

## C0. Introduction

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### C0.1

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**(C0.1) Give a general description and introduction to your organization.**

First Solar, Inc. is a leading global provider of comprehensive photovoltaic (PV) solar energy solutions with over 17 GW sold worldwide. We design, manufacture, and sell PV solar modules with an advanced thin film semiconductor technology and also develop, design, construct, and sell PV solar power systems that primarily use the modules we manufacture. Additionally, we provide operations and maintenance (“O&M”) services to system owners. We have substantial, ongoing research and development efforts focused on module and system level innovations. We are the world’s largest thin film PV solar module manufacturer and one of the world’s largest PV solar module manufacturers. Our mission is to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership, and operational excellence.

First Solar’s proven solar solutions diversify the energy portfolio and reduce the risk of fuel-price volatility while delivering a leveled cost of electricity (LCOE) that is cost competitive with fossil fuels today. First Solar has set the benchmark for environmentally responsible product life cycle management by introducing the industry’s first global and comprehensive recycling program for solar modules. We are committed to minimizing the environmental impacts and enhancing the social and economic benefits of our products and projects across their life cycle, from raw material sourcing through product end-of-life. For more information about First Solar, please visit [www.firstsolar.com](http://www.firstsolar.com)

First Solar was founded in 1999 and commercialized a unique thin film PV solar technology. Since we began commercial production in 2002, we have focused on our mission of enabling a world powered by clean, affordable, and reliable solar electricity and we have grown to become the world’s largest thin film PV solar manufacturer and one of the world’s leading PV solar manufacturers. Since 2002 and through 2017, we have sold over 17 GW of PV solar modules. Assuming average worldwide irradiance and grid electricity emissions, our products are being used to displace nearly 12 million metric tons of CO<sub>2</sub>e per year during their 25+ year product life. This is equivalent to powering more than 8 million average homes, planting 300 million trees and saving 30 billion liters of water (or 12,000+ Olympic swimming pools) per year based on worldwide averages.

### C0.2

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**(C0.2) State the start and end date of the year for which you are reporting data.**

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

### C0.3

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**(C0.3) Select the countries/regions for which you will be supplying data.**

- Australia
- Chile
- Germany
- India
- Japan
- Malaysia
- Samoa
- United States of America

**C0.4**

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**(C0.4) Select the currency used for all financial information disclosed throughout your response.**

- USD

**C0.5**

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**(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.**

- Equity share

**C1. Governance**

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**C1.1**

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**(C1.1) Is there board-level oversight of climate-related issues within your organization?**

- Yes

**C1.1a**

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**(C1.1a) Identify the position(s) of the individual(s) on the board with responsibility for climate-related issues.**

Position of individual(s)	Please explain
Board/Executive board	The Audit Committee of the Board of Directors has the highest level of oversight over risk management for the company. The annual enterprise risk assessment process includes identifying risks that would impact the company's achievement of strategic objectives. Thus, the assessment would consider climate-related risks as part of the enterprise risk management process.

**C1.1b**

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**(C1.1b) Provide further details on the board’s oversight of climate-related issues.**

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Sporadic - as important matters arise	Reviewing and guiding strategy Reviewing and guiding risk management policies	Sustainability updates are provided to the Board as important matters arise. Enterprise risk management updates are provided to the Board's Audit Committee on an annual or more frequent basis. Impacts, risks, and opportunities related to Climate Change may be included in these updates if they have a significant impact on the company's business and operations.

**C1.2**

**(C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues.**

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Operating Officer (COO)	Both assessing and managing climate-related risks and opportunities	Annually

**C1.2a**

**(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored.**

First Solar's Chief Operating Officer has the highest level of direct responsibility for climate change within the company. Leveraging sustainability as a business enabler is one of the COO's executive goals. First Solar's Senior Vice President of Global Technical Services reports into the Chief Operational Officer and is in charge of overseeing the company's global technical services and programs including Environmental Health and Safety (EHS), Sustainability, Recycling, Quality and Reliability, as well as Post-Sales and Warranty Support. The SVP of Global Technical Services provides regular sustainability updates to the executive leadership team and the Board.

The SVP of Global Technical Services also leads the company's Sustainability Council which is composed of senior leaders from Supply Chain, Government Affairs, EHS, Sustainability, Business Development, Technology & Product Development, Legal, Human Resources, Finance, as well as the Chief Operating Officer, the Chief Technology Officer, Chief Accounting Officer and the Chief Information Officer. The Sustainability Council promotes the implementation of cross-functional sustainability strategies and drives the company's sustainability goals, initiatives and programs with a focus on resource efficiency, supply chain risk management, transparency, and utilizing sustainability as a lever for growth. First Solar's corporate sustainability program drives the company's commitment to the triple bottom line of "people, planet and profit" through our approach to responsible life cycle management, environmental footprint analysis (from raw material sourcing through end-of-life recycling), greenhouse gas emissions intensity reduction, waste management, global charitable giving, operational cost reduction, and industry best practices such as responsible land use and our global PV module recycling services.

**C1.3**

**(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?**

Yes

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**(C1.3a) Provide further details on the incentives provided for the management of climate-related issues.****Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

Other, please specify (Renewable energy products)

**Comment**

Expansion of PV solar module production which enables more PV solar modules to be provided to customers and therefore to displace more electricity generation by fossil fuels. Our annual manufacturing capacity has grown from 25 megawatts (MW) in 2005 to more than 2,280 MW in 2017.

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**Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

Other, please specify (Renewable energy cost )

**Comment**

Reductions in PV solar module manufacturing costs which reduce the costs of PV solar and thus allow PV solar to become more cost competitive with conventional technologies and helps PV solar become more widely deployed and accepted.

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**Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

Efficiency target

**Comment**

First Solar provides incentives to encourage our associates to drive the company's environmental strategy and continuous improvement. Improvements in PV solar module efficiency which drive reductions in the costs of PV solar thereby expanding PV markets and displacing electricity generated by fossil fuels. Improvements in efficiency also reduce the overall lifecycle carbon footprint of our product. As a result, our average module conversion efficiency has increased more than 70% over the past decade, from 9.5% in 2006 to 16.9% in 2017.

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**Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

Other, please specify (Renewable energy cost reduction)

**Comment**

Reductions in PV solar balance of system (BoS) costs which reduces the total installed costs of PV solar and thus allows PV solar to become more cost competitive with conventional technologies and help PV become more widely deployed and accepted.

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**Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

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Other, please specify (Expansion of renewable energy)

**Comment**

Expanded PV markets and/or market segments (which help to develop emerging geographic markets for PV solar) and provide these markets with a cost-competitive alternative to electricity generated by fossil fuels.

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**Who is entitled to benefit from these incentives?**

Management group

**Types of incentives**

Recognition (non-monetary)

**Activity incentivized**

Behavior change related indicator

**Comment**

Participation in leadership development programs, such as First Solar Way and Leadership Essentials, that focus on driving product improvements which helps to lower the carbon intensity of our products and also include other sustainability-related projects.

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**Who is entitled to benefit from these incentives?**

Facilities manager

**Types of incentives**

Monetary reward

**Activity incentivized**

Energy reduction target

**Comment**

Energy saving targets are included in the performance goals (GPS) of our facilities team. GPS is a performance management process which helps our associates meet their goals. Since 2009, our manufacturing energy intensity has decreased by over 30% due to increased manufacturing throughput and module efficiency. In 2017, our manufacturing energy intensity decreased by approximately 1% compared to 2016 primarily due to the reduction in our absolute manufacturing energy consumption and continued improvements in module efficiency. Although our production volume decreased by 26% to 2.3GW in 2017, our absolute manufacturing energy consumption decreased by 27%.

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**Who is entitled to benefit from these incentives?**

All employees

**Types of incentives**

Monetary reward

**Activity incentivized**

Other, please specify (Environmental footprint reduction)

**Comment**

First Solar's Business Enablement CEO Award provides recognition and a monetary reward to projects or initiatives that help reduce the company's environmental footprint and improve efficiency. The annual awards are granted to individuals who make extraordinary contributions above and beyond their normal responsibilities. For example, First Solar's recycling team received the company's Business Enablement CEO Award for developing an innovative, resource-efficient recycling technology that requires 30% less capital, chemicals, waste and labor than our previous recycling system.

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**Who is entitled to benefit from these incentives?**

Chief Operating Officer (COO)

**Types of incentives**

Monetary reward

**Activity incentivized**

Other, please specify (Executive sustainability goal)

**Comment**

Leveraging sustainability as a business enabler is one of the COO's executive goals which includes managing risks and identifying opportunities for growth e.g. operation cost reduction through reduced resource consumption and emissions. Executives are rewarded for achieving their operational goals and objectives.

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## C2. Risks and opportunities

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### C2.1

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**(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.**

	From (years)	To (years)	Comment
Short-term	0	3	Time horizon for assessing climate-related risks and opportunities is aligned with other business practice time horizons.
Medium-term	3	5	
Long-term	5	10	

### C2.2

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**(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.**

Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

### C2.2a

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**(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.**

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Annually	1 to 3 years	As part of our enterprise risk management (ERM) process, First Solar conducts an annual survey with the functional leaders. This team works from a top down approach to catalogue areas of risk to First Solar including regulatory risks, operational risks, reputational risks, market/ customer changes, business continuity risks including due to weather and other extreme events, technology risks, supply chain, organizational adaptability. These include climate change related risks and opportunities such as regulatory and other market drivers, uncertainty in market signals, and commodity price risks. The process involves a forward-looking view of enterprise risks and risk trends over a three-year horizon. The results are reviewed and analyzed by the executive leadership team and the Board's Audit Committee to guide the company's risk mitigation efforts.

