASC 410-20, Asset Retirement Obligations ("ASC 410-20"). ASC 410-20 requires an entity to recognize the fair value of a liability for an ARO in the period in which it is incurred and a reasonable estimate of fair value can be made. Upon initial recognition of a liability for an ARO, the asset retirement cost is capitalized by increasing the carrying amount of the related long-lived asset by the same amount. Over time, the liability is accreted to its expected future value, while the capitalized cost is depreciated over the useful life of the related asset. The Company's ARO included in solar power systems were \$43 and \$26 as of December 31, 2018 and 2019, respectively.

(t) Leases

Effective January 1, 2019, the Company adopted Accounting Standards Update ("ASU") No. 2016-02, Leases (Topic 842), as amended ("ASC 842") for its lease arrangements, which were recorded under ASC 840, Leases, before implementation. Upon adoption of ASC 842, the Company elected to use the remaining lease term as of January 1, 2019 in the estimation of the applicable discount rate for leases that were in place at adoption. For the initial measurement of the lease liability for leases commencing after January 1, 2019, the Company use the discount rate as of the commencement date of the lease, incorporating the entire lease term. The Company, as a lessee, has both finance and operating lease arrangements. Right-of-use ("ROU") assets and operating lease liabilities on the consolidated balance sheets include operating lease agreements. Finance lease agreements are recorded in property, plant and equipment, other payables and other non-current liabilities on the consolidated balance sheets. Lease liabilities that become due within one year of the balance sheet date are classified as current liabilities. The Company elected the practical expedient to combine the lease and related non-lease components for all existing leases.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

The Company determines if an arrangement is a lease at inception. Leases are classified as operating or finance leases in accordance with the recognition criteria in ASC 842-20-25. At the commencement date of a lease, the Company determines the classification of the lease based on the relevant factors and presents and records a right-of-use ("ROU") asset and lease liability. ROU assets represent the right to use an underlying asset for the lease term and lease liabilities represent the obligation to make lease payments arising from the lease. ROU assets and lease liabilities are calculated as the present value of the lease payments not yet paid. Variable lease payments are excluded from the ROU asset and lease liability calculations and are recognized in the period which the obligations for those payments are incurred. Operating lease ROU assets also include any lease prepayments made, initial direct costs and deferred rent if any and exclude lease incentives. As the rate implicit in the Company's operating leases is not typically readily available, the Company uses an incremental borrowing rate based on the information available at the lease commencement date in determining the present value of lease payments. Some of the Company's lease agreements include options to extend or terminate the lease, which are not included in its minimum lease terms unless they are reasonably certain to be exercised. All operating lease expenses are fixed, which are accounted for on a straight-line basis over the lease term and that of finance lease include interest and amortization expenses incurred during the current year.

The Company's leases do not contain any material residual value guarantees or material restrictive covenants. Leases with an initial lease term of 12 months or less are not recorded on the consolidated balance sheet.

For finance leases, the amortization of the asset is recognized over the shorter of the lease term or useful life of the underlying asset within depreciation and amortization expense and other expenses from managed and franchised properties in consolidated statements of operations. The interest expense related to finance leases, including any variable lease payments, is recognized in interest expense in consolidated statements of operations.

The Company assesses ROU assets for impairment quarterly. When events or circumstances indicate the carrying value may not be recoverable, the Company evaluates the net book value of the asset for impairment by comparison to the projected undiscounted future cash flows. If the carrying value of the asset is determined to not be recoverable and is in excess of the estimated fair value, the Company recognizes an impairment charge in asset impairments on its consolidated statements of income.

(u) Contingencies

Liabilities for loss contingencies arising from claims, assessments, litigation, fines, and penalties and other sources are recorded when it is probable that a liability has been incurred and the amount can be reasonably estimated. If a potential material loss contingency is not probable but is reasonably possible, or is probable but the amount cannot be estimated, then the nature of the contingent liability, together with an estimate of the range of possible loss if determinable and material, is disclosed. Legal costs incurred in connection with loss contingencies are expensed as incurred.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(v) *Income taxes*

Deferred income taxes are recognized for temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, net tax loss carry-forwards and credits using the enacted tax rates expected to apply to taxable income in the periods in which the deferred tax liability or asset is expected to be settled or realized. Deferred tax assets are reduced by a valuation allowance when it is more likely than not that some portion or all of the deferred tax assets will not be realized. Current income taxes are provided for in accordance with the laws of the relevant taxing authorities.

Income tax expense includes (i) deferred tax expense, which generally represents the net change in the deferred tax asset or liability balance during the year plus any change in valuation allowances; (ii) current tax expense, which represents the amount of tax payable to or receivable from a taxing authority; and (iii) non-current tax expense, which represents the increases and decreases in amounts related to uncertain tax positions from prior periods and not settled with cash or other tax attributes. The Company only recognizes tax benefits related to uncertain tax positions when such positions are more likely than not of being sustained upon examination. For such positions, the amount of tax benefit that the Company recognizes is the largest amount of tax benefit that is more than fifty percent likely of being sustained upon the ultimate settlement of such uncertain tax position. The Company records penalties and interests associated with the uncertain tax positions as a component of income tax expense.

The Company uses the flow-through method to account for investment tax credits earned on qualifying projects placed into service. Under this method the investment tax credits are recognized as a reduction to income tax expense in the year the credit arises. The use of the flow-through method also results in a basis difference from the recognition of a deferred tax liability and an immediate income tax expense for reduced future tax depreciation of the related assets. Such basis differences are accounted for pursuant to the income statement method.

(w) *Revenue recognition*

The Company recognizes revenue when it satisfies a performance obligation by transferring a promised good or service to a customer.

Solar power products and materials

Solar power products, including solar modules, other solar power products, solar system kits and materials related to solar power products are transferred at a point in time when the customer obtains control of the products, which is typically upon shipment or delivery depending on the contract terms. Revenues of solar product sales also include reimbursements received from customers for shipping and handling costs. Sales agreements typically contain the assurance-type customary product warranties but do not contain any post-shipment obligations nor any return or credit provisions, see note 2 (aa) for the Company's accounting policy for warranty.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

The Company assessed whether it is probable that the Company will collect substantially all of the consideration to which it will be entitled in exchange for the products that will be transferred to the customer. As of December 31, 2018 and 2019, the Company had inventories of \$9.0 million and \$7.7 million, respectively, relating to sales to customers where revenues were not recognized because the collection of payment was determined to be not probable. The delivered products remain as inventories on consolidated balance sheets, regardless of whether the control has been transferred. If the collection of payment becomes probable in the future, the Company would then recognize revenue, adjust inventories and recognize cost of revenues.

O&M services

O&M services are transferred over time when customers receive and consume the benefits provided by the Company's performance under the terms of service arrangements. Revenues from O&M services are recognized overtime based on the work completed to date which does not require re-performances and the costs of O&M services are expensed when incurred.

EPC and development services

The Company recognizes revenue for sales of EPC and development services over time based on the estimated progress to completion using a cost-based input method. In applying the cost-based input method of revenue recognition, the Company use the actual costs incurred relative to the total estimated costs to determine the Company's progress towards contract completion and to calculate the corresponding amount of revenue and gross profit to recognize. Cost-based input method of revenue recognition is considered a faithful depiction of the Company's efforts to satisfy EPC and development services contracts and therefore reflect the transfer of goods or services to a customer under such contracts. Costs incurred towards contract completion may include costs associated with direct materials, labor, subcontractors, and other indirect costs related to contract performance. The cost-based input method of revenue recognition requires the Company to make estimates of net contract revenues and costs to complete the Company's 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 the Company's projects, including materials, labor, contingencies, and other system costs. If estimated total costs of any contract are greater than the estimated net revenues, of the contract, the Company recognizes the entire estimated loss in the period the loss becomes known. The cumulative effect of revisions to estimates related to net contract revenues and costs to complete contracts, including penalties, claims, change orders, performance incentives, anticipated losses, and others are recorded in the period in which revisions to estimates are identified and the amounts can be reasonably estimated.

Solar power projects

Sales of solar power projects are recognized at a point in time when customers obtain control of solar power projects. For sales of solar power projects in which the company obtains an interest in the project sold to the customer, the Company recognizes all of the revenue for the consideration received, including the fair value of the non-controlling interest the Company obtained, and defer any profit associated with the interest obtained.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)Electricity revenue

Electricity revenue is generated primarily by the Company's solar power plants under long-term PPAs and performance based energy incentives. For electricity sold under PPAs, the Company recognizes electricity revenue based on the price stated in the PPAs when electricity has been generated and transmitted to the grid. Performance-based energy incentives are awarded under certain state programs for the delivery of renewable electricity when the conditions attached to it have been met and there is reasonable assurance that the incentives will be received. During the years ended December 31, 2017, 2018 and 2019, the Company recognized performance-based energy incentives of \$10.9 million, \$4.7 million, and \$3.9 million, respectively, related to electricity generated and recognized in revenue.

Disaggregation of Revenue

The table represents a disaggregation of revenue from contracts with customers for the years ended December 31, 2017, 2018, and 2019. See Segment Information Note 22 for details of revenues generated from each product or service and revenues generated from different geographic locations.

The following table represents a disaggregation of revenue recognized at a point in time or over time:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	(In Thousands of U.S. Dollars)		
MSS:			
Revenue recognized at a point in time	2,705,985	2,095,743	2,238,310
Revenue recognized over time	6,938	73,175	242,828
Energy:			
Revenue recognized at a point in time	633,195	1,542,906	668,476
Revenue recognized over time	44,275	32,688	50,969
	<u>3,390,393</u>	<u>3,744,512</u>	<u>3,200,583</u>

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

The Company's contract assets and liabilities are as follow:

	At December 31, 2018	At December 31, 2019	Fluctuation
	(In Thousands of U.S. Dollars)		
Contract Assets			
Accounts receivables, unbilled	38	15,256	15,218
Contract Liabilities			
Advances from customers	39,024	134,806	95,782
Other current liabilities	51,381	20,917	(30,464)
	<u>90,405</u>	<u>155,723</u>	<u>65,318</u>

For the year ended December 31, 2019, \$62.0 million revenue is recognized from the beginning balance of contract liabilities as of January 1, 2019. Contract liabilities of \$155.7 million as of December 31, 2019 are expected to be realized within one year.

Practical Expedients and Exemptions

The Company applies the new revenue standard requirements to a portfolio of contracts (or performance obligations) with similar characteristics for transactions where it is expected that the effects on the financial statements of applying the revenue recognition guidance to the portfolio would not differ materially from applying this guidance to the individual contracts (or performance obligations) within that portfolio. Therefore, the Company has elected the portfolio approach in applying the new revenue guidance.

The Company has made an accounting policy election to not assess whether promised products are performance obligations if they are immaterial in the context of the contract with the customer. If the revenue related to a performance obligation that includes products that are immaterial in the context of the contract is recognized before those immaterial products are transferred to the customer, then the related costs to transfer those products are accrued.

The Company does not disclose the value of unsatisfied performance obligations for (i) contracts with an original expected length of one year or less and (ii) contracts for which the Company recognizes revenue at the amount to which it has the right to invoice for services performed.

The Company generally expenses incremental costs of obtaining a contract when incurred because the amortization period would be less than one year. The incremental costs are recorded in operating expense. Incremental costs of obtaining a contract with an amortization period more than one year are not material to the Company.

(x) Shipping and handling costs

Payments received from customers for shipping and handling costs are included in net revenues. Shipping and handling costs relating to sales of \$79,853, \$69,855 and \$88,079, are included in selling expenses for the years ended December 31, 2017, 2018 and 2019, respectively.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(y) Research and development

Costs related to the design, development, testing and enhancement of products and silicon reclamation program are included in research and development expenses. Research and development costs are expensed when incurred and amounted to \$28,777, \$44,193 and \$47,045 for the years ended December 31, 2017, 2018 and 2019, respectively.

(z) Other operating income, net

Other operating income, net primarily consists of gains or losses on disposal of solar power systems and property, plant and equipment, and government grants received, and compensation from business interruption insurance.

Government grants received by the Company consist of unrestricted and restricted grants and subsidies. Unrestricted grants that allowed the Company's full discretion in utilizing the funds are recognized as other operating income upon receipt of cash and when all the conditions for their receipt have been satisfied. Restricted grants related to prepaid land use rights, property, plants and equipment and certain projects, are recorded as deferred subsidies in other non-current liabilities and are amortized on a straight-line basis over the term of related assets.

The following table summarizes the Company's other operating income, net:

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Net gain on disposal of solar power system	(27,803)	(36,098)	(1,666)
Net loss on disposal of property, plant and equipment	1,960	2,565	1,227
Government grants	(6,473)	(11,013)	(10,097)
Business interruption insurance compensation	(15,238)	—	—
	<u>(47,554)</u>	<u>(44,546)</u>	<u>(10,536)</u>

(aa) Warranty cost

Before June 2009, the Company typically sold its standard solar modules with a two-year guarantee for defects in materials and workmanship and a 10-year and 25-year warranty against declines of more than 10% and 20%, respectively, from the initial minimum power generation capacity at the time of delivery. In June 2009, the Company increased its guarantee for defects in materials and workmanship to six years. In August 2011, the Company increased its guarantee for defects in materials and workmanship to ten years.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

In 2019, the Company increased its guarantee for defects in materials and workmanship up to twelve years and the Company warrant that, for a period of 25 years, its standard polycrystalline modules will maintain the following performance levels: (i) during the first year, the actual power output of the module will be no less than 97.5% of the labeled power output; (ii) from the second year to the 24th year, the actual annual power output decline of the module will be no more than 0.7%; and (iii) by the end of the 25th year, the actual power output of the module will be no less than 80.7% of the labeled power output.

The Company has lengthened the warranty against decline in performance for its bifacial module and double glass module products to 30 years.

For solar power projects built by the Company, the Company provides a limited workmanship or balance of system warranty against defects in engineering design, installation and construction under normal use, operation and service conditions for a period of up to ten years following the energizing of the solar power project. In resolving claims under the workmanship or balance of system warranty, the Company has the option of remedying through repair, refurbishment or replacement of equipment. The Company has entered into similar workmanship warranties with its suppliers to back up its warranties.

The Company maintains warranty reserves to cover potential liabilities that could arise under these guarantees and warranties. Due to limited warranty claims to date, the Company accrues the estimated costs of warranties based on an assessment of its competitors' and its own actual claim history, industry-standard accelerated testing, estimates of failure rates from the Company's quality review, and other assumptions that the Company believes to be reasonable under the circumstances. Actual warranty costs are accumulated and charged against the accrued warranty liability. To the extent that accrual for warranty costs differs from the estimates, the Company will prospectively revise its accrual rate. The Company currently records a 1% warranty provision against the revenue for sales of solar power products.

The Company has entered into agreements with a group of insurance companies with high credit ratings to back up its warranties. Under the terms of the insurance policies, which are designed to match the terms of the Company's solar module product warranty policy, the insurance companies are obliged to reimburse the Company, subject to certain maximum claim limits and certain deductibles, for the actual product warranty costs that the Company incurs under the terms of its solar module product warranty policy. The Company records the insurance premiums initially as prepaid expenses and amortizes them over the respective policy period of one year. The unamortized carrying amount is \$1,286 and \$1,486 as of December 31, 2018 and 2019, respectively and was included as a component of prepaid expenses and other current assets.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

The warranty obligations the Company records relate to defects that existed when the product was sold to the customer. The event which the Company is insured against through its insurance policies is the sale of products with these defects. Accordingly, the Company views the insured losses attributable to the shipment of defective products covered under its warranty as analogous to potential claims, or claims that have been incurred as of the product ship date, but not yet reported. The Company expects to recover all or a portion of the cost of its obligations with respect to the defective products through insurance claims. Therefore, the Company's accounting policy is to record an asset for the amount determined to be probable of recovery from the insurance claims (not to exceed the amount of the total losses incurred), consistent with the guidance set forth at ASC 410-30.

The Company considers the following factors in determining whether an insurance receivable that is probable and recoverability can be reasonably estimated: (i) reputation and credit rating of the insurance company; (ii) comparison of the solar module product warranty policy against the terms of the insurance policies, to ensure valid warranty claims submitted by customers will be covered by the policy and therefore reimbursed by the insurance companies; and (iii) with respect to specific claims submitted, written communications from the insurance company are monitored to ensure the claim has been submitted to the insurance company, and reimbursements are probable to be subsequently collected. The successfully processed claims provide further evidence that the insurance policies are functioning as anticipated.

To the extent uncertainties regarding the solvency of insurance carriers or the legal sufficiency of insurance claims (including if they became subject to litigation) were to arise, the Company will establish a provision for uncollectible amounts based on the specific facts and circumstances. To date, no provision had been determined to be necessary. In addition, to the extent that accrual for warranty costs differs from the estimates and the Company prospectively changes its accrual rate, this change may result in a change to the amount expected to be recovered from insurance.

As the warranty obligation and related recovery asset do not meet the criteria for offsetting, the gross amounts are reported in the Company's consolidated balance sheets. The asset is expected to be realized over the life of the warranty obligation, which is 25 or 30 years and is treated as a non-current asset consistent with the underlying warranty obligation. When a specific claim is submitted, and the corresponding insurance proceeds will be collected within twelve months of the balance sheet date, the Company will reclassify that portion of the receivable as being current. The insurance receivable amounts were \$75,617 and \$79,888 as of December 31, 2018 and 2019, respectively, and were included as a component of other non-current assets.

The Company made downward adjustments to its accrued warranty costs of \$1,446 and other non-current assets of \$800, for the year ended December 31, 2019, to reflect the general declining trend of the average selling price of solar modules, which is a primary input into the estimated warranty costs. Accrued warranty costs (net effect of adjustments) of \$19,793, \$13,188 and \$28,044 are included in cost of revenues for the years ended December 31, 2017, 2018 and 2019, respectively.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(ab) Foreign currency translation

The United States dollars (“U.S. dollars” or “\$”), the currency in which a substantial amount of the Company’s transactions are denominated, is used as the functional and reporting currency of CSI. Monetary assets and liabilities denominated in currencies other than the U.S. dollars are translated into U.S. dollars at the rates of exchange ruling at the balance sheet date. Transactions in currencies other than the U.S. dollars during the year are converted into the U.S. dollars at the applicable rates of exchange prevailing on the transaction date. Transaction gains and losses are recognized in the consolidated statements of operations. Gains and losses on intra-entity foreign currency transactions that are of a long-term-investment nature (that is, settlement is not planned or anticipated in the foreseeable future) between consolidated entities are not recognized in earnings, but are included as a component of other comprehensive income.

The financial records of certain of the Company’s subsidiaries are maintained in local currencies other than the U.S. dollars, such as Renminbi (“RMB”), Euros, Canadian dollars (“CAD”), Japanese yen and Brazilian reals (“BRL”), which are their functional currencies. Assets and liabilities are translated at the exchange rates at the balance sheet date, equity accounts are translated at historical exchange rates and revenues, expenses, gains and losses are translated using the average rate for the year. Translation adjustments are reported as foreign currency translation adjustment and are shown as a separate component of other comprehensive income in the statements of comprehensive income.

(ac) Comprehensive income

Comprehensive income includes all changes in equity except those resulting from investments by owners and distributions to owners. For the years presented, total comprehensive income included (i) net income, (ii) foreign currency translation adjustments, (iii) gains and losses on intra-entity foreign currency transactions that are of a long-term-investment nature (that is, settlement is not planned or anticipated in the foreseeable future) between consolidated entities and (iv) the unrealized gains or losses (effective portion) on derivative instruments that qualify for and have been designated as cash flow hedges.

(ad) Foreign currency risk

The majority of the Company’s sales in 2017, 2018 and 2019 were denominated in U.S. dollars, Renminbi and Japanese yen, with the remainder in other currencies such as Euros, Brazilian reals, Australian dollars, Canadian dollars. The Company’s Renminbi costs and expenses are primarily related to the sourcing of solar cells, silicon wafers and silicon, other raw materials, including aluminum and silver paste, toll manufacturing fees, labor costs and local overhead expenses within the PRC. From time to time, the Company enters into loan arrangements with commercial banks that are denominated primarily in Renminbi, U.S. dollars and Japanese yen. Most of its cash and cash equivalents and restricted cash are denominated in Renminbi. Fluctuations in exchange rates, particularly between the U.S. dollars, Renminbi, Thailand Baht, British pounds, Canadian dollars, Japanese yen and Euros, may result in foreign exchange gains or losses. Since 2008, the Company has hedged part of its foreign currency exposures against the U.S. dollars using foreign currency forward or option contracts.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(ae) Concentration of credit risk

Financial instruments that potentially expose the Company to concentrations of credit risk consist primarily of cash and cash equivalents, restricted cash, accounts receivable, advances to suppliers and amounts due from related parties.

All of the Company's cash and cash equivalents are held with financial institutions that Company management believes to have high credit quality.

The Company conducts credit evaluations of customers and generally does not require collateral or other security from its customers. The Company establishes an allowance for doubtful accounts primarily based upon the age of the receivables and factors surrounding the credit risk of specific customers. With respect to advances to suppliers, such suppliers are primarily suppliers of raw materials. The Company performs ongoing credit evaluations of its suppliers' financial conditions. The Company generally does not require collateral or security against advances to suppliers, however, it maintains a reserve for potential credit losses and such losses have historically been within management's expectation.

The prepayments made by the Company are unsecured and expose the Company to supplier credit risk. As of December 31, 2018 and 2019, prepayments made to individual suppliers were all less than 10% of total advances to suppliers and the concentration risk is relatively low.

(af) Fair value of financial instruments

The Company applies authoritative guidance for fair value measurements for its financial assets and liabilities. The guidance defines fair value as an exit price representing the amount that would be received upon the sale of an asset or paid to transfer a liability in an orderly transaction between market participants. The guidance also establishes a fair value hierarchy, which prioritized the inputs used in measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1 —Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets. The Company's restricted cash balance for all periods presented uses level one fair value inputs.

Level 2 —Inputs reflect quoted prices for identical assets or liabilities in markets that are not active; quoted prices for similar assets or liabilities in active markets; inputs other than quoted prices that are observable for the assets or liabilities; or inputs that are derived principally from or corroborated by observable market data by correlation or other means.

Level 3— Unobservable inputs reflecting the Company's own assumptions incorporated in valuation techniques used to determine fair value. These assumptions are required to be consistent with market participant assumptions that are reasonably available.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(ag) Derivatives instruments and hedging activity

The Company's primary objective for holding derivative financial instruments is to manage risks. Depending on the terms of the specific derivative instruments and market conditions, some of the Company's derivative instruments may be assets and liabilities at any particular point in time. The recognition of gains or losses resulting from changes in fair value of these derivative instruments is based on the use of each derivative instrument and whether it qualifies for hedge accounting.

The Company enters into derivatives to hedge its foreign currency risk exposure to losses from price adjustments of electricity and interest rate risk. When the Company determines to designate a derivative instrument as a cash flow hedge, the Company formally documents the hedging relationship and its risk management objective and strategy for undertaking the hedge, the hedging instrument, the hedged item, the nature of the risk being hedged, how the hedging instrument's effectiveness in offsetting the hedged risk will be assessed, and a description of the method of measuring ineffectiveness. The Company also formally assesses, both at the hedge's inception and on an ongoing basis, whether the derivative that is used in hedging transactions is highly effective in offsetting changes in cash flows of hedged items. The effective portion of gains and losses on derivatives designated as cash flow hedges are initially deferred in other comprehensive income before being recognized in the statements of operations in the same period as the hedged transactions are reflected in earnings. Gains and losses on derivatives that are not designated or fail to qualify as effective hedges are recognized in the statements of operations as incurred.

Fair value of the derivative instruments is determined using pricing models developed based on the underlying price of the hedged items. The values are also adjusted to reflect nonperformance risk of the counterparty and the Company, as necessary.

(ah) Earnings (loss) per share

Basic earnings (loss) is computed by dividing income (loss) attributable to holders of common shares by the weighted average number of common shares outstanding during the year. Diluted earnings (loss) per common share reflects the potential dilution that could occur if securities or other contracts to issue common shares were exercised or converted into common shares. Common share equivalents are not included in the calculation of dilutive earnings per share if their effects are anti-dilutive.

(ai) Share-based compensation

The Company's share-based compensation with employees, such as share options, restricted shares and restricted share units ("RSUs"), is measured at the grant date, based on the fair value of the award, and is recognized as compensation expense, net of estimated forfeitures, over the period during which an employee is required to provide service in exchange for the award, which is generally the vesting period.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

(aj) Recently issued accounting pronouncements

In February 2016, the FASB issued ASU 2016-02, "Leases (Topic 842)", requires the recognition of right-of-use ("ROU") assets and lease liabilities on the balance sheet and changes the pattern of expense recognition in the statement of operations. In July 2018, the FASB issued ASU 2018-11, "Leases (Topic 842)—Targeted Improvements", which provided an optional transition method to apply the new lease requirements through a cumulative-effect adjustment in the period of adoption.

The Company adopted the new standard on January 1, 2019 using this optional transition method to all leases existed at the date of initial application. In addition, the Company elected the transition practical referred to as the "package of three", that must be taken together and allows entities to (1) not reassess whether existing contracts contain leases, (2) carryforward the existing lease classification, and (3) not reassess initial direct costs associated with existing leases.

This adoption primarily affects the Company's leases arrangements previously accounted for under Topic 840. As a result of adoption, the Company recognized right-of-use ("ROU") assets and lease liabilities on the balance sheet for operating leases of \$33,829. Upon adoption of ASC 842, the Company elected to use the remaining lease term as of January 1, 2019 in the estimation of the applicable discount rate for leases that were in place at adoption. For the initial measurement of the lease liability for leases commencing after January 1, 2019, the Company use the discount rate as of the commencement date of the lease, incorporating the entire lease term. The treatment of finance leases has no difference with that under Topic 840 and there is no significant impact on results of operations or cash flows.

The reported results for year 2019 reflect the adoption of Topic 842, while the reported results for year 2017 and 2018 were prepared under the previous lease accounting guidance. There is no impact to the beginning balance of retained earnings on January 1, 2019 for this adoption.

In June 2016, the FASB issued ASU 2016-13, "Financial Instruments—Credit Losses (Topic 326)", which has been subsequently updated by ASU 2019-04, 2019-05, 2019-10, 2019-11 and 2020-03. The amendments change the impairment model for most financial assets, and will require the use of an "expected loss" model for instruments measured at amortized cost. Under this model, entities will be required to estimate the lifetime expected credit loss on such instruments and record an allowance to offset the amortized cost basis of the financial asset, resulting in a net presentation of the amount expected to be collected on the financial asset. This pronouncement is effective for fiscal years, and for interim periods within those fiscal years, beginning after December 15, 2019. The Company does not expect a material impact to its consolidated financial statement upon adoption of this ASU.

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2. SUMMARY OF PRINCIPAL ACCOUNTING POLICIES (Continued)

In August 2018, the FASB issued ASU 2018-13, “Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value”. ASU 2018-13 removes and modifies existing disclosure requirements on fair value measurement, namely regarding transfers between levels of the fair value hierarchy and the valuation processes for Level 3 fair value measurements. Additionally, ASU 2018-13 adds further disclosure requirements for Level 3 fair value measurements, specifically changes in unrealized gains and losses and other quantitative information. ASU 2018-13 is effective for fiscal years and interim periods within those fiscal years, beginning after December 15, 2019, with early adoption permitted. The Company does not expect a material impact to its consolidated financial statement upon adoption of this ASU.

In October 2018, the FASB issued ASU 2018-17, “Consolidation (Topic 810): Targeted Improvements to Related Party Guidance for Variable Interest Entities”, which expands variable interests to indirect interests held through related parties under common control. ASU 2018-17 is effective for fiscal years and interim periods within those fiscal years, beginning after December 15, 2019, with early adoption permitted. It is required to be applied retrospectively with a cumulative-effect adjustment to retained earnings at the beginning of the earliest period presented. The Company does not expect a material impact to its consolidated financial statement upon adoption of this ASU.

In December 2019, the FASB issued ASU 2019-12, Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes (“ASU 2019-12”), which simplifies income tax accounting in various areas including, but not limited to, the accounting for hybrid tax regimes, tax implications related to business combinations, and interim period accounting for enacted changes in tax law, along with some codification improvements. ASU 2019-12 is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020, with early adoption permitted. Certain changes in the standard require retrospective or modified retrospective adoption, while other changes must be adopted prospectively. The Company is currently evaluating ASU 2019-12 and its impact on its consolidated financial statements.

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3. ALLOWANCE FOR DOUBTFUL ACCOUNTS

Allowance for doubtful accounts are comprised of allowances for accounts receivable trade, advances to suppliers and other receivables.

An analysis of allowances for accounts receivable, trade for the years ended December 31, 2017, 2018 and 2019 is as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	\$	\$	\$
Beginning of the year	26,119	32,941	32,733
Allowances made (reversed) during the year, net	5,345	869	(1,386)
Accounts written-off against allowances	(174)	(297)	(309)
Foreign exchange effect	1,651	(780)	(1,493)
Closing balance	<u>32,941</u>	<u>32,733</u>	<u>29,545</u>

An analysis of allowances for advances to suppliers for the years ended December 31, 2017, 2018 and 2019 is as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	\$	\$	\$
Beginning of the year	19,527	18,762	20,926
Allowances made (reversed) during the year, net	(833)	2,287	738
Accounts written-off against allowances	—	—	(1,452)
Foreign exchange effect	68	(123)	69
Closing balance	<u>18,762</u>	<u>20,926</u>	<u>20,281</u>

An analysis of allowances for other receivables for the years ended December 31, 2017, 2018 and 2019 is as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	\$	\$	\$
Beginning of the year	9,251	10,349	9,704
Allowances made (reversed) during the year, net	549	(175)	1,919
Foreign exchange effect	549	(470)	(192)
Closing balance	<u>10,349</u>	<u>9,704</u>	<u>11,431</u>

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4. INVENTORIES

Inventories consist of the following:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Raw materials	47,759	75,722
Work-in-process	46,817	74,105
Finished goods	167,446	404,243
	<u>262,022</u>	<u>554,070</u>

In 2017, 2018 and 2019, inventory was written down by \$17,820, \$14,646 and \$19,447, respectively, to reflect the lower of cost and net realizable value.

5. PROJECT ASSETS

Project assets consist of the following:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Project assets — Acquisition cost	51,635	55,158
Project assets — EPC and other cost	1,234,128	1,031,976
	<u>1,285,763</u>	<u>1,087,134</u>
Current portion	933,563	604,083
Non-current portion	352,200	483,051

The Company recorded impairment charges and write-off for project assets of nil, \$9,016 and \$20,194 for the years ended December 31, 2017, 2018 and 2019, respectively.

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6. PROPERTY, PLANT AND EQUIPMENT, NET

Property, plant and equipment, net consist of the following:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Buildings	441,975	453,712
Leasehold improvements	13,058	14,225
Machinery	785,874	1,074,460
Furniture, fixtures and equipment	64,135	64,117
Motor vehicles	6,100	6,351
Land	18,810	20,451
	<u>1,329,952</u>	<u>1,633,316</u>
Accumulated depreciation	(489,927)	(598,297)
Impairment	(30,503)	(45,437)
Subtotal	809,522	989,582
Construction in process	75,464	56,453
Property, plant and equipment, net	<u>884,986</u>	<u>1,046,035</u>

Depreciation expense of property, plant and equipment was \$88,931, \$120,834 and \$148,034 for the years ended December 31, 2017, 2018 and 2019, respectively. Construction in process primarily represents production facilities under construction and the machinery under installation.

7. SOLAR POWER SYSTEMS , NET

Solar power systems, net consist of the following:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Solar power systems in operation	66,641	70,449
Solar power systems under construction	4,484	4,830
Accumulated depreciation	(16,227)	(22,322)
Solar power systems, net	<u>54,898</u>	<u>52,957</u>

Depreciation expense of solar power systems was \$5,683, \$3,756 and \$6,379 for the years ended December 31, 2017, 2018 and 2019, respectively.