### C2.2b

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**(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.**

First Solar conducts an annual survey to obtain the company leadership's view of enterprise risks and risk trends over a three-year horizon. Functional leaders and risk owners (Director-level and above) are requested on an annual basis to complete the survey which has a 90% response rate. Risk owners may provide their own updates more frequently if needed. Risks are assessed on their likelihood and impact, based on residual risk, i.e. remaining risk after action and control activities to reduce the impact and likelihood of an adverse event have been undertaken. 22 risk statements were captured in the survey, including areas such as regulatory risks, operational risks, reputational risks, market/customer changes, technology risks, supply chain, organizational adaptability, and corporate sustainability. These include climate change related risks and opportunities such as regulatory and other market drivers, uncertainty in market signals, commodity price risks, and corporate sustainability. The survey input is then converted into a heatmap chart depicting each risk's likelihood and impact. The results are reviewed and analyzed by the executive leadership team and the Board's Audit Committee to guide the company's risk mitigation efforts. Updates to the annual survey are made semi-annually and provided to the Board's Audit Committee. Impacts, risks, and opportunities related to Climate Change may be included in these updates if they have a significant impact on the company's business and operations. Risks associated with individual assets (including risks due to weather and other extreme events) are assessed in the context of operational and/or business continuity risks. Asset level risks (e.g. natural disasters that affect individual facilities) and opportunities are assessed through semi-annual scorecards for our manufacturing sites. Our definition for a substantive financial impact is a direct loss or opportunity cost of more than \$50 million.

**C2.2c**

**(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?**

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Climate change related risks associated with current regulations (e.g. the reduction or removal of clean energy programs and incentives) are captured under regulatory risks and are always included for evaluation in the company's ERM survey.
Emerging regulation	Relevant, always included	Risks associated with emerging regulations (e.g. new government regulations or utility policies pertaining to our modules, systems, and operation and maintenance services which could result in significant additional expenses or reduced product demand) are captured under regulatory risks and are always included for evaluation in the company's ERM survey.
Technology	Relevant, always included	Technology risks (e.g. failing to refine our technology and reduce costs could impact could render our solar modules or systems uncompetitive) are always included for evaluation in the company's ERM survey.
Legal	Relevant, always included	Legal risks (e.g. failure to comply with legal or regulatory requirements including but not limited to Foreign Corrupt Practices Act, environmental, health and safety, anti-trust, misappropriating or infringing on intellectual property rights of third parties which could adversely impact our financial position or damage our reputation) are always included for evaluation in the company's ERM survey.
Market	Relevant, always included	Market risks (e.g. if utility-scale PV solar technology proves unsuitable for widespread adoption at economically attractive rate of return or if addition demand for solar modules and systems takes longer to develop than we anticipate) are always included for evaluation in the company's ERM survey.
Reputation	Relevant, always included	All ERM risks are evaluated for their potential impact on the company's reputation. A specific example of potential reputational risks would be problems with product quality and performance of our Series 4 and Series 6 modules which could cause us to incur significant and/or unexpected warranty and related expenses, damage our market reputation, and prevent us from maintaining or increasing our market share.
Acute physical	Relevant, always included	Risks associated with individual assets (including risks due to weather and other extreme events) are assessed in the context of operational and/or business continuity risks. Asset level risks (e.g. natural disasters that affect individual manufacturing facilities) and opportunities are assessed through semi-annual scorecards for our manufacturing sites.
Chronic physical	Relevant, always included	Chronic physical climate change risks such as water shortages and adverse weather events are included for evaluation in the company's ERM survey.
Upstream	Relevant, always included	Supply chain disruptions and commodity price risks are always included for evaluation in the company's ERM survey.
Downstream	Relevant, always included	Downstream risks (e.g. exposure to price risks of services and energy costs in the transportation of our solar modules dules and are captured under commodity and component risks and are always included for evaluation in the company's ERM survey.

**C2.2d**

**(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.**

Risks and opportunities identified by the annual enterprise risk management (ERM) survey are reviewed and analyzed by our Executive Leadership Team, and help to prioritize the company's risk mitigating efforts in the next year. The Executive Leadership Team then assigns internal cross-functional teams to focus on and drive mitigation of those risks and pursue identified opportunities. ERM updates are provided to the Audit Committee of the Board of Directors on an annual or more frequent basis by the ELT and Director of Internal Audit. In addition, First Solar has specialized functional teams dedicated to providing oversight of the adequacy of internal processes and controls around key processes and operational areas. Examples of these teams include: Internal Audit, Environmental Health & Safety (EHS), Global Sustainability, Business Development, Supply Chain, Facility teams etc.

Physical climate change risks such as natural disasters that disrupt utility supply to individual manufacturing facilities are managed by the facility teams. We mitigate such risks by distributing our manufacturing capability across several sites and buildings and creating a separate production unit that creates a redundancy with our manufacturing process.

Transitional risks that impact the cost of our raw material supply (e.g. carbon taxes that can increase the costs of relatively energy-intensive raw materials such as glass) are managed by the supply chain team. To mitigate supply chain price risks, we strive to qualify multiple suppliers using a robust qualification process. When possible we attempt to use suppliers that can provide a raw material supply source that is near our manufacturing locations, reducing the cost and lead times for such materials. Sourcing raw materials from nearby suppliers also helps to reduce transport- and shipping-related energy use and carbon emissions. As needed, we may purchase a critical raw material that is used in our core production process in quantities that exceed anticipated consumption within our normal operating cycle (which is 12 months). In addition, First Solar's recycling team developed a high-value recycling process that recovers over 90% of our semiconductor material for reuse in new modules and approximately 90% of the glass for use in new glass products. First Solar is proactively investing in recycling technology improvements with the ultimate aim of refining the quality of the recovered glass so it may be reused in new solar modules.

**C2.3**

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**(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?**

Yes

**C2.3a**

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**(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.**

**Identifier**

Risk 1

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type**

Transition risk

**Primary climate-related risk driver**

Market: Uncertainty in market signals

**Type of financial impact driver**

Technology: Reduced demand for products and services

**Company- specific description**

Although we compete in key markets that do not require solar-specific government subsidies or support programs, our net sales and profits remain subject, in the near term, to regulation and variability based on the availability and size of government subsidies

and economic incentives (e.g. quotas, renewable portfolio standards, and tendering systems) and financial incentives (e.g. tax incentives, grants, loans, rebates, and production incentives). The reduction, elimination, or expiration of government subsidies, economic incentives, tax incentives, renewable energy targets, and other support for on-grid solar electricity applications, or other adverse public policies, such as tariffs or other trade remedies imposed on solar cells and modules, could negatively impact demand and/or price levels for our solar modules and systems and limit our growth or lead to a reduction in our net sales, thereby adversely impacting our operating results. Although we expect to become less impacted by, and less dependent on these forms of government support over time, such programs will continue to play varying roles in accelerating the adoption of PV solar power systems around the world. The 30% Investment Tax Credit (ITC) has been an important economic driver of solar installations in the U.S. Its extension through 2019 is expected to contribute to greater medium term demand visibility in the U.S. The positive impact of the ITC has depended to a large degree on the availability of tax equity for project financing, and any significant reduction in the availability of tax equity in the future could make it more difficult to develop and construct projects requiring financing. However, this risk is expected to decline over the next few years as utility ownership of solar is expected to increase.

**Time horizon**

Medium-term

**Likelihood**

Likely

**Magnitude of impact**

High

**Potential financial impact**

423000000

**Explanation of financial impact**

The 30% Investment Tax Credit (ITC) has been an important economic driver of solar installations in the U.S. which represented 77% of our net sales in 2017. Under a worst case scenario, if we assumed 77% of our gross profit (~\$549 million) was impacted by a change in the ITC, the maximum potential financial impact is estimated to be ~\$423 million. The more likely impact to our results would be much lower than this worst case scenario. Although the ITC step down would likely impact PV system volumes and pricing, we do not expect that all our U.S. sales would go away since it's not the only driver of solar demand. Electricity load growth and the competitiveness of solar pricing relative to other sources of generation also impact market demand.

**Management method**

We continue to devote substantial resources to our research and development efforts, which generally focus on continually improving the conversion efficiency and energy yield of our solar modules and lowering the levelized cost of electricity of our PV solar power systems. In 2017, we spent more than \$88.5 million on research and development. Our PV solar energy solutions compete favorably on an economic basis with traditional forms of energy generation in multiple markets in the U.S. In addition to investing in research and development, we focus on developing long-lasting partnerships with strategic customers and becoming the partner of choice for utilities. With utility demand for solar PV expected to grow in the coming years, we anticipate that long-term solar ownership by utilities will continue to increase.

**Cost of management**

88573000

**Comment**

**Identifier**

Risk 2

**Where in the value chain does the risk driver occur?**

Supply chain

**Risk type**

Transition risk

**Primary climate-related risk driver**

Policy and legal: Increased pricing of GHG emissions

**Type of financial impact driver**

Market: Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment)

**Company- specific description**

First Solar is exposed to price risks for the raw materials, components, and energy costs used in the manufacturing and transportation of our solar modules and balance of system (BoS) parts used in our PV solar power systems. The imposition of carbon taxes could lead to increases in the costs of raw materials, such as glass, which have relatively high energy requirements for production. We may be unable to pass along changes in the costs of the raw materials and components for our products and

systems to our customers.

**Time horizon**

Long-term

**Likelihood**

About as likely as not

**Magnitude of impact**

Medium-low

**Potential financial impact**

12000000

**Explanation of financial impact**

Our cost of raw materials in 2017 amounted to \$148.9 million. To estimate the financial implications of a carbon tax, we used the Interagency Working Group on Social Cost of Carbon's central estimate for a ton of CO2 emitted (\$39). Assuming a carbon price of \$39/ metric ton applied to our 2017 scope 3 emissions for purchased goods and services (305,910 metric tons CO2-eq), the cost of our purchased goods and services could increase by approximately \$12 million.