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8. INTANGIBLE ASSETS, NET

The following table summarizes the Company's intangible assets:

<u>At December 31, 2019</u>	<u>Gross Carrying Amount</u>	<u>Accumulated Amortization</u>	<u>Net</u>
	\$	\$	\$
Technical know-how	1,428	(1,425)	3
Computer software	38,205	(15,417)	22,788
Total intangible assets, net	<u>39,633</u>	<u>(16,842)</u>	<u>22,791</u>

<u>At December 31, 2018</u>	<u>Gross Carrying Amount</u>	<u>Accumulated Amortization</u>	<u>Net</u>
	\$	\$	\$
Technical know-how	2,369	(1,458)	911
Computer software	25,882	(11,890)	13,992
Total intangible assets, net	<u>28,251</u>	<u>(13,348)</u>	<u>14,903</u>

Amortization expense for the years ended December 31, 2017, 2018 and 2019 were \$4,659, \$4,666 and \$5,310, respectively.

Amortization expenses of the above intangible assets are expected to be approximately \$4.4 million, \$3.6 million, \$3.1 million, \$2.5 million and \$9.2 million for the years ended December 31, 2020, 2021, 2022, 2023, 2024 and thereafter, respectively.

9. FAIR VALUE MEASUREMENT

The Company measures at fair value its financial assets and liabilities by using a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. Fair value is 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.

As of December 31, 2018 and 2019, the Company's financial assets and liabilities were measured at fair value on a recurring basis in periods subsequent to their initial recognition all using the significant other observable inputs, which are Level 2 inputs.

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9. FAIR VALUE MEASUREMENT (Continued)

Foreign exchange option and forward contracts

The Company entered into certain foreign currency derivative contracts to protect against volatility of future cash flows caused by the changes in foreign exchange rates. The foreign currency derivative contracts do not qualify for hedge accounting and, as a result, the changes in fair value of the foreign currency derivative contracts are recognized in the consolidated statements of operations.

The Company's foreign currency derivative instruments relate to foreign exchange options or forward contracts involving major currencies such as Renminbi, Canadian dollars, British pounds, and Japanese yen. Since its derivative instruments are not traded on an exchange, the Company values them using valuation models. Interest rate yield curves and foreign exchange rates are the significant inputs into these valuation models. These inputs are observable in active markets over the terms of the instruments the Company holds, and accordingly, the fair value measurements are classified as Level 2 in the hierarchy. The Company considers the effect of its own credit standing and that of its counterparties in valuations of its derivative financial instruments.

Interest rate swap

During the year ended December 31, 2016, the Company entered into fixed for floating interest rate swaps with two financial institutions to hedge the interest rate risk on its project debts obtained in the United Kingdom with notional amount totaling GBP78.4 million (\$96.8 million), which will expire between 2033 and 2034. The interest rate swaps had been designated as cash flow hedges for accounting purposes.

In 2018, the UK projects were sold and the interest rate swaps were assumed by the third party buyer.

The interest rate swap contracts of total notional amounts of approximately \$399.0 million were entered into for Recurrent projects and designated as cash flow hedges. The interest rate swap contracts were transferred along with the sale of the underlying projects, and the fair value of the remaining swap contract representing a notional amount of approximately \$47.4 million entered into for Roserock project loan was recorded as derivative liabilities of \$2,170 on the balance sheet as of December 31, 2019.

The estimated fair value of interest rate swaps was measured based on observable market data, which are considered Level 2 inputs.

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9. FAIR VALUE MEASUREMENT (Continued)

The fair value of derivative instruments on the consolidated balance sheets as of December 31, 2018 and 2019 and the effect of derivative instruments on the consolidated statements of operations for the years ended December 31, 2017, 2018 and 2019 are as follows:

	Fair Value of Derivative Assets			
	At December 31, 2018		At December 31, 2019	
	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
		\$		\$
Foreign exchange forward contracts	Derivative assets — current	4,166	Derivative assets — current	5,097
Foreign exchange option contracts	Derivative assets — current	1	Derivative assets — current	450
Interest rate swap	Derivative assets — current	594	Derivative assets — current	—
Interest rate swap	Derivative assets — non-current	3,216	Derivative assets — non-current	—
	Total	<u>7,977</u>	Total	<u>5,547</u>

	Fair Value of Derivative Liabilities			
	At December 31, 2018		At December 31, 2019	
	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
		\$		\$
Foreign exchange forward contracts	Derivative liabilities — current	13,480	Derivative liabilities — current	10,127
Foreign exchange option contracts	Derivative liabilities — current	218	Derivative liabilities — current	25
Interest rate swap	Derivative liabilities — current	—	Derivative liabilities — current	329
Interest rate swap	Derivative liabilities — non-current	—	Derivative liabilities — non-current	1,841
	Total	<u>13,698</u>	Total	<u>12,322</u>

	Location of Gain (Loss) Recognized in Statements of Operations	Amount of Gain (Loss) Recognized in Statements of Operations		
		Years Ended December 31		
		2017	2018	2019
		\$	\$	\$
Foreign exchange forward contracts	Gain (loss) on change in fair value of derivatives	(2,638)	(16,414)	(20,249)
Foreign exchange option contracts	Gain (loss) on change in fair value of derivatives	—	(2,023)	(1,022)
Warrants	Gain (loss) on change in fair value of derivatives	711	—	—
Interest rate swap	Gain (loss) on change in fair value of derivatives	1,655	(793)	(947)
	Total	<u>(272)</u>	<u>(19,230)</u>	<u>(22,218)</u>

Other fair value measurements

The Company measures certain long-lived assets or long-term investments at fair value on a non-recurring basis in periods after initial measurement in circumstances when the fair value of such assets is below its recorded cost and impairment is required.

The Company recorded impairment charges for certain manufacturing asset group of \$11,626, \$30,968 and \$21,866 for the years ended December 31, 2017, 2018 and 2019, respectively. The fair value of these assets was measured based on prices offered by unrelated third-party willing buyers and classified as level 3 fair value measurements as the offering prices are not observable. The impairment was recorded in general and administrative expenses of the MSS segment.

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9. FAIR VALUE MEASUREMENT (Continued)

The Company also holds financial instruments that are not recorded at fair value in the consolidated balance sheets, but whose fair value is required to be disclosed under the U.S. GAAP.

The carrying values of cash and cash equivalents, restricted cash, trade receivables, billed and unbilled, amounts due from related parties, accounts payables, short-term notes payable, amounts due to related parties and short-term borrowings approximate their fair values due to the short-term maturity of these instruments. Long-term borrowings were \$393,614 and \$619,477 as of December 31, 2018 and 2019, respectively, which approximate their fair values since most of the borrowings contain variable interest rates. The fair value of long-term borrowings was measured based on discounted cash flow approach, which is classified as level 2 as the key inputs can be corroborated with market data.

The carrying value of the Company's outstanding convertible notes was \$127.4 million and nil as of December 31, 2018 and 2019, respectively, which approximates the fair value.

10. VARIABLE INTEREST ENTITIES

Since 2016, the Company, through its wholly owned subsidiary, CSE Japan Investment Company Limited, entered into silent partnership agreements with various Japan project companies, for the purpose of raising project finance bonds arranged by Goldman Sachs Japan Co., Ltd. Under the silent partnership agreements, the project entities are considered VIEs in which the Company has no equity interests, but is entitled to substantially all of the economic interests of the projects. In addition, the Company has the power to make decisions over the activities that most significantly impact the economic performance of the projects under the asset management agreement signed simultaneously between the project companies and Canadian Solar Project K.K, a subsidiary of the Group. As such, the Company concluded it was the primary beneficiary of the project companies and thus these project companies were accounted for as consolidated VIEs since their establishment.

As of December 31, 2018 and 2019, the carrying amounts and classifications of the consolidated VIEs' major assets and liabilities with immaterial items combined, excluding intercompany balances which are eliminated upon consolidation, included in the Company's consolidated balance sheet are as follows:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Project assets	185,448	197,366
Other assets	21,836	26,102
Total assets	<u>207,284</u>	<u>223,468</u>
Short-term borrowings	9,160	139,708
Long-term borrowings	113,973	—
Other liabilities	59,476	66,569
Total liabilities	<u>182,609</u>	<u>206,277</u>

Net income and overall cash flow activities during the year are immaterial to the consolidated financial statements.

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11. INVESTMENTS IN AFFILIATES

Investments in affiliates consist of the following:

	At December 31,			
	2018		2019	
	Carrying Value \$	Ownership Percentage (%)	Carrying Value \$	Ownership Percentage (%)
RE Roserock Holdings LLC (“Roserock”)	62,767	49	83,034	49
Canadian Solar Infrastructure Fund, Inc.	23,990	14.66	19,162	14.66
Suzhou Financial Leasing Co., Ltd.	14,361	6	16,050	6
Others	24,977	21-49	34,582	15-49
Total	126,095		152,828	

Tax equity transactions

In 2015, the Company, through its wholly owned subsidiary, Recurrent, entered into the following tax equity transactions:

In December 2015, the Company completed the sale of 100% of the class A membership interests of RE Roserock Holdings LLC, the holding company of the Roserock project companies, to Southern. The Company maintains 100% ownership in the class B membership interests of RE Roserock Holdings LLC. Southern paid the Company an initial contribution of \$45 million in cash for the class A membership interests in RE Roserock Holdings LLC.

Under the LLC agreements, the class A membership interests and class B membership interests will receive 51% and 49%, respectively, of future cash flow distributions, and Southern is entitled to substantially all of the projects’ federal tax benefits.

Effective with the sale of the class A membership interests, the Company ceased having controlling financial interests in Roserock, and accounted for the transactions as partial sales of real estates under ASC360-20 when the transactions incurred in 2015. The Company also considered that it would continue to exercise significant influences over its retained interests in and has accounted for these interests pursuant to the equity method of accounting.

Under this method, the Company recognizes its equity in earnings attributable to class B membership interests according to its proportionate share of investees’ operating cash flows. Additionally, the Company amortizes the basis difference between the cost of investment and its proportionate share of the investees’ net assets over the estimated lives of the related assets.

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11. INVESTMENTS IN AFFILIATES (Continued)

In December 2018, the Company wrote down the class B membership interests in Roserock project to its anticipated resell value by \$5.0 million.

Other investments

On September 8, 2015, SZSP established an entity, Suzhou Financial Leasing Co., Ltd., for cash consideration of \$13,860, in which the Company holds 6% voting interests. One of five board members is designated by SZSP and, as such SZSP is considered having significant influence over the investee and the equity method is used in this investment.

On October 26, 2017, Canadian Solar Infrastructure Fund, Inc. ("CSIF") priced its initial public offering. As of December 31, 2018 and 2019, the Company owned 14.66% of total units of CSIF. One out of the three members of the board of directors of CSIF represents the Company. The quorum for a board resolution of CSIF is a majority of the members of the board of directors, and the adoption of a resolution requires a majority of the votes presents.

In September 2018, the Company made full impairment charge of \$0.7 million on investment in eNow, Inc., in which the Company holds 10% voting interests, due to deterioration of the investee's financial position.

Equity in earnings of unconsolidated investees were \$9,411, \$5,908 and \$28,948 for the years ended December 31, 2017, 2018 and 2019, respectively.

12 . LEASE

The Company leases office space, office equipment, vehicles, spaces for solar power plants construction, and manufacturing facilities in various regions where the Company operates. Leased assets mainly locate in China, United States, Japan, German, and Italy.

The leases considered as ROU assets have various terms of up to twenty years. The Company also has certain leases with terms of 12 months or less, which are not recorded on the balance sheet.

The components of lease expenses were as follows:

	Year ended December 31, 2019
	\$
Finance lease cost:	
Amortization of right-of-use assets	18,900
Interest on lease liabilities	3,213
Operating fixed lease cost	17,619
Short-term lease cost	8,920
Total lease cost	<u>45,916</u>

The operating lease expenses were \$20.9 million and \$19.8 million for the years ended December 31, 2018, and 2017, respectively. Finance lease expenses were \$24.7 million and \$19.1 million for the years ended December 31, 2018 and 2017, respectively.

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12 . LEASE (Continued)

Other supplemental information related to leases is summarized below:

	<u>Year ended December 31, 2019</u> \$
Cash paid for amounts included in the measurement of lease liabilities	
Operating cash flows from finance lease	(3,213)
Operating cash flows from operating lease	(15,866)
Financing cash flows from finance lease	(33,614)
Right-of-use assets obtained in exchange of new finance lease liabilities in non-cash transaction	7,300
Right-of-use assets obtained in exchange of new operating lease liabilities in non-cash transaction	18,222
	<u>At December 31, 2019</u>
Weighted average of remaining operating lease term - finance leases (in years)	1.41
Weighted average of remaining operating lease term - operating leases (in years)	3.03
Weighted average of operating lease discount rate - finance lease	5.82 %
Weighted average of operating lease discount rate - operating lease	4.36 %

As of December 31, 2019, maturities of operating and finance lease liabilities up to five years were as follows:

	<u>Operating Lease Payment</u>	<u>Finance Lease Payment</u>	<u>Total Lease Payment</u>
<u>Year Ending December 31:</u>	\$	\$	\$
2020	18,953	27,439	46,392
2021	12,980	13,087	26,066
2022	4,666	604	5,270
2023	2,541	—	2,541
2024	1,077	—	1,077
Thereafter	1,504	—	1,504
Total future minimum lease payments	41,721	41,130	82,851
Less: imputed interest	2,236	2,056	4,292
NPV for future minimum lease payments	39,485	39,074	78,559
Analysis as:			
Short-term	18,767	25,998	44,765
Long-term	20,718	13,076	33,794
Total lease liabilities	39,485	39,074	78,559

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The future minimum lease payments from 2018 Form 20-F as filed in accordance with Leases (Topic 840) were as follows:

<u>Year Ending December 31:</u>	<u>Operating Lease Payment</u>	<u>Finance Lease Payment</u>	<u>Total Lease Payment</u>
	\$	\$	\$
2019	18,287	40,945	59,232
2020	11,790	23,483	35,273
2021	9,379	11,842	21,221
2022	2,485	556	3,041
2023	838	—	838
Thereafter	7,743	—	7,743
Total future minimum lease payments	50,522	76,826	127,348
Less: imputed interest		5,024	5,024
NPV for future minimum lease payments		<u>71,802</u>	<u>71,802</u>

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13. BORROWINGS

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
Analysis as:		
Short-term borrowings	856,876	819,031
Long-term borrowings, current portion	171,051	114,089
Subtotal for short-term borrowings	1,027,927	933,120
Long-term borrowings on project assets — current ⁽¹⁾	265,770	286,173
Long-term borrowings	393,614	619,477
Total	<u>1,687,311</u>	<u>1,838,770</u>

(1) Certain long-term borrowings were classified as current liabilities because these borrowings are associated with certain solar power projects that are expected to be sold within one year.

As of December 31, 2019, the Company had contractual credit facilities of \$2,331,226 and \$579,545 was available for draw down upon demand. In addition, as of December 31, 2019, the Company also had non-binding credit facilities of \$513,566.

As of December 31, 2019, short-term borrowings of \$708,787, long-term borrowings on project assets – current of \$283,409 and long-term borrowings of \$513,622 were secured by property, plant and equipment with carrying amounts of \$192,103, inventories of \$55,955, prepaid land use rights of \$28,763, restricted cash of \$138,950, accounts receivable of \$226,938, equity interest of \$373,751 and project assets and solar power systems of \$579,695.

Long term borrowings newly obtained during the year ended December 31, 2019 were as follows:

On January 31, 2019, Canadian Solar Japan K.K. entered into a financing agreement with Mizuho Bank, Ltd, denominated in JPY, which agreed to provide revolving long-term working capital financing of approximately \$8,476. The total outstanding borrowings under this agreement equaled \$8,476 at December 31, 2019. The loan is secured by inventory and accounts receivable. The agreement does not contain any financial covenants or restrictions.

On January 25, 2019, CSI Cells (Yancheng) Co., Ltd. entered into a financing agreement, denominated in RMB, with a Chinese financial institution, which agreed to provide long-term Capex financing of \$129,010 in Jiangsu Province. The outstanding borrowing under this agreement was \$40,136 at December 31, 2019, which requires repayment in 2021 and 2022. The loan is secured by prepaid land use rights and guaranteed by Chinese Subsidiary of CSI. The agreement does not contain any financial covenants or restrictions.