**Management method**

To mitigate supply chain price risks, we strive to qualify multiple suppliers using a robust qualification process. When possible we attempt to use suppliers that can provide a raw material supply source that is near our manufacturing locations, reducing the cost and lead times for such materials. Sourcing raw materials from nearby suppliers also helps to reduce transport- and shipping-related energy use and carbon emissions. As needed, we may purchase a critical raw material that is used in our core production process in quantities that exceed anticipated consumption within our normal operating cycle (which is 12 months). We classify excess raw materials that are not consumed within our operating cycle as "noncurrent". Our non-current inventory in 2017 amounted to more than \$113 million (compared to \$100 million in 2016). In addition, First Solar's recycling team developed a high-value recycling process that recovers over 90% of our semiconductor material for reuse in new modules and approximately 90% of the glass for use in new glass products. First Solar is proactively investing in recycling technology improvements with the ultimate aim of refining the quality of the recovered glass so it may be reused in new solar modules.

**Cost of management**

113277000

**Comment**

**Identifier**

Risk 3

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type**

Physical risk

**Primary climate-related risk driver**

Acute: Increased severity of extreme weather events such as cyclones and floods

**Type of financial impact driver**

Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

**Company- specific description**

Our asset-level (manufacturing plants) scorecards have identified natural disasters (such as earthquakes, tornadoes, hurricane, building collapse, flood, etc.) as a key risk driver that can impact our manufacturing plant's abilities to operate in Perrysburg, Ohio. Damage to or disruption of facilities could interrupt our business and impair our ability to generate net sales. This would result in an inability to maintain maximum production levels

**Time horizon**

Short-term

**Likelihood**

Unlikely

**Magnitude of impact**

Medium-low

**Potential financial impact**

12000000

**Explanation of financial impact**

Of the 2.3 GW produced in 2017, our manufacturing facility in Perrysburg represented approximately 9%. Module sales in 2017 amounted to approximately \$806 million. We would likely lose some production for a while in the event of a natural disaster until we are able to bring the affected buildings back into production. Assuming production in Perrysburg was down for approximately 2 months (impacting 1.5% of our global production volume in 2017), the potential financial impact would be approximately \$12 million.

**Management method**

To mitigate the impacts of a natural disaster on our operations in Ohio, we separate our manufacturing capability across several buildings and created a separate production unit that creates a redundancy with our manufacturing process. We have implemented our management method so the risk has already been reduced.

**Cost of management**

0

**Comment**

We own our manufacturing facility in Perrysburg so the cost of management is \$0.

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**Identifier**

Risk 4

**Where in the value chain does the risk driver occur?**

Supply chain

**Risk type**

Physical risk

**Primary climate-related risk driver**

Acute: Increased severity of extreme weather events such as cyclones and floods

**Type of financial impact driver**

Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

**Company- specific description**

Our asset-level (manufacturing plants) scorecards have identified natural disasters at a supplier's site as a key risk driver for their ability to disrupt supply and shipment channels at our manufacturing facility in Malaysia. Shortages of essential components could occur due to interruptions of supply and could impair our ability to meet customer demand for our products and interrupt our business. This would result in an inability to maintain maximum production levels.

**Time horizon**

Short-term

**Likelihood**

Likely

**Magnitude of impact**

Medium-high

**Potential financial impact**

64000000

**Explanation of financial impact**

Interruption of supply to our Malaysia manufacturing facility caused by physical climate drivers could significantly affect the company's production levels. Of the 2.3 GW produced in 2017, our manufacturing facility in Malaysia represented approximately 91%. Module sales in 2017 amounted to approximately \$806 million. We would likely lose some production for a while in the event of a natural disaster interrupting our supply. Assuming our production in Malaysia was down for 2 months (impacting approximately 8% of our global production volume in 2017), the potential financial impact would be approximately \$64 million.

**Management method**

To mitigate risk impacts from interruptions to supply, we are developing secondary geographically located source suppliers and increasing our inventory by stocking critical materials onsite. We purchase critical raw materials used in our core production process in quantities that exceed anticipated consumption within our operating cycle (which is 12 months). We classify the raw materials that we do not expect to be consumed within our operating cycle as noncurrent. Our non-current inventory in 2017 amounted to more than \$113 million (compared to \$100 million in 2016). These costs are annual and ongoing.

**Cost of management**

113277000

**Comment**

## C2.4

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### **(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

## C2.4a

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### **(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.**

#### **Identifier**

Opp1

#### **Where in the value chain does the opportunity occur?**

Direct operations

#### **Opportunity type**

Products and services

#### **Primary climate-related opportunity driver**

Shift in consumer preferences

#### **Type of financial impact driver**

Increased revenue through demand for lower emissions products and services

#### **Company- specific description**

The demand for corporate renewables is accelerating, with corporations worldwide committing to the RE100 campaign, a collaborative, global initiative of influential businesses committed to 100% renewable electricity. The wholesale commercial and industrial market represents a promising opportunity given our utility-scale PV solar power system expertise. With more than 125 global corporations having made commitments to 100 percent renewable energy, we anticipate strong demand growth in corporate solar procurement in the coming years. Our ability to offer turn-key solutions and a willingness to work on an innovative deal structure to meet the customers' needs were critical elements in winning this business. We believe we also have a competitive advantage in the commercial and industrial market due to customers' sensitivity to the bankability and financial viability of their suppliers and geographically diverse operating locations.

#### **Time horizon**

Short-term

#### **Likelihood**

Very likely

#### **Magnitude of impact**

High

#### **Potential financial impact**

#### **Explanation of financial impact**

In combination with a greater than 400MW DC module supply agreement that we booked in 2017 our modules are currently powering or will be powering more than 830 MW DC of corporate renewables in the U.S. The power delivered from the 179 MWAC Switch Station projects, and a portion of the 280 MWAC California Flats project, will directly or indirectly be consumed by corporate customers. In early 2018 we announced that we signed a 150MW PPA that will help a major global corporation advance towards their goal of 100 percent renewable power. With more than 125 global corporations having made commitments to 100 percent renewable energy, we anticipate strong demand growth in corporate solar procurement in the coming years.

#### **Strategy to realize opportunity**

With our strong development experience, financial strength, and global footprint, we are well positioned to meet the needs of corporate customers. For example, we recently completed the sale of our California Flats project in Monterey County, California, from which Apple Inc. will purchase electricity from 130 MWAC of the project under a 25-year power purchase agreement. Our vertical integration combined with our partner collaboration enables us to identify and make system-level innovations, which creates further value for our customers. Business development and selling expenses for the commercial and Industrial segment are part of our selling, general and administrative costs which amounted to approximately \$203 million in 2017.

**Cost to realize opportunity**

203000000

**Comment**

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**Identifier**

Opp2

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Development and/or expansion of low emission goods and services

**Type of financial impact driver**

Better competitive position to reflect shifting consumer preferences, resulting in increased revenues

**Company- specific description**

Our lower-carbon solar technology not only has positive environmental benefits, but also provides a competitive advantage in commercial discussions. Solar PV tenders in France require an official carbon footprint assessment of solar modules to be eligible for participating in government auctions. After module price, carbon footprint is the most important criteria. In 2017, we were awarded a greater than 100MW module supply agreement in France, not only as a result of our competitive offering but also because of the significant environmental benefits that our module technology offers. On a life cycle basis, our thin film modules have the smallest carbon footprint, lowest water use and fastest energy payback time in the industry.

**Time horizon**

Current

**Likelihood**

Very likely

**Magnitude of impact**

Medium

**Potential financial impact**

32000000

**Explanation of financial impact**

In 2017, we were awarded a greater than 100MW module supply agreement in France, not only as a result of our competitive offering but also because of the significant environmental benefits that our module technology offers. Assuming the French market represented 4% of our total modules produced in 2017 (~100MW out of 2,300MW) and 4% of our net module sales in 2017 (\$806 million), we estimate the potential financial impact of this opportunity to amount to \$32 million based on 2017 sales.

**Strategy to realize opportunity**

In November 2016, we announced plans for the introduction of our Series 6 module, which will be manufactured using similar materials and processes as our legacy module technologies that have been proven in high volume production and have been in the field for over a decade. One of our key points of differentiation is our sustainability advantage and it is set to increase with our Series 6 technology due to its larger form factor, higher anticipated efficiency of 17.5 percent and lower glass usage per m<sup>2</sup>. By transitioning to our larger, more efficient and still recyclable Series 6 modules, the environmental footprint of our thin film PV technology is expected to be four times lower than the average PV module. We continue to pursue module sales activities in France which is running tenders where utility-scale PV solar projects can bid for capacity. Our modules business cost of sales amounted to more than \$694 million in 2017 and includes the cost of raw materials and components for manufacturing solar modules, direct labor for the manufacturing of solar modules and manufacturing overhead, such as engineering, equipment maintenance, environmental health and safety, quality and production control, information technology, and procurement costs. Assuming the French market represented 4% of our total modules produced in 2017 (~100MW out of 2,300MW) and 4% of our module cost of sales, the estimated cost to realize the opportunity is ~\$30 million.

**Cost to realize opportunity**

30000000

**Comment**

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**Identifier**Opp3

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**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Energy source

**Primary climate-related opportunity driver**

Use of supportive policy incentives

**Type of financial impact driver**

Other, please specify (Increased demand for existing products)

**Company- specific description**

The majority of states in the United States have enacted legislation adopting Renewable Portfolio Standard ("RPS") mechanisms. Under a RPS, regulated utilities and other load serving entities are required to procure a specified percentage of their total retail electricity sales to end-user customers from eligible renewable resources, such as solar energy generation facilities, by a specified date. Measured in terms of the volume of renewable electricity required to meet its RPS mandate, California's RPS program is the most significant in the United States, and the California market for renewable energy has dominated the western U.S. region for the past several years. Pursuant to amendments enacted by the California Legislature in 2015, the California RPS program now requires utilities and other obligated load serving entities to procure 50% of their total retail electricity demand from eligible renewable resources by 2030.