On March 18, 2019, Canadian Solar Projects K.K. entered into a financing agreement, denominated in JPY, with a Japanese financial institution, which agreed to provide revolving long-term working capital financing of \$49,290 for Solar power project development in Japan. The outstanding borrowing under this agreement was \$11,881 at December 31, 2019, which requires repayment in 2022. The loan is unsecured and guaranteed by CSI. The agreement does not contain any financial covenants or restrictions.

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13. BORROWINGS (Continued)

On May 8, 2019, CSI entered into a financing agreement, denominated in USD, with Credit Suisse, which agreed to provide revolving long-term working capital financing of \$50,000 for Solar power project development worldwide. The outstanding borrowing under this agreement was \$50,000 at December 31, 2019, which requires repayment in 2021. The loan is secured by equity and guaranteed by SEA subsidiaries of CSI. As of December 31, 2019, the Company met all the requirements of financial covenants.

On June 25, 2019, CSI Cells Co., Ltd. entered into a financing agreement, denominated in RMB, with a Chinese financial institution, which agreed to provide long-term Capex financing of \$43,003 in Jiangsu Province. The outstanding borrowing under this agreement was \$34,188 at December 31, 2019, which requires repayment in 2024. The loan is secured by property, plant and equipment and guaranteed by Chinese Subsidiary of CSI. The agreement does not contain any financial covenants or restrictions.

On June 28, 2019, Europe Clean Energies Asia K.K. entered into a financing agreement, denominated in JPY, with a Japanese financial institution, which agreed to provide project financing of \$5,989 for Solar power project development in Japan. The outstanding borrowing under this agreement was \$1,503 at December 31, 2019, which requires repayment in 2021. The loan is secured by project assets and guaranteed by CSI. As of December 31, 2019, the Company met all the requirements of financial covenants.

On July 15, 2019, Canadian Solar Manufacturing (Thailand) Co.,Ltd. entered into a financing agreement, denominated in USD, with syndicate financial institutions, which agreed to provide long-term Capex financing of \$110,000 in Thailand. The outstanding borrowing under this agreement was \$91,095 at December 31, 2019, which requires repayment in 2024. The loan is secured by prepaid land use rights and property, plant and equipment and guaranteed by Chinese Subsidiary of CSI. As of December 31, 2019, the Company met all the requirements of financial covenants.

On September 6, 2019, Re SH ProCo LLC entered into a financing agreement, denominated in USD, with Syndicate financial institutions, which agreed to provide module supply financing of \$123,708 for in US. The outstanding borrowing under this agreement was \$123,708 at December 31, 2019, which requires repayment in 2022. The loan is secured by equity and guaranteed by CSI. As of December 31, 2019, the Company met all the requirements of financial covenants.

On October 11, 2019, Re SH Mezz Borrower LLC. entered into a financing agreement, denominated in USD, with a Japan financial institution, which agreed to provide module supply financing of \$60,000 for in US. The outstanding borrowing under this agreement was \$60,000 at December 31, 2019, which requires repayment in 2022. The loan is secured by equity and guaranteed by CSI. As of December 31, 2019, the Company met all the requirements of financial covenants.

On October 25, 2019, Canadian Solar Projects K.K. entered into a financing agreement, denominated in JPY, with a Japanese financial institution, which agreed to provide revolving long-term working capital financing of \$93,975 for Solar power project development in Japan. The outstanding borrowing under this agreement was \$93,975 at December 31, 2019, which requires repayment in 2021. The loan is unsecured and guaranteed by CSI. The agreement does not contain any financial covenants or restrictions.

The newly obtained long-term borrowings disclosed above bear effective floating interest rates from 0.95% to 8.28% per annum.

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13. BORROWINGS (Continued)

Future principal repayments on the long-term borrowings are as follows:

2020	400,262
2021	245,927
2022	276,675
2023	40,679
2024	15,158
Thereafter	41,038
Total	1,019,739
Less: future principal repayment related to long-term borrowings, current portion	(400,262)
Total long-term portion	<u>\$ 619,477</u>

Interest expenses

Average effective interest rates on borrowings are as follows:

	At December 31, 2018	At December 31, 2019
Short-term borrowings	4.58 %	4.86 %
Long-term borrowings on project assets – current	4.61 %	3.65 %
Long-term borrowings	3.13 %	5.43 %

The Company capitalized interest costs incurred on borrowings obtained to finance construction of solar power projects or property, plant and equipment until the asset is ready for its intended use. The interests incurred during the years ended December 31, 2017, 2018 and 2019 are as follows:

	Years Ended December 31		
	2017	2018	2019
	\$	\$	\$
Interest capitalized — project assets	13,274	15,462	10,794
Interest capitalized — property, plant and equipment	1,010	1,182	2,620
Interest expense	117,971	106,032	81,326
Total interest incurred	<u>132,255</u>	<u>122,676</u>	<u>94,740</u>

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14. SHORT-TERM NOTES PAYABLE

The Company enters into arrangements with banks whereby the banks issue notes to the Company's vendors, which effectively serve to extend the payment date of the associated accounts payable. Vendors may present the notes for payment to a bank, including the bank issuing the note, prior to the stated maturity date, but generally at a discount from the face amount of the note. The Company is generally required to deposit restricted cash balances with the issuing bank, which are utilized to immediately repay the bank upon the banks' settlement of the notes. Given the purpose of these arrangements is to extend the payment dates of accounts payable, the Company has recorded such amounts as short-term notes payable. As payments by the bank are immediately repaid by the Company's restricted cash balances and other deposits with the same bank, the notes payable does not represent cash borrowings from the bank. As of December 31, 2018 and 2019, short-term notes payable was \$369,722 and \$544,991, respectively.

15. ACCRUED WARRANTY COSTS

The Company's warranty activity is summarized below:

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Beginning balance	61,139	55,659	50,605
Warranty provision	19,793	13,188	28,044
Warranty costs incurred	(26,552)	(16,732)	(23,282)
Foreign exchange effect	1,279	(1,510)	511
Ending balance	<u>55,659</u>	<u>50,605</u>	<u>55,878</u>

16. RESTRICTED NET ASSETS

As stipulated by the relevant laws and regulations applicable to China's foreign investment enterprise, the Company's PRC subsidiaries are required to make appropriations from net income as determined under accounting principles generally accepted in the PRC ("PRC GAAP") to non-distributable reserves, which include general reserve, enterprise expansion reserve and staff welfare and bonus reserve. The wholly-owned PRC subsidiaries are not required to make appropriations to the enterprise expansion reserve but appropriations to the general reserve are required to be made at not less than 10% of the profit after tax as determined under PRC GAAP. The board of directors determines the staff welfare and bonus reserve.

The general reserve is used to offset future losses. The PRC subsidiaries may, upon a resolution passed by the stockholder, convert the general reserve into capital. The staff welfare and bonus reserve is used for the collective welfare of the employee of the subsidiaries. The enterprise expansion reserve is for the expansion of the PRC subsidiaries' operations and can be converted to capital subject to approval by the relevant authorities. These reserves represent appropriations of the retained earnings determined in accordance with Chinese law.

In addition to the general reserve, the Company's PRC subsidiaries are required to obtain approval from the local PRC government prior to distributing any registered share capital. Accordingly, both the appropriations to general reserve and the registered share capital of the Company's PRC subsidiaries are considered as restricted net assets amounting to \$497.2 million as of December 31, 2019.

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17. CONVERTIBLE NOTES

On February 18, 2014, the Company issued \$130,000 of convertible notes (the "2014 Notes"). The Company granted the initial purchasers a 30-day option to purchase up to an additional \$20,000 aggregate principal amount of the 2014 Notes. The option was fully exercised by initial purchasers on the same day. The key terms of the 2014 Notes are described as follows:

Maturity date. The 2014 Notes mature on February 15, 2019.

Interest. The 2014 Notes holders are entitled to receive interest at 4.25% per annum on the principal outstanding, in semi-annually installments, payable in arrears on February 15 and August 15 of each year, beginning August 15, 2014.

Conversion. The initial conversion rate is 22.2222 shares per \$1,000 initial principal amount, which represents an initial conversion price of approximately \$45.00 per share. The 2014 Notes are convertible at any time prior to maturity. The conversion rate is subject to change for certain anti-dilution events and upon a change in control. If the holders elect to convert the 2014 Notes upon a change of control, the conversion rate will increase by a number of additional shares as determined by reference to an adjustment schedule based on the date on which the change in control becomes effective and the price paid per common share in the transaction (referred to as the "Fundamental Change Make-Whole Premium"). The Fundamental Make-Whole Premium is intended to compensate holders for the loss of time value upon early exercise.

Redemption. The Company may redeem for cash all or any portion of the notes (i) at the Company's option, on or after February 21, 2017, if the last reported sale price of the Company's common stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which the Company provides notice of redemption, or (ii) following the occurrence of certain tax related events, in each case, at a redemption price equals to 100% of the principal amount of the notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date.

As of December 31, 2018, and 2019, the carrying value of the convertible notes was \$127,428 and nil, respectively. The balance at December 31, 2018 and 2019 was net of unamortized issuance costs of \$72 and nil, respectively. The debt issuance costs are being amortized through interest expense over the period from February 18, 2014, the date of issuance, to February 15, 2019, the date of expiration, using the effective interest rate method which was 4.96%. The amortization expense was \$907, \$953 and \$71.8 for the years ended December 31, 2017, 2018 and 2019, respectively. Coupon interest of \$5,419 and \$903 was recorded for the years ended December 31, 2018 and 2019, of which, \$2,008 and recorded in other payables as of December 31, 2018 and all amounts were paid upon December 31, 2019.

In February 2019, the company repaid the entire \$127.5 million outstanding balance of senior convertible notes.

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18. INCOME TAXES***Income tax expenses***

The provision for income taxes is comprised of the following:

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Income before income taxes			
Canada	(30,524)	10,570	(61,880)
United States	(33,205)	61,377	8,319
PRC including Hong Kong and Taiwan	173,266	178,050	204,632
Japan	28,164	27,555	29,335
Other	6,233	26,848	28,215
	<u>143,934</u>	<u>304,400</u>	<u>208,621</u>
Current tax			
Canada	346	(1,846)	(3,420)
United States	(54,482)	(14,786)	(4,803)
PRC including Hong Kong and Taiwan	(7,383)	27,285	44,622
Japan	31,266	5,325	13,229
Other	(8,008)	2,397	7,057
	<u>(38,261)</u>	<u>18,375</u>	<u>56,685</u>
Deferred tax			
Canada	(6,464)	12,117	(6,558)
United States	67,426	32,696	(2,412)
PRC including Hong Kong and Taiwan	23,452	2,653	(5,333)
Japan	(4,499)	(3,381)	(2,953)
Other	(703)	(491)	2,637
	<u>79,212</u>	<u>43,594</u>	<u>(14,619)</u>
Total income tax expense			
Canada	(6,118)	10,271	(9,978)
United States	12,944	17,910	(7,215)
PRC including Hong Kong and Taiwan	16,069	29,938	39,289
Japan	26,767	1,944	10,276
Other	(8,711)	1,906	9,694
	<u>40,951</u>	<u>61,969</u>	<u>42,066</u>

The Company mainly operates in Canada, PRC, Japan, Germany, the United States, Hong Kong, Thailand and Vietnam.

Canada

The Company was incorporated in Ontario, Canada and is subject to both federal and Ontario provincial corporate income taxes at a rate of 26.5% for the years ended December 31, 2017, 2018 and 2019.

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18. INCOME TAXES (Continued)

Canadian Solar Solutions Inc. was incorporated in Ontario, Canada and is subject to both federal and Ontario provincial corporate income taxes at a rate of 25% for all years ended December 31, 2017, 2018 and 2019.

United States

Canadian Solar (USA) Inc. was incorporated in Delaware, USA and is subject to federal and state corporate income taxes at a rate of 38.61%, 24.82% and 22.89% for the years ended December 31, 2017, 2018 and 2019, respectively.

Recurrent Energy Group Inc. was incorporated in Delaware, USA and is subject to federal and state corporate income taxes at a rate of 38.32%, 25.32% and 27.89% for the years ended December 31, 2017, 2018 and 2019, respectively.

Japan

Canadian Solar Japan K.K. was incorporated in Japan and is subject to Japanese corporate income taxes at a normal statutory rate of approximately 32.02%, 32.02% and 31.78% for the years ended December 31, 2017, 2018 and 2019, respectively.

Germany

Canadian Solar EMEA GmbH was incorporated in Munich, Germany and is subject to German corporate income tax at a rate of approximately 33% for the years ended December 31, 2017, 2018 and 2019, respectively.

Vietnam

Canadian Solar Manufacturing Vietnam Co., Ltd was incorporated in Vietnam on June 25, 2015 and is subject to Vietnamese corporate income taxes at a normal statutory rate of 10%. The Company enjoyed full tax exemption from 2016 to 2019 and will use a reduced statutory rate of 5% from 2020 to 2028.

Thailand

Canadian Solar Manufacturing (Thailand) Co.,Ltd. was incorporated in Thailand in November 20, 2015 and is subject to Thailand corporate income taxes at a normal statutory rate of 20%. The Company currently has two Board of Investment certificates for full tax exemption which have different effective years. The licenses both started from year 2017, one of which will expire in year 2022 and the other in year 2025.

Hong Kong

Canadian Solar International Ltd. was incorporated in Hong Kong, China, and is subject to Hong Kong profits tax at a rate of 16.5% for the years ended December 31, 2017, 2018 and 2019, respectively.

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18. INCOME TAXES (Continued)**PRC**

The other major operating subsidiaries, including CSI Solartronics (Changshu) Co., Ltd., CSI Solar Technologies Inc., CSI Cells Co., Ltd., Canadian Solar Manufacturing (Luoyang) Inc., CSI Solar Power Group Co., Ltd. (formerly “CSI Solar Power (China) Inc.”) and Canadian Solar Manufacturing (Changshu) Inc., and Suzhou Sanysolar Materials Technology Co., Ltd. were governed by the PRC Enterprise Income Tax Law (“EIT Law”).

CSI Solartronics (Changshu) Co., Ltd., CSI Solar Technologies Inc., Canadian Solar Manufacturing (Luoyang) Inc., CSI Solar Power Group Co., Ltd. (formerly “CSI Solar Power (China) Inc.”) are all subject to the enterprise income tax rate of 25% for the years ended December 31, 2017, 2018 and 2019.

Certain of the Company's PRC subsidiaries, such as CSI New Energy Holding and CSI Luoyang Manufacturing, were once HNTEs and enjoyed preferential enterprise income tax rates. These benefits have, however, expired. In 2019, Suzhou Sanysolar, CSI Cells, CSI Changshu Manufacturing, Changshu Tegu, Suzhou Gaochuangte New Energy Development, Canadian Solar Sunenergy (Suzhou) and Changshu Tlian enjoyed preferential enterprise income tax rates.

Reconciliation between the provision for income tax computed by applying Canadian federal and provincial statutory tax rates to income before income taxes and the actual provision and benefit for income taxes is as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
Combined federal and provincial income tax rate	27 %	27 %	27 %
Effect of permanent difference	(18)%	(11)%	(1)%
Effect of different tax rate on earnings in other jurisdictions	(7)%	— %	3 %
Effect of tax holiday	(2)%	(1)%	(4)%
Unrecognized tax provision	— %	4 %	(3)%
Change in valuation allowance	(6)%	7 %	(3)%
Effect of change in tax rate	39 %	(3)%	(1)%
Others	(5)%	(3)%	2 %
	<u>28 %</u>	<u>20 %</u>	<u>20 %</u>

The aggregate amount and per share effect of tax holiday are as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	(In Thousands of U.S. Dollars, except per share data)		
The aggregate amount	2,850	3,089	7,956
Per share — basic	0.05	0.05	0.13
Per share — diluted	0.05	0.05	0.13

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18. INCOME TAXES (Continued)***Deferred tax assets and liabilities***

The components of the deferred tax assets and liabilities are presented as follows:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
Deferred tax assets:		
Accrued warranty costs	9,424	8,326
Bad debt allowance	7,019	10,324
Inventory write-down	1,723	1,128
Future deductible expenses	26,973	20,731
Depreciation and impairment difference of property, plant and equipment and solar power systems	19,647	23,380
Accrued liabilities related to antidumping, countervailing and other duty costs and true-up charges	9,341	496
Deferred tax assets relating to sales of solar power systems	481	8,927
Net operating losses carry-forward	90,536	112,710
Unrealized foreign exchange loss and capital loss	9,471	7,064
Interest limitation	13,520	2,767
Others	13,947	26,415
Total deferred tax assets, gross	<u>202,082</u>	<u>222,268</u>
Valuation allowance	(76,522)	(70,627)
Total deferred tax assets, net of valuation allowance	<u>125,560</u>	<u>151,641</u>
Deferred tax liabilities:		
Derivative assets	2,697	217
Depreciation difference of property, plant and equipment	1,212	18,789
Deferred profit of projects	4,108	—
Insurance recoverable	14,838	15,771
Unrealized foreign exchange gain	4,803	10,984
Others	12,513	8,380
Total deferred tax liabilities	<u>40,171</u>	<u>54,141</u>
Net deferred tax assets	<u>85,389</u>	<u>97,500</u>
Analysis as:		
Deferred tax assets	121,087	153,963
Deferred tax liabilities	(35,698)	(56,463)
Net deferred tax assets	<u>85,389</u>	<u>97,500</u>

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18. INCOME TAXES (Continued)

In accordance with the EIT Law, dividends, which arise from profits of foreign invested enterprises in PRC earned after January 1, 2008, are subject to a 10% withholding income tax. Under applicable accounting principles, a deferred tax liability should be recorded for taxable temporary difference attributable to excess of financial reporting basis over tax basis in the investment in a foreign subsidiary. However, a deferred tax liability is not recognized if the basis difference is not expected to reverse in the foreseeable future and is expected to be permanent in duration. As of December 31, 2019, all of the undistributed earnings of approximately \$625.9 million attributable to the Company's PRC subsidiaries and affiliates are considered to be permanently reinvested, and no

provision for PRC withholding income tax on dividend has been made thereon accordingly. Upon distribution of those earnings generated after January 1, 2008, in the form of dividends or otherwise, the Company would be subject to the then applicable PRC tax laws and regulations. Distributions of earnings generated before January 1, 2008 are exempt from PRC dividend withholding tax. The amounts of unrecognized deferred tax liabilities for these earnings are in the range of \$31.3 million to \$62.6 million, as the withholding tax rate of the profit distribution will be 5% or 10% depends on whether the immediate offshore companies can enjoy the preferential withholding tax rate of 5%.

Valuation allowance

Movement of the valuation allowance is as follows:

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Beginning balance	71,469	65,399	76,522
Additions (Reversals)	(5,361)	11,051	(6,156)
Foreign exchange effect	(709)	72	261
Ending balance	<u>65,399</u>	<u>76,522</u>	<u>70,627</u>

As of December 31, 2019, the Company has accumulated net operating losses of \$670,541 of which \$186,360 will expire between 2020 and 2039, and the remaining can be carried forward and back.

The Company considers positive and negative evidences to determine whether some portion or all of the deferred tax assets will not be realized. This assessment considers, among other matters, the nature, frequency and severity of recent losses, forecasts of future profitability, the duration of statutory carry-forward periods, the Company's experience with tax attributes expiring unused and tax planning alternatives. The Company has considered the following possible sources of taxable income when assessing the realization of deferred tax assets:

- Tax planning strategies;
- Future reversals of existing taxable temporary differences;
- Further taxable income exclusive of reversing temporary differences and carry-forwards;

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18. INCOME TAXES (Continued)

The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible for tax purposes. As a result, the Company has recognized a valuation allowance of \$76,522 and \$70,627 as at December 31, 2018 and 2019, respectively.

Uncertain tax positions

The Company makes an assessment of the level of authority for each of its uncertain tax positions (including the potential application of interest and penalties) based on their technical merits, and has measured the unrecognized benefits associated with such tax positions. This liability is recorded as liability for uncertain tax positions in the consolidated balance sheets. In accordance with its policies, the Company accrues and classifies interest and penalties associated with such unrecognized tax benefits as a component of its income tax provision. The amount of interest and penalties accrued as of December 31, 2018 and 2019 was \$4,398 and \$4,795, respectively. The Company does not anticipate any significant changes to its liability for unrecognized tax positions within the next 12 months.

The following table illustrates the movement and balance of the Company's liability for uncertain tax positions (excluding interest and penalties) for the years ended December 31, 2017, 2018 and 2019, respectively.

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Beginning balance	5,684	6,181	15,730
Addition for tax positions related to the current year	1,376	9,806	11
Reductions for tax positions from prior years/Statute of limitations expirations	(1,094)	—	(5,720)
Foreign exchange effect	215	(257)	536
Ending balance	<u>6,181</u>	<u>15,730</u>	<u>10,557</u>

The Company is subject to taxation in various jurisdictions where it operates, mainly including Canada, China and the United States. Generally, the Company's taxation years from 2014 to 2019 are open for reassessment to the Canadian tax authorities. The Company is subject to taxation in the United States and various state jurisdictions. The Company is not currently under examination by the federal or state tax authorities. The Company's income tax returns for 2015 through 2019 remain open to examination by the U.S. tax authorities.

According to the PRC Tax Administration and Collection Law, the statute of limitations is three years if the underpayment of income taxes has resulted from the computational errors of the taxpayer. The statute of limitations could be extended to five years under special circumstances. For income tax adjustments relating to transfer pricing matters, the statute of limitations is ten years. Therefore, the Company's Chinese subsidiaries might be subject to reexamination by the Chinese tax authorities on non-transfer pricing matters for taxation years up to 2014 retrospectively, and on transfer pricing matters for taxation years up to 2009 retrospectively. There is no statute of limitations in case of tax evasion in China.

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19. EARNINGS PER SHARE

The following table sets forth the computation of basic and diluted earnings per share for the years indicated:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	<u>(In Thousands of U.S. Dollars, except share and per share data)</u>		
Numerator:			
Net income attributable to Canadian Solar Inc. — basic	\$ 99,572	\$ 237,070	\$ 171,585
Dilutive effect of interest expense of convertible notes	4,649	4,683	975
Net income attributable to Canadian Solar Inc. — diluted	<u>\$ 104,221</u>	<u>\$ 241,753</u>	<u>\$ 172,560</u>
Denominator:			
Denominator for basic calculation — weighted average number of common shares — basic	58,167,004	58,914,540	59,633,855
Diluted effects of share number from share options and RSUs	547,821	543,797	794,526
Dilutive effects of share number from convertible notes	2,833,333	2,833,333	349,315
Denominator for diluted calculation — weighted average number of common shares — diluted	<u>61,548,158</u>	<u>62,291,670</u>	<u>60,777,696</u>
Basic earnings per share	<u>\$ 1.71</u>	<u>\$ 4.02</u>	<u>\$ 2.88</u>
Diluted earnings per share	<u>\$ 1.69</u>	<u>\$ 3.88</u>	<u>\$ 2.83</u>

The following table sets forth anti-dilutive shares excluded from the computation of diluted earnings per share for the years indicated.

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
Share options and RSUs	<u>372,743</u>	<u>276,618</u>	<u>41,950</u>

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20. RELATED PARTY BALANCES AND TRANSACTIONS

Related party balances

The amount due from related parties of \$31,232 as of December 31, 2019 consists of (i) trade receivable of \$13,930 for development services provided to Roserock, the Company's 49% owned affiliate, (ii) cash funding of \$16 to Pilipinas Newton Energy Corp, the Company's 40% owned affiliate, (iii) \$17,284 receivable for solar power products sold to ET Solutions South Africa 1 Pty , the Company's 49% owned affiliate. (iv) \$2 receivable for asset management service provided to Canadian Solar Infrastructure Fund, Inc., the Company's 14.66% owned affiliate. No amount was due as of December 31, 2019.

The amount due to related parties of \$10,077 as of December 31, 2019 consists of (i) a trade payable of \$7,884 due to Suzhou iSilver Materials Co., Ltd., the Company's 15% owned affiliate, for raw materials purchased, (ii) payable for equipment purchase of \$2,138 to Suzhou Kzone Equipment Technology Co., Ltd, the Company's 32% owned affiliate obtained in September 2017, and (iii) payable of \$55 for material purchased from Luoyang Jiwa New Material Technology Co., Ltd., the Company's 25% owned affiliate.

Related party transactions

Guarantees and loans

Dr. Shawn Qu, fully guaranteed one-year loan facilities from Chinese commercial banks of RMB1,346 million (\$206 million), RMB1,270 million (\$185 million) and RMB1,420 million (\$204 million) in 2017, 2018 and 2019, respectively. Amounts drawn down under the facilities as at December 31, 2017, 2018 and 2019 were \$135,225, \$155,956 and \$82,937 respectively.

The Company granted 77,289, 83,805 and 26,691 restricted share units to Dr. Shawn Qu in 2017, 2018 and 2019, respectively, on account of his having guaranteed these loan facilities.

Sales and purchase contracts with affiliates

In 2019, the Company sold three solar power projects to CSIF, the Company's 14.66% owned affiliate in Japan, in the amount of JPY 5,889,000 (\$53,874) recorded in revenue.

In 2018, the Company sold 5 solar power projects to CSIF, the Company's 14.66% owned affiliate in Japan, in the amount of JPY12,276,404 (\$109,597) recorded in revenue, and JPY89,238 (\$836) recorded in other operating income, respectively.

In 2017, The Company sold 13 solar power projects to CSIF, the Company's 14.66% owned affiliate in Japan, in the amount of JPY18,426,754 (\$163,155) recorded in revenue and JPY3,148,648 (\$27,879) recorded in other operating income, respectively.

In 2017, 2018 and 2019, the Company provided asset management service to CSIF in the amount of JPY303,772 (\$2,699), JPY247,341(\$2,210) and JPY 281,094 (\$2,573), respectively.

In 2017, 2018 and 2019, the Company provided O&M service to CSIF in the amount of JPY32,119 (\$285), JPY122,529 (\$1,105) and JPY 223,598 (\$2,052), respectively.

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20. RELATED PARTY BALANCES AND TRANSACTIONS (Continued)

In 2018 and 2019, the Company sold solar power products to ET Solutions South Africa 1 Pty, the Company's 49% owned affiliate in South Africa in the amount of RMB45,407 (\$6,859) and ZAR586,832 (\$40,970), respectively.

In 2017, the Company sold solar power products to Gaochuangte in the amount of RMB11,352 (\$1,648), before Gaochuangte became the Company's 80% owned subsidiary.

In 2017, 2018 and 2019, the Company purchased raw materials from Suzhou iSilver Materials Co., Ltd, the Company's 14.63% owned affiliate in China, in the amount of RMB331,958 (\$49,113), RMB512,154 (\$74,490) and RMB 350,590 (\$50,359), respectively.

In 2018 and 2019, the Company purchased equipment from Suzhou Kzone Equipment Technology Co., Ltd, the Company's 32% owned affiliate in China, in the amount of RMB41,635 (\$6,056) and RMB 61,174 (\$8,787), respectively.

In 2017, the Company incurred costs of RMB44,271 (\$6,430), to Gaochuangte for EPC services related to the Company's solar power projects, respectively. These amounts were recorded in project assets.

21. COMMITMENTS AND CONTINGENCIES

a) Capital commitments

As of December 31, 2019, the commitments for the purchase of property, plant and equipment were approximately \$12 million, and the payment schedule for the commitments is as follow:

<u>Year Ending December 31:</u>	<u>\$</u>
2020	9,000
2021	3,000
Total	<u>12,000</u>

b) Solar power system commitments

As of December 31, 2019, the commitments of the service to be purchased for solar power system were approximately \$0.8 million, and the payment schedule for the commitments is as follow:

<u>Year Ending December 31:</u>	<u>\$</u>
2020	600
2021	200
Total	<u>800</u>

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21. COMMITMENTS AND CONTINGENCIES (Continued)

c) Contingencies

Class Action Lawsuits

Following the two subpoenas from the SEC in 2010, six class action lawsuits were filed in the U.S. District Court for the Southern District of New York, or the New York cases, and another class action lawsuit was filed in the U.S. District Court for the Northern District of California, or the California case. The New York cases were consolidated into a single action in December 2010. On January 5, 2011, the California case was dismissed by the plaintiff, who became a member of the lead plaintiff group in the New York action. On March 11, 2011, a Consolidated Complaint was filed with respect to the New York action. The Consolidated Complaint alleges generally that the Company's financial disclosures during 2009 and early 2010 were false or misleading; asserts claims under Sections 10(b) and 20(a) of the Exchange Act and Rule 10b-5 thereunder; and names the Company, its chief executive officer and its former chief financial officer as defendants. The Company filed its motion to dismiss in May 2011, which was taken under submission by the Court in July 2011. On March 30, 2012, the Court dismissed the Consolidated Complaint with leave to amend, and the plaintiffs filed an Amended Consolidated Complaint against the same defendants on April 19, 2012. On March 29, 2013, the Court dismissed with prejudice a class action lawsuit filed against the Company and certain named defendants alleging that the Company's financial disclosures during 2009 and early 2010 were false or misleading and in violation of federal securities law. The court found that the plaintiffs failed to adequately allege a securities law violation and granted the Company's motion to dismiss all claims against all defendants with prejudice. On December 20, 2013, the United States Court of Appeals for the Second Circuit affirmed the district court's order dismissing such class action lawsuit.

In addition, a similar class action lawsuit was filed against the Company and certain of its executive officers in the Ontario Superior Court of Justice on August 10, 2010. The lawsuit alleges generally that the Company's financial disclosures during 2009 and 2010 were false or misleading and brings claims under the shareholders' relief provisions of the CBCA, Part XX III.1 of the Ontario Securities Act as well as claims based on negligent misrepresentation. In December 2010, the Company filed a motion to dismiss the Ontario action on the basis that the Ontario Court has no jurisdiction over the claims and potential claims advanced by the plaintiff. The court dismissed the Company's motion on August 29, 2011. On March 30, 2012, the Ontario Court of Appeal denied the Company's appeal with regard to its jurisdictional motion. On November 29, 2012, the Supreme Court of Canada denied the Company's application for leave to appeal the order of the Ontario Court of Appeal. The plaintiff's motions for class certification and leave to assert the statutory cause of action under the Ontario Securities Act were served in January 2013 and initially scheduled for argument in the Ontario Superior Court of Justice in June 2013. However, the plaintiff's motions were adjourned in view of the plaintiff's decision to seek an order compelling the Company to file additional evidence on the motions. On July 29, 2013 the Court dismissed the plaintiff's motion to compel evidence. On September 24, 2013 the plaintiff's application for leave to appeal from the July 29 order was dismissed. In September 2014, the plaintiff obtained an order granting him leave to assert the statutory cause of action under the Ontario Securities Act for certain of his misrepresentation claims.

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21. COMMITMENTS AND CONTINGENCIES (Continued)

In January 2015, the plaintiff in the class action lawsuit filed against the Company and certain of its executive officers in the Ontario Superior Court of Justice obtained an order for class certification in respect of certain claims for which he had obtained leave in September 2014 to assert the statutory cause of action for misrepresentation under the Ontario Securities Act, for certain negligent misrepresentation claims and for oppression remedy claims advanced under the CBCA. The Court dismissed the Company's application for leave to appeal and the class action is at the merits stage. The common issues trial is scheduled for November 2020. The Company believes the Ontario action is without merit and the Company is defending it vigorously.

Solar 1

In October 2011, a trade action was filed with the U.S. Department of Commerce, or USDOC, and the U.S. International Trade Commission, or USITC, by the U.S. unit of SolarWorld AG and six other U.S. firms, accusing Chinese producers of crystalline silicon photovoltaic cells, or CSPV cells, whether or not incorporated into modules, of selling their products (i.e., CSPV cells or modules incorporating these cells) into the United States at less than fair value, or dumping, and of receiving countervailable subsidies from the Chinese authorities. These firms asked the U.S. government to impose antidumping and countervailing duties on Chinese-origin CSPV cells. The Company was identified as one of a number of Chinese exporting producers of the subject goods to the U.S. market. The Company also has affiliated U.S. operations that import the subject goods from China.