**Time horizon**

Current

**Likelihood**

Virtually certain

**Magnitude of impact**

High

**Potential financial impact**

850000000

**Explanation of financial impact**

Net sales in 2017 were \$2.9 billion and were primarily driven by the sale of the Moapa, California Flats, Switch Station, and Cuyama projects in 2017, together with an increase in third-party module sales in 2017 compared to 2016. In 2017, approximately 29% of our total net sales (approximately \$850 million) were derived from our systems projects or third-party module sales to solar power projects in California.

**Strategy to realize opportunity**

We have significant experience and a market leadership position in developing, engineering, constructing, and maintaining utility-scale power plants in the United States, particularly in California and other southwestern states, and increasingly in southeastern states. Through our fully integrated systems business, we provide complete turn-key PV solar power systems, or solar solutions, that draw upon our capabilities, which include (i) project development, (ii) EPC services, and (iii) O&M services. Net sales from our systems segment decreased by \$94.2 million in 2017 primarily as a result of the completion of substantially all construction activities on a number of projects in 2016, including the Desert Stateline, Astoria, Taylor, East Pecos, Silver State South, Butler, and McCoy projects.

**Cost to realize opportunity**

94000000

**Comment**

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**Identifier**

Opp4

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Markets

**Primary climate-related opportunity driver**

Access to new markets

**Type of financial impact driver**

Increased revenues through access to new and emerging markets (e.g., partnerships with governments, development banks)

**Company- specific description**

As part of our long-term strategic plans, we are focused on providing utility-scale PV solar energy solutions using our modules in key geographic markets that we believe have a compelling need for mass-scale PV electricity, including markets throughout the Americas, the Asia-Pacific region, and certain other strategic markets. There is significant potential for PV solar energy in India due to its growing energy needs, substantial population centers, lack of electrification to many parts of the country, high energy costs, strong irradiance, and aggressive renewable energy targets set by the government, which include increasing the country's solar capacity to 100 GW by the year 2022. The market potential for solar energy in the Middle East continues to be driven by a combination of strong economic fundamentals, aggressive tariff pricing, abundant solar resources, and robust policy. Africa offers strong potential for PV solar energy, which can play a useful role in meeting the region's diversified energy needs.

**Time horizon**

Current

**Likelihood**

Very likely

**Magnitude of impact**

High

**Potential financial impact**

667000000

**Explanation of financial impact**

In 2017, international markets (i.e. non-U.S.) represented 23% of our net sales (\$2.9 billion) or \$667 million.

**Strategy to realize opportunity**

We have established and are continuing to develop a global business presence. Assuming international markets represented 23% of our total cost of sales (\$2.39 billion), the estimated cost to realize this opportunity is approximately \$550 million.

**Cost to realize opportunity**

550000000

**Comment**

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C2.5

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**(C2.5) Describe where and how the identified risks and opportunities have impacted your business.**

	Impact	Description
Products and services	Impacted	Solar energy is one of the fastest growing forms of renewable energy with numerous economic and environmental benefits that make it an attractive complement to and/or substitute for traditional forms of energy generation. The cumulative global installed base of PV has grown tenfold over the past 7 years, to more than 400GW in 2017. Due to the increased global demand for PV products, 2017 was a record year for First Solar with net bookings of 7.7GW DC, which included 2.6GW DC of our Series 6 module technology.
Supply chain and/or value chain	Not yet impacted	Interruption of supply to our manufacturing facilities caused by physical climate drivers has not yet occurred but could significantly affect the company's production levels, particularly in Malaysia. Of the 2.3 GW produced in 2017, our Malaysian manufacturing facility represented approximately 91%. Module sales in 2017 amounted to approximately \$806 million. Assuming 91% of our 2017 module manufacturing capacity was impacted, the potential financial impact would be approximately \$733 million. Since natural disasters and extreme weather events are becoming increasingly frequent, the potential timescale for such an impact is short-term (1-3 years). Our supply chain has also not yet been impacted by rising energy prices associated with a carbon tax or similar climate change regulations. However we estimate the impact on our purchased goods and services would be relatively low. Assuming a carbon price of \$39/ metric ton applied to our 2017 scope 3 emissions for purchased goods and services (305,910 metric tons CO2-eq), the cost of our purchased goods and services could increase by approximately \$12 million. Since a carbon tax is about as likely as not, the potential/predicted timescale for this impact is long-term (>5 years)
Adaptation and mitigation activities	Impacted	To reduce grid electricity consumption and mitigate risks associated with increasing electricity costs, First Solar is implementing energy efficiency initiatives and installing onsite PV installations as part of our standard manufacturing system design at our production sites in Ohio and Malaysia and at our recycling facility in Frankfurt Oder, Germany. Over the past four years, we invested approximately \$6.7 million into energy efficiency and onsite PV installations at our manufacturing facilities in Ohio and Malaysia. By reducing our consumption of grid electricity, these projects helped us save over \$10 million since 2014.
Investment in R&D	Impacted	In 2017, we spent more than \$88.5 million on our research and development efforts, which generally focus on continually improving the conversion efficiency and energy yield of our solar modules and lowering the levelized cost of electricity of our PV solar power systems. As a result, our integrated power plant solutions deliver an economically attractive alternative to fossil-fuel electricity generation today. We believe we are among the lowest cost PV module manufacturers in the solar industry on a module cost per watt basis, based on publicly available information. This cost competitiveness allows us to compete favorably in markets where pricing for modules and fully integrated PV solar power systems is highly competitive.
Operations	Not yet impacted	Our manufacturing operations have not yet been significantly impacted by a natural disaster. We would likely lose some production for a while in the event of a natural disaster until we are able to bring the affected buildings back into production. Since natural disasters and extreme weather events are becoming increasingly frequent, the potential timescale for such an impact is short-term (1-3 years).
Other, please specify	Not impacted	No other areas of the business have been impacted by the identified risks and opportunities.

**C2.6**

**(C2.6) Describe where and how the identified risks and opportunities have factored into your financial planning process.**

	Relevance	Description
Revenues	Impacted	100% of our revenues come from providing PV solar solutions to climate change.
Operating costs	Impacted	In terms of operating expenses relating to climate change risks and opportunities, we invest in research and development to continually improve the conversion efficiency and energy yield of our solar modules and lower the levelized cost of electricity of our PV solar power systems so they can compete with fossil fuel technologies. In 2017, we spent more than \$202 million on global 'selling, general and administrative' expenses which consist primarily of salaries and other personnel-related costs, professional fees, insurance costs, travel expenses, and other business development and selling expenses related to the increasing demand for renewable energy products.
Capital expenditures / capital allocation	Impacted	We expect to make significant capital investments over the next several years as we transition our production to Series 6 module technology and purchase the related manufacturing equipment and infrastructure. Such investments also include the commencement and expansion of operations at our previously announced manufacturing plant in Vietnam. We expect the aggregate capital investment for currently planned Series 6 related programs to be approximately \$1.4 billion, including \$0.5 billion of capital expenditures already made as of December 31, 2017. Such programs are expected to provide an annual Series 6 manufacturing capacity of approximately 5 GW once completed, enabling us to capitalize on the increasing demand for renewable energy products. Other relevant climate change mitigation capital expenditures include energy efficiency and low carbon installations (onsite PV) at our manufacturing and recycling sites to reduce electricity consumption.
Acquisitions and divestments	Not impacted	We had no acquisitions or divestments in 2017 that were impacted by climate change risks or opportunities.
Access to capital	Not impacted	Our module business is not impacted as this is financed with cash on the balance. Our systems business is also not impacted as access to capital is more a function of liquidity in the market versus demand for renewable energy.
Assets	Not yet impacted	Our manufacturing assets have not yet been significantly impacted by extreme weather events and natural disasters. Since natural disasters and extreme weather events are becoming increasingly frequent, the potential timescale for such an impact is short-term (1-3 years).
Liabilities	Not impacted	Liabilities were not impacted by climate-related risks and opportunities.
Other	Not impacted	No other financial planning aspects are impacted by climate-related risks and opportunities.

**C3. Business Strategy**

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**C3.1**

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**(C3.1) Are climate-related issues integrated into your business strategy?**

Yes

**C3.1a**

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**(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?**

Yes, quantitative

**C3.1c**

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### (C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

In setting the company's vision and mission, First Solar's CEO clearly articulated that the threat of climate change is real, with the world facing rising sea and surface temperatures, increasing CO<sub>2</sub> emissions, and a greater occurrence of extreme weather events. All of which will be exacerbated as global energy and electricity demand continues to grow, unless solar and other forms of sustainable energy are part of the solution. First Solar's long-term vision is 'to lead the world's sustainable energy future'. Our mission, 'to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership and operational excellence,' describes how we strive towards our vision in the short-term. With the combination of strong industry growth and our points of differentiation, we believe that we can turn our vision into reality and achieve attractive returns for our shareholders.

One of our key points of differentiation is our sustainability advantage. In addition to providing a cost and performance advantage, our thin film photovoltaic (PV) technology boasts the smallest carbon footprint, lowest water use and fastest energy payback time in the industry. Our lower-carbon solar technology not only has positive environmental benefits, but it also provides a competitive advantage in commercial discussions. As a result of our technology's competitive offering and low carbon footprint, we were awarded more than 100 megawatts (MW) of module supply agreements in France in 2017.

Our most substantial business decision, to transition to our next generation Series 6 PV technology, was influenced by the need for low-cost clean energy products. In 2017, we made tremendous progress and installed our first Series 6 manufacturing line in our Ohio factory began tool installation at a second factory in Malaysia, retrofitted a legacy factory in Vietnam, and commenced construction of a fourth factory, also in Vietnam. Our Series 6 product readiness efforts in 2017 culminated in the completion of our first Series 6 module late in the year. In addition, our sustainability advantage is set to increase with our Series 6 technology due to its larger form factor, higher anticipated efficiency of 17.5 percent and lower glass usage per m<sup>2</sup>. By transitioning to our larger, more efficient and still recyclable Series 6 modules, the environmental footprint of our thin film PV technology is expected to be four times lower than the average PV module. (Sinha and Wade, Addressing Hotspots in the Product Environmental Footprint of CdTe Photovoltaics, IEEE PVSC, 2017.)

The Paris Agreement has influenced our business strategy in terms of creating opportunities and generating demand for our PV energy solutions. Policy makers, investors and the public increasingly recognize solar as a sustainable response to the environmental cost of hydrocarbon-fueled power generation. In addition, the Paris Agreement led to an increasing demand for corporate renewables, with companies worldwide committing to procuring 100% renewable electricity. The wholesale commercial and industrial market is a promising opportunity for First Solar given our large-scale PV system expertise. Our lower carbon and water footprint and faster energy payback time provides an ecologically leading solution to climate change, water scarcity and energy security, which also enables our customers to achieve their sustainability goals.

In addition to manufacturing PV modules with the lowest environmental impact in the industry, First Solar is committed to reducing the company's own operational impact. Since 2009, we've successfully reduced our energy, water, waste, and carbon intensity per watt produced through improvements in module efficiency, manufacturing throughput and capacity utilization, as well as by implementing resource conservation projects at our facilities. After surpassing our greenhouse gas (GHG) emissions reduction goal in 2016, we set a new five-year goal for 2021 to reduce our GHG emissions intensity per watt produced by 45 percent compared to our 2008 baseline. First Solar also developed the industry's first global module recycling program to recycle manufacturing scrap and end-of-life modules. Recycling ensures the solutions to climate change today do not pose a waste management burden on future generations and enables us to recycle semiconductor material for reuse in new solar modules, glass for new glass products, and laminate material for new rubber products such as mats and bicycle handles. By avoiding the landfilling of manufacturing waste, GHG emissions associated with landfill disposal are avoided.

### C3.1d

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**(C3.1d) Provide details of your organization’s use of climate-related scenario analysis.**

Climate-related scenarios	Details
2DS	We used forward-looking scenario analyses such as the 2°C scenario, when considering the company’s new greenhouse gas emissions target. However, due to our transition to Series 6 module manufacturing and the new machinery and equipment’s expected impact on our energy usage and emissions intensity, we are unable to set science-based targets at this time. In assessing the feasibility of science-based targets, we used the CSO Carbon Metric with RCP2.6 - a 2°C GHG mitigation scenario developed under IPCC. Inputs include historical Scope 1 and 2 GHG emissions, gross margins, and total units of production. The scenario was considered over a medium term time horizon of 5 years, consistent with our business planning horizon. However the CSO Carbon Metric method provides forecasts through 2050. Areas of the organization considered as part of the scenario analysis include Scope 1 and 2 emissions sources (manufacturing and R&D facilities, owned and operational PV projects, owned EPC equipment, vehicle fleet, purchased electricity).

**C4. Targets and performance**

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**C4.1**

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**(C4.1) Did you have an emissions target that was active in the reporting year?**

Intensity target

**C4.1b**

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**(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).**

**Target reference number**

Int 1

**Scope**

Scope 1 +2 (market-based)

**% emissions in Scope**

100

**% reduction from baseline year**

45

**Metric**

Other, please specify (Metric Tons CO2e per megawatt (MW) )

*Metric Tons CO2e per megawatt (MW) of solar panels produced*

**Base year**

2008

**Start year**

2011

**Normalized baseline year emissions covered by target (metric tons CO2e)**

246

**Target year**

2021

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**% achieved (emissions)**

93

**Target status**

Underway

**Please explain**

After successfully achieving the company's first GHG emissions intensity reduction target. First Solar set a new five-year goal for 2021 to reduce our greenhouse gas emissions intensity per watt produced by 45 percent compared to our 2008 baseline. We evaluated the possibility of setting science-based targets but are not currently able to implement them at this stage. Due to our transition to Series 6 module manufacturing and related re-tooling and replacement of machinery and production equipment, uncertainties related to energy consumption during commissioning, ramp-up and achieving steady-state manufacturing operations with projected module conversion efficiencies, we are unable to set science-based targets at this time. However, we remain committed to evaluating and striving towards science-based targets.

**% change anticipated in absolute Scope 1+2 emissions**

522

**% change anticipated in absolute Scope 3 emissions**

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**C4.2**

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**(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.**

**C4.3**

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**(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.**

Yes

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### C4.3a

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(C4.3a) Identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	1	59
Not to be implemented	0	0

### C4.3b

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(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

**Activity type**

Energy efficiency: Building services

**Description of activity**

Lighting

**Estimated annual CO2e savings (metric tonnes CO2e)**

59

**Scope**

Scope 2 (market-based)

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in CC0.4)**

10500

**Investment required (unit currency – as specified in CC0.4)**

25860

**Payback period**

1-3 years

**Estimated lifetime of the initiative**

3-5 years

**Comment**

Replace and reduce lighting in office area in Kulim, Malaysia manufacturing facility.

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### C4.3c

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**(C4.3c) What methods do you use to drive investment in emissions reduction activities?**

Method	Comment
Dedicated budget for low-carbon product R&D	Our product causes the greatest impact on GHG reduction. We have a dedicated Research and Development function whose sole purpose is to enhance the efficiency of our product and lower the cost of making it. These projects get a significant amount of First Solar's overall R&D spending.
Employee engagement	We have engaged employees at the site and global level. We have a global facilities team working on defining priorities, identifying opportunities, and implementing energy conservation projects. This is also done at the site level in our manufacturing and research locations, where we have dedicated local teams. Our facilities teams are also rewarded for achieving our energy savings targets.
Financial optimization calculations	Each project opportunity is evaluated for its payback, and external incentives are considered when calculating payback. Energy saving targets are established to reduce manufacturing costs.
Lower return on investment (ROI) specification	Although we do not have a specific ROI for energy conservation projects, we recognize that energy projects are low risk and this understanding of risk is integrated into our regular capital planning decisions.
Partnering with governments on technology development	We have worked with local utilities to find and implement energy conservation projects. For example, we worked with Silicon Valley Power to identify opportunities to reduce our GHG emissions, energy consumption and energy costs at our Santa Clara office building.

**C4.5**

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**(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?**

Yes

**C4.5a**

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**(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.**

**Level of aggregation**

Company-wide

**Description of product/Group of products**

In addition to manufacturing PV solar modules that generate clean reliable electricity with no air emissions, waste production, and minimal water use, First Solar constructs PV projects that displace the use of electricity generated by fossil fuels, and provides operations and maintenance products and services to enhance grid stability. Our solar PV solutions are helping displace approximately 5 times the emissions we emit through our global operations. In 2017, First Solar produced 2.3 GW of PV solar modules and our company-wide scope 1 and scope 2 greenhouse gas emissions amounted to approximately 0.3 million metric tons of CO<sub>2</sub> equivalent. Assuming worldwide average irradiance and grid electricity emissions, we conservatively estimate that our 2017 products are being used to displace over 1.6 million metric tons CO<sub>2</sub>e per year for the 25+ year product life. Since First Solar began commercial operations in 2002 and through 2017, we have sold over 17 GW of PV solar modules. Assuming average worldwide irradiance and grid electricity emissions, our products are being used to displace over 12 million metric tons of CO<sub>2</sub>e per year for their 25+ year product life. This is equivalent to powering over 8 million average homes and saving over 30 billion liters of water (~12,000 Olympic swimming pools) per year based on worldwide averages.

**Are these low-carbon product(s) or do they enable avoided emissions?**

Low-carbon product and avoided emissions

**Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions**

Other, please specify (Worldwide average carbon displacement)

**% revenue from low carbon product(s) in the reporting year**

100

**Comment**

First Solar's eco-efficient PV modules and power plants are displacing more than thirty times the amount of greenhouse gas emissions we emit through our global operations. In 2017, First Solar's company-wide scope 1 and scope 2 greenhouse gas emissions amounted to approximately 0.3 million metric tons of CO<sub>2</sub> equivalent. With over 17GW of modules sold worldwide, First Solar PV solutions are displacing more than 12 million metric tons of CO<sub>2</sub> equivalent per year, resulting in a net beneficial carbon impact of over 11 million metrics tons CO<sub>2</sub>e per year, assuming average worldwide irradiance and grid electricity emissions. More information on the worldwide average solar carbon displacement methodology is provided in our technical report: P. Sinha and L. Jenkins, 2011, Estimating Carbon Displacement by Solar Deployment, First Solar Technical Report. (Available at: [http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/Sustainability-Studies/TechnicalReportCarbonDisplacement\\_02761\\_NA.ashx?dl=1](http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/Sustainability-Studies/TechnicalReportCarbonDisplacement_02761_NA.ashx?dl=1))

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## C5. Emissions methodology

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### C5.1

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**(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).**

**Scope 1**

**Base year start**

January 1 2008

**Base year end**

December 31 2008

**Base year emissions (metric tons CO2e)**

1020

**Comment**

**Scope 2 (location-based)**

**Base year start**

January 1 2008

**Base year end**

December 31 2008

**Base year emissions (metric tons CO2e)**

123046

**Comment**

**Scope 2 (market-based)**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**C5.2**

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**(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.**

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

**C6. Emissions data**

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**C6.1**

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**(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?**

**Row 1**

**Gross global Scope 1 emissions (metric tons CO2e)**

16161

**End-year of reporting period**

<Not Applicable>

**Comment**

**C6.2**

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**(C6.2) Describe your organization's approach to reporting Scope 2 emissions.**

**Row 1**

**Scope 2, location-based**

We are reporting a Scope 2, location-based figure

**Scope 2, market-based**

We are reporting a Scope 2, market-based figure

**Comment**

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**C6.3**

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**(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?**

**Row 1**

**Scope 2, location-based**

347212

**Scope 2, market-based (if applicable)**

309357

**End-year of reporting period**

<Not Applicable>

**Comment**

In 2017, First Solar purchased grid electricity for its Kulim, Malaysia facility with a supplier-specific emissions factor of 0.630 metric tons CO2e/MWh. The national grid average emissions factor for Malaysia is 0.671 metric tons CO2e/MWh. First Solar purchased grid electricity for its Perrysburg, Ohio, USA facility with a supplier-specific emissions factor of 0.430 metric tons CO2e/MWh. The USEPA eGRID regional grid average emissions factor (RFC West region) is 0.685 metric tons CO2e/MWh.