From October 2012 to July 2018, the USDOC issued final affirmative determinations with respect to its antidumping and countervailing duty investigations on crystalline silicon photovoltaic, or CSPV, cells, whether or not incorporated into modules, from China, and the first to fifth administrative review results. The results of sixth and seventh administrative reviews are expected to conclude in mid-2020.

Between 2017 and 2019, the USDOC and USITC conducted five -year sunset reviews and determined to continue the Solar 1 antidumping and countervailing duty orders. In March 2018, the USDOC published the results of its expedited first sunset reviews and concluded that revocation of the Solar 1 orders would likely lead to a continuation or recurrence of dumping and a countervailable subsidy. The Company did not participate in USDOC's first sunset review. The Company did, however, participate in the USITC's first sunset review and requested that the Solar 1 duties be revoked. The USITC issued an affirmative determination in March 2019 declining to revoke the Solar 1 orders and finding that such revocation would be likely to lead to a continuation or recurrence of material injury to the U.S. industry within a reasonably foreseeable time. As a result, the Solar 1 orders remain in effect.

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21. COMMITMENTS AND CONTINGENCIES (Continued)

Solar 2

On December 31, 2013, SolarWorld Industries America, Inc. filed a new trade action with the USDOC and the USITC accusing Chinese producers of certain CSPV modules of dumping their products into the U.S. and of receiving countervailable subsidies from the Chinese authorities. This trade action also alleged that Taiwanese producers of certain CSPV cells and modules dumped their products into the U.S.. Excluded from these new actions were those Chinese-origin solar products covered by the Solar 1 orders described above. The Company was identified as one of a number of Chinese producers exporting the Solar 2 subject goods to the U.S. market.

“Chinese CSPV products subject to Solar 2 orders” refer to CSPV products manufactured in mainland China using non-Chinese (e.g., Taiwanese) CSPV cells and imported into the U.S. during the investigation or administrative review periods of Solar 2. “Taiwanese CSPV products subject to Solar 2 orders” refer to CSPV products manufactured outside of mainland China using Taiwanese CSPV cells and imported into the U.S. during the investigation or review periods of Solar 2.

From December 2014 to late 2019, the USDOC issued final affirmative determinations and results of the first to fourth administrative reviews with respect to its antidumping and countervailing duty investigation on these CSPV products.

The Company will not be subject to the fifth administrative review of the Chinese orders. The USDOC is expected to initiate the fifth administrative review of the Taiwanese orders soon.

The USDOC and USITC are currently conducting five-year sunset reviews to determine whether to continue the Solar 2 orders on CSPV products from China and Taiwan. The USDOC is conducting an expedited review, with its final results expected in May 2020. The USITC is currently assessing whether it will conduct an expedited or full sunset review, with a decision due on this issue in spring 2020. The USITC’s sunset review will follow this preliminary decision.

In 2019, the Company booked the benefits of antidumping duty and countervailing duty provision reversals of \$52.3 million, primarily associated with prior years’ module sales based on the respective updated rates of the administrative reviews carried out by the U.S. Department of Commerce.

Section 201

On May 17, 2017, following receipt of a petition from Suniva, Inc., which was later joined by SolarWorld Americas, Inc., the USITC instituted a safeguard investigation to determine whether there were increased imports of CSPV products in such quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing like or directly competitive products. On September 22, 2017, the USITC determined that CSPV products are being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry.

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21. COMMITMENTS AND CONTINGENCIES (Continued)

On January 23, 2018, the President of the United States imposed a safeguard measure on imports of CSPV cells. This safeguard measure, which became effective on February 7, 2018, applies to CSPV products imported from all countries, except for certain developing country members of the World Trade Organization.

The USITC conducted a midterm review of the safeguard order in early 2020, issuing its monitoring report in February 2020. Additionally, in March 2020, at the request of the Office of the U.S. Trade Representative (USTR), the USITC released a report regarding the probable economic effect on the domestic CSPV cell and module manufacturing industry of modifying the safeguard measure on CSPV products.

In addition, on June 13, 2019 and following an abbreviated public comment period, USTR granted an exclusion from the safeguard measure for bifacial solar panels comprising solely bifacial solar cells. On October 9, 2019, USTR determined to withdraw this exclusion, effective October 28, 2019. Invenergy Renewables LLC contested USTR's withdrawal determination at the CIT and persuaded the Court to enjoin USTR's withdrawal due to procedural deficiencies. In early 2020, USTR conducted a renewed notice-and-comment process in order to withdraw the exclusion for bifacial solar panels. Subject to the CIT's further review, the exclusion could be terminated as soon as May 18, 2020.

European Antidumping and Anti-Subsidy Investigations

On September 6, 2012, following a complaint lodged by EU ProSun, an ad-hoc industry association of EU CSPV module, cell and wafer manufacturers, the European Commission initiated an antidumping investigation concerning EU imports of CSPV modules and key components (i.e., cells and wafers) originating in China. On November 8, 2012, following a complaint lodged by the same parties, the European Commission initiated an anti-subsidy investigation on these same products. On December 6, 2013, the EU imposed definitive antidumping and countervailing measures on imports of CSPV modules and key components (i.e., cells and wafers) originating in or consigned from China. On March 3, 2017, the European Commission extended the antidumping and countervailing measures for 18 months on imports of CSPV modules and key components (i.e., cells and wafers) originating in or consigned from China. On September 16, 2017, the European Commission amended the form of the antidumping and countervailing measures for certain Chinese exporters (but not for Canadian Solar). On March 9, 2018, the antidumping and countervailing measures expired. As a result, since then, the CSPV modules and cells of the Company that originate in, or are consigned from, China, are no longer subject to antidumping or countervailing measures.

On February 28, 2014, the Company filed separate actions with the General Court of the EU for annulment of the regulation imposing the definitive antidumping measures and of the regulation imposing the definitive countervailing measures (case T-162/14 and joined cases T-158/14, T-161/14, and T-163/14). The General Court rejected these actions for annulment. On May 8, 2017, the Company appealed the judgements of the General Court before the Court of Justice of the EU (cases C-236/17 and C-237/17). On March 27, 2019, the Court of Justice rejected the appeals. There is no further action with regard to these matters.

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21. COMMITMENTS AND CONTINGENCIES (Continued)

Canadian Antidumping and Countervailing Duties Expiry Review

On June 3, 2015, the Canada Border Services Agency (CBSA) released final determinations regarding the dumping and subsidization of solar modules and laminates originating from China. The CBSA determined that such goods were dumped and subsidized. The CBSA found the Company to be a “cooperative exporter” and, as such, ascertained a low (relative to other Chinese exporters) Canadian Solar-specific subsidies rate of RMB0.014 per Watt. On July 3, 2015 the Canadian International Trade Tribunal (CITT) determined that the Canadian industry was not negatively affected as a result of imported modules but was threatened with such negative impact. As a result of these findings, definitive duties were imposed on imports of Chinese solar modules into Canada starting on July 3, 2015. The CITT is required by law to review such finding every five (5) years lest the finding expire. The CITT’s finding expires on July 2, 2020.

On April 1, 2020, the CITT initiated the preliminary stage of the expiry review regarding the above finding. The Company has responded to the CITT with its intent to participate in such review. The CITT will decide by May 21, 2020 based on responses to be received from domestic and Chinese producers whether the expiry review is warranted.

Regardless of the outcome, the Company does not believe there will be a material negative effect upon its results of operations because it has module manufacturing capacity in Ontario and do not rely on Chinese solar modules to serve its Canadian business.

Please refer to “Item 8. Financial Information—A. Consolidated Statements and Other Financial Information—Legal and Administrative Proceedings” in the Company’s Form 20-F for detailed information on antidumping and countervailing duties.

22. SEGMENT INFORMATION

The Company uses the management approach to determine operating segments. The management approach considers the internal organization and reporting used by the Company’s chief operating decision maker (“CODM”) for making decisions, allocating resources and assessing performance. The Company’s CODM has been identified as the Chief Executive Officer of the Company, since he reviews consolidated and segment results when making decisions about allocating resources and assessing performance of the Company.

The Company has been operating in two principal businesses since 2016: module and system solutions (“MSS”) and Energy. The MSS business comprises primarily the design, development, manufacture and sale of solar modules, other solar power products and solar system kits. The MSS business also provides engineering, procurement and construction (EPC) and operating and maintenance (O&M) services. The Energy business comprises primarily the development and sale of solar projects, operating solar power projects and the sale of electricity. The module sales from the Company’s MSS business to its Energy business are on terms and conditions similar to sales to third parties. The Company’s CODM reviews net revenue and gross profit and does not review balance sheet information by segment.

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22. SEGMENT INFORMATION (Continued)

The following table summarizes the Company's revenues, gross profit and income from operations generated from each segment:

	Years Ended December 31, 2019			
	MSS	Energy	Elimination	Total
	\$	\$	\$	\$
Net revenues	2,582,635	719,445	(101,497)	3,200,583
Cost of revenues	1,934,062	635,716	(87,692)	2,482,086
Gross profit	<u>648,573</u>	<u>83,729</u>	<u>(13,805)</u>	<u>718,497</u>
Income from operations	279,715	(7,031)	(13,805)	258,879

	Years Ended December 31, 2018			
	MSS	Energy	Elimination	Total
	\$	\$	\$	\$
Net revenues	2,413,889	1,575,594	(244,971)	3,744,512
Cost of revenues	1,923,131	1,302,779	(256,480)	2,969,430
Gross profit	<u>490,758</u>	<u>272,815</u>	<u>11,509</u>	<u>775,082</u>
Income from operations	141,609	211,539	11,509	364,657

	Years Ended December 31, 2017			
	MSS	Energy	Elimination	Total
	\$	\$	\$	\$
Net revenues	2,850,859	677,470	(137,936)	3,390,393
Cost of revenues	2,390,686	473,453	(111,344)	2,752,795
Gross profit	<u>460,173</u>	<u>204,017</u>	<u>(26,592)</u>	<u>637,598</u>
Income from operations	136,419	159,518	(26,592)	269,345

Income from operations is estimated based on the Company's management accounts as some services are shared by two segments.

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22. SEGMENT INFORMATION (Continued)

The following table summarizes the Company's net revenues generated from different geographic locations. The information presented below is based on the location of customers' headquarters:

	Years Ended December 31,		
	2017	2018	2019
	\$	\$	\$
Europe and other regions:			
—Australia	48,069	232,409	313,167
—Germany	94,066	95,514	109,119
—South Africa	21,916	53,739	93,911
—Spain	13,471	58,811	78,228
—Netherlands	51,357	83,475	68,770
—United Kingdom	48,295	101,479	33,158
—Czech	10,822	17,411	17,717
—Others	68,144	55,730	66,389
	<u>356,140</u>	<u>698,568</u>	<u>780,459</u>
The Americas:			
—United States	628,815	999,144	852,231
—Brazil	388,554	339,964	395,303
—Mexico	5,274	50,004	94,446
—Others	85,519	85,545	60,061
	<u>1,108,162</u>	<u>1,474,657</u>	<u>1,402,041</u>
Asia:			
—Japan	476,946	483,041	372,687
—PRC	874,559	620,520	317,077
—Korea	25,244	46,697	72,552
—India	336,468	145,873	70,893
—United Arab Emirates	91,991	104,467	43,311
—Vietnam	462	4,216	39,268
—Thailand	4,167	23,511	12,753
—Others	116,254	142,962	89,542
	<u>1,926,091</u>	<u>1,571,287</u>	<u>1,018,083</u>
Total net revenues	<u><u>3,390,393</u></u>	<u><u>3,744,512</u></u>	<u><u>3,200,583</u></u>

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22. SEGMENT INFORMATION (Continued)

The following table summarizes the Company's long-lived assets, including property, plant and equipment, non-current project assets, solar power systems, prepaid land use rights and intangible assets at December 31, 2018 and 2019 by geographic region, based on the physical location of the assets:

	<u>At December 31,</u> <u>2018</u>	<u>At December 31,</u> <u>2019</u>
	\$	\$
PRC	824,618	835,991
Thailand	168,280	331,931
Japan	233,155	259,197
Australia	61,960	63,143
United States	50,052	60,177
Canada	9,739	14,718
Others	24,899	100,513
Total long-lived assets	<u>1,372,703</u>	<u>1,665,670</u>

The following table summarizes the Company's revenues generated from each product or service:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	\$	\$	\$
MSS:			
Solar modules and other solar power products	2,551,509	1,930,701	2,055,249
Solar system kits	84,598	93,253	116,449
EPC services	—	62,408	223,423
O&M services	6,938	10,767	19,405
Others (materials)	69,878	71,789	66,612
Energy:			
Solar power projects	632,256	1,542,906	668,476
Electricity	29,236	8,735	5,866
Others (EPC and development services)	15,978	23,953	45,103
Total net revenues	<u>3,390,393</u>	<u>3,744,512</u>	<u>3,200,583</u>

23. MAJOR CUSTOMERS

Details of customers accounting for 10% or more of total net revenues are as follows:

	<u>Years Ended December 31,</u>		
	<u>2017</u>	<u>2018</u>	<u>2019</u>
	\$	\$	\$
Company A	—	718,341	—

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23. MAJOR CUSTOMERS (Continued)

The accounts receivable from three customers with the largest receivable balances represents 17%, 5% and 4% of the balance of the account at December 31, 2019, and 12%, 5% and 5% of the balance of the account at December 31, 2018, respectively. The balance from the customer with the largest receivable balance is \$59,224 and \$74,376 as of December 31, 2018 and 2019, respectively.

24. EMPLOYEE BENEFIT PLANS

Employees of the Company located in the PRC are covered by the retirement schemes defined by local practice and regulations, which are essentially defined contribution schemes. The calculation of contributions for eligible employees is based on 16% of the applicable payroll cost in 2019. The expense incurred by the Company to these defined contributions schemes was \$9,412, \$12,544 and \$11,738 for the years ended December 31, 2017, 2018 and 2019, respectively.

In addition, in 2019, the Company is required by PRC law to contribute approximately 6-8.5%, 8%, 0.5-0.7% and 0.9-2.5% of applicable salaries for medical insurance benefits, housing funds, unemployment and other statutory benefits, respectively. The PRC government is directly responsible for the payment of the benefits to these employees. The amounts contributed for these benefit schemes were \$10,447, \$11,211 and \$11,409 for the years ended December 31, 2017, 2018 and 2019, respectively.

25. SHARE-BASED COMPENSATION

In March 2006, the Company adopted a share incentive plan, or the Plan. The purpose of the Plan is to promote the success and enhance the value of the Company by linking the personal interests of the directors, employees and consultants to those of the shareholders and providing the directors, employees and consultants with an incentive for outstanding performance to generate superior returns to the shareholders. The Plan is also intended to motivate, attract and retain the services of the directors, employees and consultants upon whose judgment, interest and effort the successful conduct of the Company's operations is largely dependent. In September 2010, the shareholders approved an amendment to the Plan to increase the maximum number of common shares which may be issued pursuant to all awards of options, restricted shares and RSUs under the Plan to the sum of (i) 2,330,000 plus (ii) the sum of (a) 1% of the number of outstanding common shares of the Company on the first day of each of 2007, 2008 and 2009 and (b) 2.5% of the number of outstanding common shares of the Company outstanding on the first day of each calendar year after 2009. The Plan will expire on, and no awards may be granted after, May 8, 2021. Under the terms of the Plan, options are generally granted with an exercise price equal to the fair market value of the Company's ordinary shares and expire ten years from the date of grant.

Options to Employees

During the year ended December 31, 2019, 103,723 options were exercised with a weighted average exercise price of \$8.47. The total intrinsic value of options exercised during the years ended December 31, 2017, 2018 and 2019 was \$605, \$256 and \$1,422, respectively. As of December 31, 2019, there were 120,779 options outstanding with a weighted average exercise price of \$10.97 and weighted average remaining contract terms of 1 year. The intrinsic value of outstanding options as of December 31, 2019 was \$1,344.