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**C6.4**

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**(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?**

No

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**C6.5**

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**(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.**

## **Purchased goods and services**

### **Evaluation status**

Relevant, calculated

### **Metric tonnes CO2e**

305910

### **Emissions calculation methodology**

Based on life cycle assessment of First Solar PV module production (Table III; DOI: 10.1002/pip.1068) and total modules produced in 2017, and subtracting 2017 Scope 1 and 2 emissions.

### **Percentage of emissions calculated using data obtained from suppliers or value chain partners**

25

### **Explanation**

Bill of materials for PV module manufacturing from a previous year were the basis for the life cycle assessment combined with modules produced in 2017.

## **Capital goods**

### **Evaluation status**

Relevant, calculated

### **Metric tonnes CO2e**

313689

### **Emissions calculation methodology**

Our capital expenditures are disclosed as 'purchases of property, plant, and equipment' in our annual report's consolidated cash flow statement. In alignment with the WRI/WBCSD GHG Protocol, we used the Quantis Scope 3 Evaluator tool to calculate scope 3 emissions associated with capital goods purchased based on spend. The emissions are calculated by multiplying our 2017 capital goods spend by a CO2 emission factor based on the broad sector of purchase.

### **Percentage of emissions calculated using data obtained from suppliers or value chain partners**

25

### **Explanation**

Capital expenditures on purchases of property, plant, and equipment were the basis for the estimate

## **Fuel-and-energy-related activities (not included in Scope 1 or 2)**

### **Evaluation status**

Relevant, calculated

### **Metric tonnes CO2e**

15397

### **Emissions calculation methodology**

GHG emissions from transmission and distribution losses were estimated from market-based Scope 2 GHG emissions from purchased electricity (presented earlier) in conjunction with a transmission and distribution loss factor of 5%.

### **Percentage of emissions calculated using data obtained from suppliers or value chain partners**

25

### **Explanation**

Quantities of purchased electricity were the basis for the estimate.

## Upstream transportation and distribution

### Evaluation status

Relevant, calculated

### Metric tonnes CO<sub>2</sub>e

4588

### Emissions calculation methodology

Glass supply distances and transport methods (truck/rail/ship) to First Solar manufacturing facilities were used in conjunction with emission factors from WRI GHG Protocol transport tool (V. 2.5.1). For transport by ship, a transoceanic freight ship fuel consumption factor of 0.0025 kg heavy fuel oil per tonne-km and a residual fuel oil emission factor from WRI GHG Protocol stationary combustion tool (V. 4.1) were used.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

GHG Emissions were extrapolated from glass supply distances and transport methods from a previous year combined with data on modules produced in 2017.

## Waste generated in operations

### Evaluation status

Relevant, calculated

### Metric tonnes CO<sub>2</sub>e

1584

### Emissions calculation methodology

In 2017, we disposed of 3.27 million kilograms of waste (or 3,600 Tons). Quantity of disposed waste from manufacturing facilities was used in conjunction with U.S. EPA mixed waste landfilling emission factor of 0.12 Metric Ton Carbon Equivalent /Ton. The mass conversion factor of mass carbon to mass CO<sub>2</sub> generated during combustion processes is 44/12.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Explanation

Quantities of disposed non-hazardous and hazardous waste were the basis for the estimate. In 2017, we disposed of 3.27 million kilograms of waste (or 4,905 Tons). Note that approximately 18.80 million kilograms of waste (or 85% of the 22.06 million kilograms of total waste generated) were recycled in 2017.

## Business travel

### Evaluation status

Relevant, calculated

### Metric tonnes CO<sub>2</sub>e

4897

### Emissions calculation methodology

Short, medium, and long haul passenger air miles recorded by corporate travel agent were used in conjunction with air travel emission factors of 0.53, 0.43, and 0.39 lb CO<sub>2</sub> per passenger mile, respectively.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Explanation

Short, medium, and long haul passenger air miles recorded by corporate travel agent were the basis for the estimate.

## Employee commuting

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

9828

### Emissions calculation methodology

Number of full-time equivalent employees in 2017 was the basis for this estimate combined with assumptions regarding average employee commuting GHG emissions from the Quantis Scope 3 evaluator tool.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

Number of full-time equivalent employees in 2017 was the basis for this estimate.

## Upstream leased assets

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

219

### Emissions calculation methodology

Leased vehicle mileage was used in conjunction with vehicle emission factors from the WRI Transport Tool, V. 2.5 and IPCC Fourth Assessment Report GWP values.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

50

### Explanation

Vehicle inventory data was the basis for the estimate in conjunction with upper bound mileage estimate per vehicle from a previous year.

## Downstream transportation and distribution

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

9608

### Emissions calculation methodology

Finished product (PV module) transport distances and transport methods (ship) from our largest manufacturing facility (Kulim, Malaysia) to our largest market (U.S.; Long Beach, CA used as representative port) were used in conjunction with a transoceanic freight ship fuel consumption factor of 0.0025 kg heavy fuel oil per tonne-km and a residual fuel oil emission factor from WRI GHG Protocol stationary combustion tool (V. 4.1).

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

GHG Emissions were estimated from quantity of PV modules produced in 2017 in conjunction with port to port distances

## Processing of sold products

### Evaluation status

Not relevant, explanation provided

### Metric tonnes CO2e

### Emissions calculation methodology

Not relevant

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

### Explanation

Our products are not further processed. In less than 3.5 hours, First Solar's fully integrated manufacturing process transforms a sheet of glass into a completed thin film solar PV module, which is flash tested, boxed, and ready for shipment. All processes from the beginning of our manufacturing process to completed module are covered in our scope 1 and 2 emissions.

## Use of sold products

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

0

### Emissions calculation methodology

Our products (PV modules) are energy producing rather than energy consuming products.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Explanation

Our products are classified as zero-emission electricity generation technologies. First Solar PV solar modules generate clean reliable electricity with no air emissions, waste production, and minimal water use. In 2017, First Solar produced 2.3 GWdc of PV solar modules. Assuming world-wide average irradiance and grid electricity emissions, we estimate that our 2017 products are being used to displace 1.6 million metric tons CO2e per year for the 25+ year product life.

## End of life treatment of sold products

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

992

### Emissions calculation methodology

Electricity consumption per square meter of PV module recycled (DOI: 10.4229/27thEUPVSEC2012-6CV.4.9) was used in conjunction with quantities of end of life PV modules recycled at First Solar's recycling facilities in U.S., Germany, and Malaysia and market-specific GHG electricity emission factors.

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

GHG emissions were estimated from quantity of end of life PV modules recycled in 2017 in conjunction with an electricity consumption factor from a previous year. First Solar, as part of its commitment to extended producer responsibility, has voluntarily established and implemented the industry's first global module recycling program. Note that since these recycling facilities are owned and operated by First Solar, their greenhouse gas emissions are already accounted for within Scope 1 and 2.

## Downstream leased assets

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

463

### Emissions calculation methodology

Electricity consumption per square foot for warehouse facilities from EIA CBECS database was used in conjunction with square footage from leased warehouse facilities and WRI GHG Protocol tool for purchased electricity (V. 4.7).

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

GHG emissions were estimated based on square footage of leased warehouse facilities.

## Franchises

### Evaluation status

Not relevant, explanation provided

### Metric tonnes CO2e

### Emissions calculation methodology

Not relevant

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

### Explanation

We do not have franchises therefore this is not relevant and there are no scope 3 emissions to report.

## Investments

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

12250

### Emissions calculation methodology

GHG Emissions from projects in the construction phase were estimated from First Solar Topaz Solar Farm Environmental Impact Report, Appendix 8A, Table 4-10 (which uses URBEMIS vehicle emission factors and IPCC Second Assessment Report GWP values), scaled to 2017 EPC solar deployment of 1696MW (dc).

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

25

### Explanation

GHG Emissions were extrapolated from First Solar Topaz Solar Farm Environmental Impact Report based on 2017 EPC solar deployment data.

## Other (upstream)

### Evaluation status

Not relevant, explanation provided

### Metric tonnes CO2e

### Emissions calculation methodology

Not relevant

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

### Explanation

There are no other relevant Scope 3 GHG emissions from upstream sources.

## Other (downstream)

### Evaluation status

Not relevant, explanation provided

### Metric tonnes CO2e

### Emissions calculation methodology

Not relevant

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

### Explanation

There are no other relevant Scope 3 GHG emissions from downstream sources.

## C6.7

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### (C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

No

## C6.10

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### (C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

#### Intensity figure

0.000111

#### Metric numerator (Gross global combined Scope 1 and 2 emissions)

325518

#### Metric denominator

unit total revenue

#### Metric denominator: Unit total

2941324000

#### Scope 2 figure used

Market-based

#### % change from previous year

21

#### Direction of change

Decreased

#### Reason for change

In 2017, our absolute Scope 1 and 2 GHG emissions (325,518 MT CO2e) decreased by 20% relative to 2016 (406,108 MT CO2e) due to emission reductions activities (lighting conservation measures), increased manufacturing capacity utilization and a temporary decrease in our production volumes. Total revenue increased by 1% in 2017 (\$2.94 billion) compared to 2016 (\$2.90 billion). 2016 net sales data has been adjusted to \$2,904, 563,000 as a result of the adoption of Accounting Standards Update (ASU) 2014-09. Net sales from our modules segment increased by \$130.9 million in 2017 primarily due to a 68% increase in the volume of watts sold, partially offset by a 29% decrease in the average selling price per watt. Net sales from our systems segment decreased by \$94.2 million in 2017 primarily as a result of the completion of substantially all construction activities on a number of projects in 2016, including the Desert Stateline, Astoria, Taylor, East Pecos, Silver State South, Butler, and McCoy projects, partially offset by the sale of the Moapa, California Flats, Switch Station, and Cuyama projects in 2017.

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#### Intensity figure

79

#### Metric numerator (Gross global combined Scope 1 and 2 emissions)

325518

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**Metric denominator**

full time equivalent (FTE) employee

**Metric denominator: Unit total**

4130

**Scope 2 figure used**

Market-based

**% change from previous year**

4

**Direction of change**

Increased

**Reason for change**

In 2017, our Scope 1 and 2 GHG emissions (325,518 MT CO<sub>2</sub>e) decreased by 20% relative to 2016 (406,108 MT CO<sub>2</sub>e) while FTE decreased by a similar though slightly greater percentage (23%) from 5,358 in 2016 to 4,130 in 2017.  $(406,108/5,358= 76$  metric tons of CO<sub>2</sub>e per FTE equivalent in 2016.  $325,518/4,130=79$  metric tons of CO<sub>2</sub>e per FTE equivalent in 2017.  $(79-76)/76*100= 4\%$  increase.

**Intensity figure**

143

**Metric numerator (Gross global combined Scope 1 and 2 emissions)**

325518

**Metric denominator**

Other, please specify (MW of PV modules produced)

**Metric denominator: Unit total**

2284

**Scope 2 figure used**

Market-based

**% change from previous year**

9

**Direction of change**

Increased

**Reason for change**

Our GHG emissions intensity per MW produced increased in 2017 due to the temporary ramp down in production. In November 2016, we announced plans for the introduction of our Series 6 technology- a larger, more efficient and still recyclable PV module. To enable this transition, we started ramping down production of our Series 4 modules. As a result, we produced approximately 2.3 GW of solar modules during 2017, which represented a 26% decrease from 2016. Although our Scope 1 and 2 GHG emissions (325,518 MT CO<sub>2</sub>e) decreased by 20% in 2017 relative to 2016 (406,108 MT CO<sub>2</sub>e), the MW of PV panels produced decreased by a similar though slightly greater percentage (26%) from 3,097 in 2016 to 2,284 in 2017.  $(143-131)/131=9\%$  increase per MW produced.

**C7. Emissions breakdowns****C7.1****(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?**

Yes

**C7.1a**

**(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).**

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	13202	IPCC Fifth Assessment Report (AR5 – 100 year)
HFCs	2959	IPCC Fourth Assessment Report (AR4 - 100 year)

## C7.2

**(C7.2) Break down your total gross global Scope 1 emissions by country/region.**

Country/Region	Scope 1 emissions (metric tons CO2e)
Germany	463
Malaysia	3026
United States of America	12672
Japan	0
Australia	0
Samoa	0
Chile	0
India	0

## C7.3

**(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.**

- By business division
- By facility
- By activity

### C7.3a

**(C7.3a) Break down your total gross global Scope 1 emissions by business division.**

Business division	Scope 1 emissions (metric ton CO2e)
Manufacturing and Recycling	5539
Research and Development	146
Engineering, Procurement, and Construction	8299
Vehicle Fleet	2177

### C7.3b

**(C7.3b) Break down your total gross global Scope 1 emissions by business facility.**

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Perrysburg, Ohio, USA	2050	41.557058	-83.552515
Frankfurt-Oder, Germany	463	52.312919	14.481102
Kulim, Malaysia	3026	5.428624	100.572598
Santa Clara, California, USA	146	37.371053	-121.951931
Engineering, Procurement, and Construction	8299	39.766959	-86.164956
Vehicle Fleet	2177	39.766959	-86.164956

**C7.3c**

**(C7.3c) Break down your total gross global Scope 1 emissions by business activity.**

Activity	Scope 1 emissions (metric tons CO2e)
Stationary Combustion	10953
Mobile Source Emissions	2128
Fugitive Emissions	2959
Process Emissions	121

**C7.5**

**(C7.5) Break down your total gross global Scope 2 emissions by country/region.**

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)
Australia	13	13	16	0
Chile	1073	1073	2221	0
Germany	901	901	1894	0
India	2325	2325	2511	0
Japan	9	9	16	0
Malaysia	284649	267111	423986	0
Samoa	13	13	40	0
United States of America	58229	37912	87584	0

**C7.6**

**(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.**

- By business division
- By facility
- By activity

**C7.6a**

**(C7.6a) Break down your total gross global Scope 2 emissions by business division.**

Business division	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Manufacturing and Recycling	340106	302251
Research and Development	2483	2483
Owned Operational Solar Projects	4623	4623

**C7.6b**

**(C7.6b) Break down your total gross global Scope 2 emissions by business facility.**

Facility	Scope 2 location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Perrysburg, Ohio, USA	54556	34239
Frankfurt-Oder, Germany	901	901
Kulim, Malaysia	284649	267111
Santa Clara, California, USA	1422	1422
Mesa, Arizona, USA	1061	1061
Owned Operational Solar Projects	4623	4623

**C7.6c**

**(C7.6c) Break down your total gross global Scope 2 emissions by business activity.**

Activity	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Purchased Electricity	347212	309357

**C7.9**

**(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?**

Decreased

**C7.9a**

**(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.**

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change	0	First Solar's on-site PV installations at its manufacturing and recycling facilities in Kulim, Malaysia (750 kW), Frankfurt-Oder, Germany (2.9 MW), and Perrysburg, Ohio, USA (2.75 MW) continue to generate about 7 GWh/yr of electricity for self-consumption.
Other emissions reduction activities	59	Decreased	0.01	First Solar implemented lighting conservation measures for office areas at its manufacturing facility in Kulim, Malaysia. These measures resulted in savings of 59 metric tons CO2e from avoided electricity consumption in 2017. Our scope 1 and 2 emissions in the previous year (2016) amounted to 406,115 metric tons CO2e. We arrived at a 0.01% decrease in our gross global emissions through $(59 / 406,115) * 100 = 0.01\%$
Divestment	0	No change	0	There were no divestments in 2017.
Acquisitions	0	No change	0	There were no acquisitions in 2017.
Mergers	0	No change	0	There were no mergers in 2017.
Change in output	106649	Decreased	26.3	From 2016 to 2017 First Solar decreased its production of PV solar modules by 26% from 3.1GW to 2.3GW. This decreased output corresponds to a reduction of 106,649 metric tons CO2e of emissions, or 26.3% of the previous year's emissions through $(106,649 / 406,115) * 100 = 26.3\%$ .
Change in methodology	52149	Increased	12.8	In 2017, First Solar changed the grid electricity emission factor for its Kulim, Malaysia facility from a supplier-specific factor of 0.591 kg CO2e/kWh in 2016 to a supplier-specific factor of 0.630 kg CO2e/kWh in 2017. Use of the updated supplier specific factor resulted in an increase of 48,446 metric tons CO2e of emissions compared with using the 2016 factor. Also in 2017, First Solar changed the grid electricity emission factor for its Perrysburg, Ohio facility from a supplier-specific factor of 0.406 kg CO2e/kWh in 2016 to a supplier-specific factor of 0.430 kg CO2e/kWh in 2017. Use of the updated supplier specific factor resulted in an increase of 3,703 metric tons CO2e of emissions compared with using the 2016 factor. The updated emission factors for the two facilities account for 12.8% of the previous year's emissions through $(48,446 + 3,703) / 406,115 * 100 = 12.8\%$ .
Change in boundary	0	Please select	0	There were no changes in boundary in 2017.
Change in physical operating conditions	0	Please select	0	There no changes in physical operating conditions in 2017.
Unidentified	0	Please select	0	There were no unidentified changes in 2017
Other	26039	Decreased	6.4	In 2017, First Solar ran its manufacturing facilities at approximately 99% capacity utilization, which represented a 2.0 percentage point increase from 2016. These improvements resulted in a decrease of 26,039 metric tons CO2e of emissions, or 6.4% of the previous year's emissions through $(26,039 / 406,115) * 100 = 6.4\%$ .