CANADIAN SOLAR INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
FOR THE YEARS ENDED DECEMBER 31, 2017, 2018 and 2019
(In
Thousands of U.S. Dollars, unless otherwise indicated)

25. SHARE-BASED COMPENSATION (Continued)***RSUs to Employees***

The Company granted 1,033,001, 759,702 and 706,637 RSUs to employees in 2017, 2018 and 2019, respectively. The RSUs entitle the holders to receive the Company's common shares upon vesting. The RSUs were granted for free and generally vest over periods from one to four years based on the specific terms of the grants. The fair market value of the Company's ordinary shares at the date of grant resulted in total compensation cost of approximately \$13.3 million, \$10.2 million and \$12.2 million that will be recognized ratably over the vesting period for the RSUs granted in 2017, 2018 and 2019, respectively. In the years ended December 31, 2017, 2018 and 2019, the Company recognized \$9,314, \$10,258 and \$10,682 in compensation expense associated with these awards, respectively.

As of December 31, 2019, there was \$20,507 of total unrecognized share-based compensation related to unvested RSUs, which is expected to be recognized over a weighted-average period of 2.27 years.

A summary of the RSU activity is as follows:

	<u>Number of Shares</u>	<u>Weighted Average Grant-Date Fair Value</u> \$
Unvested at January 1, 2019	1,781,271	14.18
Granted	706,637	18.05
Vested	(696,853)	15.40
Forfeited	(131,288)	15.01
Unvested at December 31, 2019	<u>1,659,767</u>	<u>15.26</u>

The total fair value of RSUs vested during the years ended December 31, 2017, 2018 and 2019 was \$12,091, \$10,242 and \$10,733, respectively.

26. SUBSEQUENT EVENTS

In the first quarter of 2020, the Company repurchased additional 381,330 shares with total costs of \$5,963

. The Company repurchased 990,846

shares in total so far under the share repurchase plan authorized by its Board Directors on December 9, 2019. These repurchased shares have been cancelled and retired.

In early February 2020, the World Health Organization declared the outbreak of novel coronavirus, or COVID-19, a Public Health Emergency of International Concern. The outbreak of COVID-19 posed significant challenges to many aspects of the Company's business. Global commerce generally has been negatively affected due to travel restrictions, disruptions of global shipping and logistics systems, quarantines, and other measures taken by governments. Near-term global economic growth has also been adversely impacted. The Company is taking mitigation strategies to reduce the adverse impact of COVID-19 to its business. The COVID-19 situation remains fluid and the Company will continue to monitor it closely to assess the potential impacts.

On March 27, 2020, the U.S. President Donald Trump signed into law the "Coronavirus Aid, Relief and Economic Security (CARES) Act". The impact of the CARES Act could be material to the Company's business in the U.S. The Company is in the process of evaluating the impact on its operation as further IRS guidance would be issued to address these complex provisions under the CARES Act.

Additional Information — Financial Statement Schedule I

Canadian Solar Inc.

Schedule I has been provided pursuant to the requirements of Rule 12-04(a) and 4-08(e)(3) of Regulation S-X, which require condensed financial information as to financial position, changes in financial position and results of operations of a parent company as of the same dates and for the same periods for which audited consolidated financial statements have been presented as the restricted net assets of Canadian Solar Inc.'s consolidated and unconsolidated subsidiaries not available for distribution to Canadian Solar Inc. as of December 31, 2019 of \$497.2 million, exceeded the 25% threshold.

The condensed financial information has been prepared using the same accounting policies as set out in the consolidated financial statements, except that the equity method has been used to account for investments in subsidiaries.

FINANCIAL INFORMATION OF PARENT COMPANY
BALANCE SHEETS

	December 31, 2018	December 31, 2019
	(In Thousands of U.S. Dollars, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	9,097	1,362
Restricted cash	—	950
Accounts receivable trade, net of allowance for doubtful accounts of \$3,462 and \$3,379 as of December 31, 2018 and 2019, respectively	11,476	—
Amounts due from subsidiaries	279,039	341,557
Prepaid expenses and other current assets	15,222	9,846
Total current assets	314,834	353,715
Investments in subsidiaries	1,154,004	1,383,935
Investments in affiliates	—	2,483
Deferred tax assets	28,208	23,657
Other non-current assets	68,068	69,070
TOTAL ASSETS	1,565,114	1,832,860
LIABILITIES AND EQUITY		
Current liabilities:		
Convertible notes	127,428	—
Accounts payable	3,903	3
Amounts due to related parties	154,765	340,502
Derivative liabilities	3,879	4,713
Other current liabilities	8,255	8,531
Total current liabilities	298,230	353,749
Long-term borrowings	—	50,000
Deferred tax liabilities	28,779	22,936
Liability for uncertain tax positions	12,633	13,041
TOTAL LIABILITIES	339,642	439,726
Equity:		
Common shares — no par value: unlimited authorized shares, 59,180,624 and 59,371,684 shares issued and outstanding at December 31, 2018 and 2019, respectively	702,931	703,806
Treasury stock	—	(11,845)
Additional paid-in capital	10,675	17,179
Retained earnings	622,015	793,601
Accumulated other comprehensive loss	(110,149)	(109,607)
TOTAL EQUITY	1,225,472	1,393,134
TOTAL LIABILITIES AND EQUITY	1,565,114	1,832,860

FINANCIAL INFORMATION OF PARENT COMPANY
STATEMENTS OF OPERATIONS

	Years Ended December 31		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Net revenues	35,011	86,755	4,351
Cost of revenues	29,542	53,926	4,188
Gross profit	<u>5,469</u>	<u>32,829</u>	<u>163</u>
Operating expenses:			
Selling expenses	2,221	2,518	1,727
General and administrative expenses	18,390	18,970	29,093
Research and development expenses	645	795	462
Other operating loss, net	1,173	77	—
Total operating expenses	<u>22,429</u>	<u>22,360</u>	<u>31,282</u>
Income (loss) from operations	<u>(16,960)</u>	<u>10,469</u>	<u>(31,119)</u>
Other income (expenses):			
Interest expense	(20,078)	(9,170)	(3,005)
Interest income	42,191	32,370	25,272
Loss on change in fair value of derivatives, net	(7,134)	(2,671)	(5,193)
Foreign exchange gain (loss)	(18,110)	22,255	(11,318)
Investment loss	(11,944)	—	(116,879)
Other income (expenses), net:	<u>(15,075)</u>	<u>42,784</u>	<u>(111,123)</u>
Income (loss) before income taxes and equity in earnings (loss) of subsidiaries and unconsolidated investees	(32,035)	53,253	(142,242)
Income tax (expense) benefit	1,686	(12,133)	5,230
Equity in earnings of subsidiaries	130,048	195,950	308,597
Equity in loss of unconsolidated investees	(127)	—	—
Net income	<u>99,572</u>	<u>237,070</u>	<u>171,585</u>

FINANCIAL INFORMATION OF PARENT COMPANY
STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Net income	99,572	237,070	171,585
Other comprehensive income (loss) (net of tax of nil):			
Foreign currency translation adjustment	37,780	(56,115)	542
Comprehensive income	<u>137,352</u>	<u>180,955</u>	<u>172,127</u>

FINANCIAL INFORMATION OF PARENT COMPANY
STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2017	2018	2019
	(In Thousands of U.S. Dollars)		
Operating activities:			
Net income	99,572	237,070	171,585
Adjustments to reconcile net income to net cash provided by (used in) operating activities:			
Depreciation and amortization	33	21	154
Loss on disposal of subsidiaries	9,559	—	116,879
Impairment loss of investment	3,686	—	—
Loss on change in fair value of derivatives	7,134	2,671	5,193
Allowance for doubtful accounts	2,666	(212)	(83)
Equity in earnings of subsidiaries	(130,048)	(195,950)	(308,597)
Equity in loss of unconsolidated investees	127	—	—
Share-based compensation	9,314	10,259	10,682
Changes in operating assets and liabilities:			
Accounts receivable trade	(6,739)	(5,089)	11,563
Amounts due from subsidiaries	57,539	(184,755)	(43,630)
Advances to suppliers	(60)	60	—
Prepaid expenses and other current assets	(5,715)	(2,749)	5,449
Other non-current assets	1,016	(149)	(1,158)
Accounts payable	—	3,900	(3,900)
Amounts due to related parties	55,399	15,598	183,675
Other liabilities	22,436	(25,958)	1,193
Liability for uncertain tax positions	833	6,008	408
Deferred taxes	(6,106)	9,230	(1,292)
Net settlement of derivatives	(6,358)	21,450	(11,125)
Net cash provided by (used in) operating activities	<u>114,288</u>	<u>(108,595)</u>	<u>136,996</u>
Investing activities:			
Investments in subsidiaries	(64,185)	(1,051)	(36,146)
Investments in affiliates	—	—	(2,483)
Proceeds from disposal of subsidiaries	61,749	—	—
Purchase of property, plant and equipment	(26)	—	1
Funding of loans to subsidiaries	(74,458)	(94,000)	(40,601)
Repayment of loans from subsidiaries	—	375,635	12,809
Net cash provided by (used in) investing activities	<u>(76,920)</u>	<u>280,584</u>	<u>(66,420)</u>
Financing activities:			
Repayment of short-term borrowings	(49,000)	(151,000)	—
Proceeds from long-term borrowings	—	—	50,000
Repayment of convertible notes	—	—	(127,500)
Payments for repurchase of treasury stock	—	—	(11,845)
Proceeds from exercise of stock options	879	769	875
Net cash used in financing activities	<u>(48,121)</u>	<u>(150,231)</u>	<u>(88,470)</u>
Effect of exchange rate changes	<u>6,362</u>	<u>(29,618)</u>	<u>11,110</u>
Net decrease in cash and cash equivalents	(4,391)	(7,860)	(6,784)
Cash and cash equivalents at the beginning of the year	21,348	16,957	9,097
Cash and cash equivalents at the end of the year	<u>16,957</u>	<u>9,097</u>	<u>2,313</u>
Supplemental disclosure of cash flow information:			
Interest paid (net of amounts capitalized)	18,375	10,154	4,644

Appendix 1

Major Subsidiaries of CSI

The following table sets forth information concerning CSI's major subsidiaries:

Subsidiary	Place and Date of Incorporation	Attributable Equity Interest Held	Principal Activity
CSI Solartronics (Changshu) Co., Ltd.	PRC November 23, 2001	100 %	Developing solar power project
CSI Solar Technologies Inc.	PRC August 8, 2003	100 %	Sales and marketing of solar products
CSI New Energy Holding Co., Ltd.	PRC January 7, 2005	100 %	Investment holding
Canadian Solar Manufacturing (Luoyang) Inc.	PRC February 24, 2006	100 %	Manufacture of solar modules, ingots and wafers
Canadian Solar Manufacturing (Changshu) Inc.	PRC August 1, 2006	100 %	Production of solar modules
CSI Cells Co., Ltd.	PRC August 23, 2006	100 %	Manufacture of solar cells
Canadian Solar (USA) Inc.	USA June 8, 2007	100 %	Sales and marketing of modules
Canadian Solar Japan K.K.	Japan June 21, 2009	100 %	Sales and marketing of modules
Canadian Solar Solutions Inc.	Canada June 22, 2009	100 %	Developing solar power project and manufacture of solar modules
CSI Solar Power Group Co., Ltd. (formerly named/known as "CSI Solar Power (China) Inc.")	PRC July 7, 2009	100 %	Investment holding and trading
Canadian Solar EMEA GmbH	Germany August 21, 2009	100 %	Sales and marketing of modules
Canadian Solar (Australia) Pty Limited	Australia February 3, 2011	100 %	Developing solar power project
Canadian Solar International Limited	Hong Kong March 25, 2011	100 %	Sales and marketing of modules
Canadian Solar O and M (Ontario) Inc.	Canada May 10, 2011	100 %	Solar farm operating and maintenance service
Suzhou Sanysolar Materials Technology Co., Ltd.	PRC August 17, 2011	99.73 %	Production of solar module materials
Canadian Solar South East Asia Pte. Ltd.	Singapore September 19, 2011	100 %	Sales and marketing of modules
Canadian Solar South Africa (Pty) Ltd	South Africa June 22, 2012	100 %	Sales and marketing of modules
Canadian Solar Brazil Commerce, Import and Export of Solar Panels Ltd.	Brazil November 14, 2012	100 %	Sales and marketing of solar modules, and provide solar energy solution to customer
Canadian Solar Construction (USA) LLC	USA May 20, 2014	100 %	Solar farm operating and maintenance service
Canadian Solar Projects K.K.	Japan May 20, 2014	100 %	Developing solar power project
CSI&GCL Solar Manufacturing (Yan Cheng) Inc.	PRC May 29, 2014	100 %	Research and developing, manufacture and sales of solar cells, and solar power projects development
Canadian Solar UK Ltd.	United Kingdom May 29, 2014	100 %	Sales and marketing of modules
Canadian Solar UK Projects Ltd.	United Kingdom August 29, 2014	100 %	Developing solar power project
Changshu Tegu New Material Technology Co., Ltd.	PRC September 2, 2014	100 %	EVA solar packaging film research and development, production, and sales
Changshu Tlian Co., Ltd.	PRC December 26, 2014	100 %	Junction box and connector research, development, production and sales
Recurrent Energy Group Inc.	USA January 22, 2015	100 %	Developing solar power project
Recurrent Energy, LLC	USA March 31, 2015	100 %	Developing solar power project
PT. Canadian Solar Indonesia	Indonesia February 26, 2015	67 %	Production of solar modules
Canadian Solar Manufacturing Vietnam Co., Ltd.	Vietnam June 25, 2015	100 %	Production of solar modules
Canadian Solar Energy Private Limited	India May 06, 2015	100 %	Sales and marketing of modules
Canadian Solar MSS (Australia) Pty Ltd (formerly named/known as "Canadian Solar Australia 1 Pty Ltd.")	Australia August 03, 2015	100 %	Sales and marketing of modules
Canadian Solar Energy Holding Company Limited	Hong Kong September 22, 2015	100 %	Project investment, financing, trading of solar modules
Canadian Solar Energy Singapore Pte. Ltd.	Singapore October 29, 2015	100 %	Development & Ownership of solar PV projects
Canadian Solar Manufacturing (Thailand) Co.,Ltd.	Thailand	99.9992 %	Cells and module production

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Canadian Solar Sunenergy (Suzhou) Co., Ltd.	November 20, 2015 PRC May 12, 2016	100 %	Production of solar modules
Canadian Solar Sunenergy (Baotou) Co., Ltd.	PRC August 18, 2016	100 %	Production of solar modules, ingots and wafers
Canadian Solar Middle East DMCC	United Arab Emirates March 28, 2017	100 %	Sales and marketing of modules
CSI Investment Management (SuZhou) Co., Ltd.	PRC May 05, 2017	100 %	Investment management & assets management
Suzhou Gaochuangte New Energy Development Co., Ltd.	PRC June 12, 2017	90 %	Design, engineering construction and management of solar power project
CSI Cells (Yancheng) Co., Ltd.	PRC May 18, 2017	*	Production of solar cells
CSI Modules (DaFeng) Co., Ltd.	PRC May 16, 2017	**	Production of solar modules
Canadian Solar Construction (Australia) Pty Ltd	Australia July 04, 2017	100 %	Providing engineering, procurement and construction service
CSUK Energy Systems Construction and Generation JSC	Turkey October 30, 2017	100 %	Construction of power plants generating electricity by utilizing renewable energy sources
CSI Modules (JiaXing) Co., Ltd.	PRC November 3, 2017	100 %	Production of solar modules
CSI Wafer (LuoYang) Co., Ltd.	PRC November 27, 2017	100 %	Production of solar cells and wafers
Canadian Solar Manufacturing Taiwan Co., Ltd.	PRC December 05, 2017	100 %	Production of solar modules
Canadian Solar Argentina Investment Holding Ltd.	Argentina January 23, 2018	100 %	Developing solar power project
Changsu Xingu Photovoltaic Material Technology Co., Ltd.	PRC March 19, 2018	100 %	EVA solar packaging film research and development, production and sales
Canadian Solar New Energy Holding Company Limited	Hong Kong March 20, 2019	100 %	Project investment, financing, trading of solar modules.
Canadian Solar Energy Holding Singapore Pte. Ltd.	Singapore April 22, 2019	100 %	Development & Ownership of Solar PV Projects
Canadian Solar SSES (Canada) Inc.	Canada Nov 27, 2019	100 %	System Solution and Energy Storage
Canadian Solar SSES (UK) Ltd	United Kingdom December 18, 2019	100 %	IP holding

* CSI Cells Co., Ltd. holds 52% equity rights of CSI Cells (Yancheng) Co., Ltd., a limited partnership fund, of which CSI Cells Co., Ltd. holds 37.33% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.17% shares as a general partner, holds 48% equity rights of CSI Cells (Yancheng) Co., Ltd.

** Canadian Solar Manufacturing (Changshu) Inc. holds 3.12% equity rights of CSI Modules (DaFeng) Co., Ltd., a limited partnership fund, of which Canadian Solar Manufacturing (Changshu) Inc. holds 20% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.067% shares as a general partner, holds 96.88% equity rights of CSI Modules (DaFeng) Co., Ltd.

**DESCRIPTION OF THE REGISTRANT'S SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF THE
SECURITIES EXCHANGE ACT OF 1934**

Canadian Solar Inc. (“we,” “us,” “our company,” or “our”) has the following securities registered pursuant to Section 12(b) of the Securities Exchange Act of 1934 (the “Exchange Act”):

<u>Title of each class registered as of the end of the period covered by the annual report</u>	<u>Trading symbol</u>	<u>Name of each exchange on which registered</u>
Common shares with no par value	CSIQ	Nasdaq Global Select Market

This exhibit contains a description of the rights of the holders of our common shares. The following summary is subject to and qualified in its entirety by our articles of continuance, as amended from time to time, (the “articles”), bylaws as effective from time to time, and by applicable Canadian law, particularly the Canada Business Corporations Act (the “CBCA”). This is not a summary of all the significant provisions of the articles, bylaws or of Canadian law and does not purport to be complete. Capitalized terms used but not defined herein have the meanings given to them in our annual report on Form 20-F to which this description of securities registered under section 12 of the Exchange Act is an exhibit.

Item 9. General

Item 9.A.3 Pre-emptive rights

Our common shares do not contain any pre-emptive purchase rights to any of our securities.

Item 9.A.5 Type and class of securities

Our class of common shares are registered with the U.S. Securities and Exchange Commission. We may issue an unlimited number of common shares, without par value. Other than under applicable securities laws, there are no restrictions on the transferability of common shares.

Item 9.A.6 Limitations or qualifications

Not applicable.

Item 9.A.7 Rights of other types of securities

Our board of directors has the authority, without approval from the shareholders, to issue an unlimited number of preferred shares in one or more series. Our board of directors may establish the number of shares to be included in each such series and may fix the designations, preferences, powers and other rights of the shares of a series of preferred shares

Item 10.B Memorandum and articles of association

Item 10.B.3 Shareholder rights

Dividends

Holders of our common shares are entitled to receive, from funds legally available therefor, dividends when and as declared by the board of directors, subject to any prior rights of the holders of our preferred shares if issued. The CBCA restricts the directors’ ability to declare, and our ability to pay,

dividends by requiring that certain solvency tests be satisfied at the time of such declaration and payment.

Voting rights

Each common share is entitled to one vote on all matters upon which the common shares are entitled to vote.

Liquidation

With respect to a distribution of assets in the event of our liquidation, dissolution or winding-up, whether voluntary or involuntary, or any other distribution of our assets for the purposes of winding up our affairs, assets available for distribution among the holders of common shares shall be distributed among the holders of the common shares on a pro rata basis, subject to any prior rights of the holders of our preferred shares if issued.

There are no provisions in our articles discriminating against any existing or prospective shareholder as a result of such shareholder owning a substantial number of our common shares. Our common shares are not subject to liability to further capital calls by our company. Also, no provisions or rights exist in our articles regarding our common shares in connection with exchange, redemption, retraction, purchase for cancellation, surrender or sinking or purchase funds.

Item 10.B.4 Changes to shareholder rights

All or any of the rights attached to our common shares, or any other class of shares duly authorized may, subject to the provisions of the CBCA, be varied either with the unanimous written consent of the holders of the issued shares of that class or by a special resolution passed at a meeting of the holders of the shares of that class. A “special resolution” means a resolution passed by not less than two-thirds of the votes cast by the shareholders entitled to vote on the resolution at a meeting at which a quorum is present.

Item 10.B.6 Limitations on shareholder rights

There are no limitations under the laws of Canada or in the organizational documents of our company on the rights of shareholders who are not residents of Canada to hold and vote common shares.

Other Canadian law considerations with respect to ownership and exchange controls

Competition Act

Limitations on the ability to acquire and hold our common shares may be imposed by the Competition Act (Canada). This legislation establishes a pre-merger notification regime for certain types of merger transactions that exceed certain statutory shareholding and financial thresholds. Transactions that are subject to notification cannot be closed until the required materials are filed and the applicable statutory waiting period has expired or been waived by the Commissioner of Competition, or the Commissioner. Further, the Competition Act (Canada) permits the Commissioner to review any acquisition of control over or of a significant interest in us, whether or not it is subject to mandatory notification. This legislation grants the Commissioner jurisdiction, for up to one year, to challenge this type of acquisition before the Canadian Competition Tribunal if it would, or would be likely to, substantially prevent or lessen competition in any market in Canada.

Investment Canada Act

The Investment Canada Act requires notification and, in certain cases, advance review and approval by the Government of Canada, through the Minister of Innovation, Science and Economic

Development (the “**Minister**”), of an investment to establish a new Canadian business by a non-Canadian or of the acquisition by a non-Canadian of “control” of a “Canadian business”, all as defined in the Investment Canada Act. Generally, the threshold for advance review and approval will be higher in monetary terms for a member of the World Trade Organization. The Investment Canada Act generally prohibits the implementation of such a reviewable transaction unless, after review, the Minister is satisfied that the investment is likely to be of net benefit to Canada. The Investment Canada Act contains various rules to determine if there has been an acquisition of control. For example, for purposes of determining whether an investor has acquired control of a corporation by acquiring shares, the following general rules apply, subject to certain exceptions. The acquisition of a majority of the voting shares of a corporation is deemed to be acquisition of control of that corporation. The acquisition of less than a majority but one-third or more of the voting shares of a corporation is presumed to be an acquisition of control of that corporation unless it can be established that, on the acquisition, the corporation is not controlled in fact by the acquiror through the ownership of voting shares. The acquisition of less than one-third of the voting shares of a corporation is deemed not to be acquisition of control of that corporation.

In addition, under the Investment Canada Act, “national security” review on a discretionary basis may also be undertaken by the federal government in respect of a much broader range of investments by a non-Canadian to “acquire, in whole or in part, or to establish an entity carrying on all or any part of its operations in Canada, with the relevant test being whether such an investment by a non-Canadian could be “injurious to national security.” The Minister has broad discretion to determine whether an investor is a non-Canadian and therefore may be subject to “national security” review. Review on national security grounds is at the discretion of the federal government and may occur on a pre- or post-closing basis. If the Minister, after consultation with the Minister of Public Safety and Emergency Preparedness and the investor, consider the investment could be injurious to “national security”, the Minister refers the matter to the Governor in Council. Following its review, if the Governor in Council determines the investment could be injurious to “national security”, the Governor in Council may take any measures in respect of the investment that it considers advisable to protect national security, including denying the investment, asking for undertakings, imposing terms or conditions for the investment, or ordering divestiture (if the investment has been completed). Any of these provisions may discourage a potential acquirer from proposing or completing a transaction that may have otherwise presented a premium to our shareholders. We cannot predict whether investors will find our company and our common shares less attractive because we are governed by foreign laws.

Item 10.B.7 Change in control

There are no provisions in our articles or in the CBCA that would have an effect of delaying, deferring or preventing a change in control of our company which would operate with respect to a merger, acquisition or corporate restructuring involving our company or any of our subsidiaries. Please see Item 9.A.7 regarding the preferred shares issuable in series.

Item 10.B.8 Ownership disclosure threshold for our common shares

Our articles do not have any specific threshold requiring disclosure of ownership by holders of our common shares. In addition, the CBCA and securities regulation in Canada requires that we disclose in our proxy information circular for our annual general meeting and certain other disclosure documents filed by us under such regulation, holders who beneficially own more than 10% of our issued and outstanding common shares.

Item 10.B.9 Differences in the law

See Items 10.B.3, 10.B.4, 10.B.6, 10.B.7, 10.B.8 above.

Item 10.B.10 Changes in capital

The requirements imposed by the articles governing changes in capital are not more stringent than is required by law.

Item 12. Description of securities other than equity securities

Item 12.A Debt securities

Not applicable.

Item 12.B Warrants and rights

Not applicable.

Item 12.C Other securities

Not applicable.

Item 12.D.1 and 12.D.2 Description of American Depositary Shares

Not applicable.

LIST OF MAJOR SUBSIDIARIES
(As of March 31, 2020)

Name of entity	Place of incorporation	Ownership interest
CSI Solartronics (Changshu) Co., Ltd.	PRC	100%
CSI Solar Technologies Inc.	PRC	100%
CSI New Energy Holding Co., Ltd.	PRC	100%
Canadian Solar Manufacturing (Luoyang) Inc.	PRC	100%
Canadian Solar Manufacturing (Changshu) Inc.	PRC	100%
CSI Cells Co., Ltd.	PRC	100%
Canadian Solar (USA) Inc.	USA	100%
Canadian Solar Japan K.K.	Japan	100%
Canadian Solar Solutions Inc.	Canada	100%
CSI Solar Power Group Co., Ltd. (formerly named/known as “CSI Solar Power (China) Inc.”)	PRC	100%
Canadian Solar EMEA GmbH	Germany	100%
Canadian Solar (Australia) Pty Limited	Australia	100%
Canadian Solar International Limited	Hong Kong	100%
Canadian Solar O and M (Ontario) Inc.	Canada	100%
Suzhou SanySolar Materials Technology Co., Ltd.	PRC	99.73%
Canadian Solar South East Asia Pte. Ltd.	Singapore	100%
Canadian Solar South Africa (Pty) Ltd	South Africa	100%
Canadian Solar Brazil Commerce, Import and Export of Solar Panels Ltd.	Brazil	100%
Canadian Solar Construction (USA) LLC	USA	100%
Canadian Solar Projects K.K.	Japan	100%
CSI&GCL Solar Manufacturing (Yan Cheng) Inc.	PRC	100%
Canadian Solar UK Ltd.	United Kingdom	100%
Canadian Solar UK Projects Ltd.	United Kingdom	100%
Changshu Tegu New Material Technology Co., Ltd.	PRC	100%
Changshu Tlian Co., Ltd.	PRC	100%
Recurrent Energy Group Inc.	USA	100%
Recurrent Energy, LLC	USA	100%
PT. Canadian Solar Indonesia	Indonesia	67%
Canadian Solar Manufacturing Vietnam Co., Ltd.	Vietnam	100%
Canadian Solar Energy Private Limited	India	100%
Canadian Solar MSS (Australia) Pty Ltd (formerly named/known as “Canadian Solar Australia 1 Pty Ltd.”)	Australia	100%
Canadian Solar Energy Holding Company Limited	Hong Kong	100%
Canadian Solar Energy Singapore Pte. Ltd.	Singapore	100%
Canadian Solar Manufacturing (Thailand) Co., Ltd.	Thailand	99.99992%
Canadian Solar Sunenergy (Suzhou) Co., Ltd.	PRC	100%
Canadian Solar Sunenergy (Baotou) Co., Ltd.	PRC	100%
Canadian Solar Middle East DMCC	United Arab Emirates	100%
CSI Investment Management (SuZhou) Co., Ltd.	PRC	100%
CSI Cells (Yancheng) Co., Ltd.	PRC	*
CSI Modules (DaFeng) Co., Ltd.	PRC	**
Suzhou Gaochuangte New Energy Development Co., Ltd.	PRC	90%
Canadian Solar Construction (Australia) Pty Ltd	Australia	100%
CSUK Energy Systems Construction and Generation JSC	Turkey	100%
CSI Modules (JiaXing) Co., Ltd.	PRC	100%
CSI Wafer (LuoYang) Co., Ltd.	PRC	100%
Canadian Solar Manufacturing Taiwan Co., Ltd.	Taiwan	100%
Canadian Solar Argentina Investment Holding Ltd.	Argentina	100%
Canadian Solar New Energy Holding Company Limited	Hong Kong	100%
Canadian Solar Energy Holding Singapore Pte. Ltd.	Singapore	100%
Canadian Solar SSES (Canada) Inc.	Canada	100%

Canadian Solar SSES (UK) Ltd
Canadian Solar SSES (US) Inc.
Canadian Solar Asset Management LLC
Canadian Solar Netherlands Cooperative U.A.

United Kingdom	100%
USA	100%
USA	100%
Netherland	100%

* CSI Cells Co., Ltd. holds 52% equity rights of CSI Cells (Yan cheng) Co., Ltd. a limited partnership fund, of which CSI Cells Co., Ltd. holds 37.33% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.17% shares as a general partner, holds 48% equity rights of CSI Cells (Yancheng) Co., Ltd.

** Canadian Solar Manufacturing (Changshu) Inc. holds 3.12% equity rights of CSI Modules (DaFeng) Co., Ltd. a limited partnership fund, of which Canadian Solar Manufacturing (Changshu) Inc. holds 20% shares as a limited partner and a wholly-owned subsidiary of CSI Solar Power Group Co., Ltd. holds 0.067% shares as a general partner, holds 96.88% equity rights of CSI Modules (DaFeng) Co., Ltd.

**Certification by the Chief Executive Officer
Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002**

I, Shawn (Xiaohua) Qu, certify that:

1. I have reviewed this annual report on Form 20-F of Canadian Solar Inc. (the “Company”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Company as of, and for, the periods presented in this report;
4. The Company’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - (c) Evaluated the effectiveness of the Company’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the Company’s internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting; and
5. The Company’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Company’s auditors and the audit committee of the Company’s board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company’s ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Company’s internal control over financial reporting.

Date: April 28, 2020

By: /s/ Shawn (Xiaohua) Qu

Name: Shawn (Xiaohua) Qu

Title: Chief Executive Officer

**Certification by the Chief Financial Officer
Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002**

I, Huifeng Chang, certify that:

1. I have reviewed this annual report on Form 20-F of Canadian Solar Inc. (the “Company”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Company as of, and for, the periods presented in this report;
4. The Company’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - (c) Evaluated the effectiveness of the Company’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the Company’s internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting; and
5. The Company’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Company’s auditors and the audit committee of the Company’s board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company’s ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Company’s internal control over financial reporting.

Date: April 28, 2020

By: /s/ Huifeng Chang

Name: Huifeng Chang

Title: Chief Financial Officer

**Certification by the Chief Executive Officer
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Annual Report of Canadian Solar Inc. (the "Company") on Form 20-F for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Shawn (Xiaohua) Qu, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1). The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2). The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: April 28, 2020

By: /s/ Shawn (Xiaohua) Qu

Name: Shawn (Xiaohua) Qu

Title: Chief Executive Officer

**Certification by the Chief Financial Officer
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Annual Report of Canadian Solar Inc. (the "Company") on Form 20-F for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Huifeng Chang, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1). The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2). The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: April 28, 2020

By: /s/ Huifeng Chang

Name: Huifeng Chang

Title: Chief Financial Officer

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-147042, 333-178187 and 333-201766 on Form S-8 and Registration Statement No. 333-208828 on Form F-3 of our reports dated April 28, 2020, relating to the financial statements of Canadian Solar Inc. and subsidiaries (the “Company”), and the effectiveness of the Company’s internal control over financial reporting, appearing in this Annual Report on Form 20-F of the Company for the year ended December 31, 2019.

/s/ Deloitte Touche Tohmatsu Certified Public Accountants LLP

Shanghai, China
April 28, 2020