**C7.9b**

**(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?**

Market-based

**C8. Energy**

**C8.1**

**(C8.1) What percentage of your total operational spend in the reporting year was on energy?**

More than 0% but less than or equal to 5%

## C8.2

### (C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

## C8.2a

### (C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	54871	54871
Consumption of purchased or acquired electricity	<Not Applicable>	0	518268	518268
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	7172	<Not Applicable>	7172
Total energy consumption	<Not Applicable>	7172	573139	580311

## C8.2b

### (C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

## C8.2c

### (C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

#### Fuels (excluding feedstocks)

Natural Gas

#### Heating value

HHV (higher heating value)

#### Total fuel MWh consumed by the organization

13073

**MWh fuel consumed for the self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

13073

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

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**Fuels (excluding feedstocks)**

Diesel

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

32758

**MWh fuel consumed for the self-generation of electricity**

98

**MWh fuel consumed for self-generation of heat**

32660

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

---

**Fuels (excluding feedstocks)**

Motor Gasoline

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

9040

**MWh fuel consumed for the self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

9040

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

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C8.2d

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**(C8.2d) List the average emission factors of the fuels reported in C8.2c.**

**Diesel**

**Emission factor**

2.685

**Unit**

kg CO2e per liter

**Emission factor source**

GHG Protocol tool for stationary combustion. Version 4.1

**Comment**

**Motor Gasoline**

**Emission factor**

8.941

**Unit**

kg CO2e per gallon

**Emission factor source**

GHG Protocol tool for mobile combustion. Version 2.2

**Comment**

**Natural Gas**

**Emission factor**

1.887

**Unit**

kg CO2e per m3

**Emission factor source**

GHG Protocol tool for stationary combustion. Version 4.1

**Comment**

**C8.2e**

---

**(C8.2e) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.**

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	7172	7172	7172	7172
Heat	0	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

**C8.2f**

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**(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.**

**Basis for applying a low-carbon emission factor**

Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

**Low-carbon technology type**

Solar PV

**MWh consumed associated with low-carbon electricity, heat, steam or cooling**

1095

**Emission factor (in units of metric tons CO2e per MWh)**

0

**Comment**

First Solar installed 7,820 modules to power our manufacturing facility in Kulim, Malaysia. The 750kW installation generates enough energy to power 350 average Malaysian homes and displace 750 metric tons of CO2-eq annually, which is the equivalent of removing 150 cars from the road and saving over 1.4 million liters of water per year, based on national averages. The electricity generated is used for self-consumption.

---

**Basis for applying a low-carbon emission factor**

Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

**Low-carbon technology type**

Solar PV

**MWh consumed associated with low-carbon electricity, heat, steam or cooling**

2705

**Emission factor (in units of metric tons CO2e per MWh)**

0

**Comment**

First Solar installed four PV installations (totaling 2.9MW) on our recycling facility in Frankfurt Oder, Germany. The installations generate enough energy to power over 700 average German homes and displace over 1,200 metric tons of CO2-eq emissions per year, based on national averages. The electricity generated is used for self-consumption.

---

**Basis for applying a low-carbon emission factor**

Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

**Low-carbon technology type**

Solar PV

**MWh consumed associated with low-carbon electricity, heat, steam or cooling**

3372

**Emission factor (in units of metric tons CO2e per MWh)**

0

**Comment**

First Solar installed a 2.75MW rooftop and ground-mount PV installation at our Perrysburg, Ohio manufacturing facility. The PV installation generates enough energy to power 290 average local homes and displace 1,920 metric tons of CO2-eq emissions per year, based on the regional average grid. The electricity generated is used for self-consumption.

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## C9. Additional metrics

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### C9.1

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**(C9.1) Provide any additional climate-related metrics relevant to your business.**

**Description**

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Waste

**Metric value**

9.7

**Metric numerator**

grams

**Metric denominator (intensity metric only)**

Watt produced

**% change from previous year**

7

**Direction of change**

Increased

**Please explain**

In 2017, our manufacturing waste intensity (grams per watt produced) increased by approximately 7% primarily due to the decommissioning of our Series 4 manufacturing equipment.

---

**Description**

Energy use

**Metric value**

0.23

**Metric numerator**

kilowatt hours

**Metric denominator (intensity metric only)**

Watt produced

**% change from previous year**

1

**Direction of change**

Decreased

**Please explain**

In 2017, our manufacturing energy intensity decreased by approximately 1% compared to 2016 (from .228 to .225 kWh per Watt produced) primarily due to the reduction in our absolute manufacturing energy consumption and continued improvements in module efficiency. Our absolute manufacturing energy consumption fell by approximately 27% as our production volume decreased by 26% to 2.3GW in 2017 during our transition to Series 6 module technology and manufacturing equipment.

---

**Description**

Other, please specify (Water)

**Metric value**

1.23

**Metric numerator**

Liters

**Metric denominator (intensity metric only)**

Watt produced

**% change from previous year**

16

**Direction of change**

Increased

**Please explain**

In 2017, First Solar's manufacturing water intensity increased by 16% due to the temporary reduction in our manufacturing capacity. Although we ramped down production, we were still using water for our bathroom facilities, cooling towers and process water generation.

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## C10. Verification

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### C10.1

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**(C10.1) Indicate the verification/assurance status that applies to your reported emissions.**

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	No third-party verification or assurance

### C10.1a

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**(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.**

**Scope**

Scope 1

**Verification or assurance cycle in place**

Triennial process

**Status in the current reporting year**

No verification or assurance of current reporting year

**Type of verification or assurance**

Limited assurance

**Attach the statement**

Final\_FSI\_AudRep\_2015.pdf

**Page/ section reference**

Entire document; Section 7, pg. 25: Statement of Verification. Due to the temporary ramp down of production in 2017, we did not pursue verification for the reporting year and will verify our 2018 emissions instead.

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

Final\_FSI\_AudRep\_2015.pdf

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**Scope**

Scope 2 market-based

**Verification or assurance cycle in place**

Triennial process

**Status in the current reporting year**

No verification or assurance of current reporting year

**Type of verification or assurance**

Limited assurance

**Attach the statement**

Final\_FSI\_AudRep\_2015.pdf

**Page/ section reference**

Entire document; Section 5, pg.17 : Verification of Findings Section 6, pg.23: Conclusions Section 7, pg. 25: Statement of Verification. Due to the temporary ramp down of production in 2017, we did not pursue verification for the reporting year and will verify our 2018 emissions instead

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

Final\_FSI\_AudRep\_2015.pdf

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## C10.2

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**(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?**

No, we do not verify any other climate-related information reported in our CDP disclosure

## C11. Carbon pricing

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### C11.1

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**(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?**  
No, and we do not anticipate being regulated in the next three years

### C11.2

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**(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?**  
No

### C11.3

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**(C11.3) Does your organization use an internal price on carbon?**  
No, and we do not currently anticipate doing so in the next two years

## C12. Engagement

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### C12.1

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**(C12.1) Do you engage with your value chain on climate-related issues?**  
Yes, our suppliers  
Yes, our customers  
Yes, other partners in the value chain

### C12.1a

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**(C12.1a) Provide details of your climate-related supplier engagement strategy.**

**Type of engagement**

Compliance & onboarding

**Details of engagement**

Included climate change in supplier selection / management mechanism

Climate change is integrated into supplier evaluation processes

**% of suppliers by number**

14

**% total procurement spend (direct and indirect)**

22

**% Scope 3 emissions as reported in C6.5**

10

**Rationale for the coverage of your engagement**

First Solar evaluates new suppliers using a balanced scorecard which focuses on the areas of Quality, Cost, Flexibility, Service, Technology and Sustainability. The EHS section of our supplier audit tool uses the Electronics Industry Citizenship Coalition ("EICC") Code of Conduct as a framework and encompasses topics such as environmental management, health and safety, labor and human rights, and ethics. Our supplier audit tool also includes questions on energy consumption, GHG emissions goals and targets, as well as other environmental performance objectives. We prioritize our engagement by focusing on our module and system component suppliers. Suppliers with a potential of being high risk based on California's Transparency in Supply Chains Act (SB 657) were prioritized for assessment in 2017. We assessed ~14% of suppliers in 2017, representing 22% of our spend and 10% of our scope 3 emissions. This was estimated based on 22% of our 2017 Scope 3 Emissions from purchased goods and services (305,910 metric tons CO<sub>2</sub>-eq) which amounts to 67,300 metric tons CO<sub>2</sub>-eq, divided by total 2017 scope 3 emissions (667,225) = 10% of total scope 3 emissions. We expect the proportion of suppliers engaged and the % of procurement spend they represent to increase as we continue to roll out our supplier audit tool. Before any materials are used in our manufacturing process, a supplier must undergo a rigorous qualification process.

**Impact of engagement, including measures of success**

Suppliers are scored in terms of low, medium and high risk to determine whether further engagement or corrective actions are needed. First Solar's Supplier Quality group trends and monitors on a monthly basis the number of non-conformances and drives the supplier to provide permanent corrective actions to prevent any reoccurrence of issues. After completing an onsite assessment, suppliers are more aware of First Solar's environmental, health and safety (EHS) requirements. Results from audits have led suppliers to make improvements such as creating or improving recycling programs, EHS objectives and targets. The audits have also resulted in increased supplier employee EHS awareness, improved EHS labeling and signage in the workplace, as well as better use of personal protective equipment (PPE) for specific tasks. Per the criteria for scoring suppliers for EHS audits, the assessed suppliers scored an average of 90%.

**Comment**

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**C12.1b**

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**(C12.1b) Give details of your climate-related engagement strategy with your customers.**

**Type of engagement**

Collaboration & innovation

**Details of engagement**

Other – please provide information in column 5

**Size of engagement**

100

**% Scope 3 emissions as reported in C6.5**

0

**Please explain the rationale for selecting this group of customers and scope of engagement**

We work with electric utility customers to meet government mandated renewable portfolio standards through solar PV deployment. We work with commercial/industrial customers to meet carbon mitigation/neutrality goals through solar PV deployment. Since our products (solar PV modules) are energy producing rather than energy consuming products, they represent 0% of our scope 3 emissions.

**Impact of engagement, including measures of success**

These engagements receive high priority as they are commercial opportunities. Success is measured by the performance of our solar PV projects and the amount of conventional grid electricity that is displaced. In 2017, First Solar produced 2.3 GW of PV solar modules and our company-wide scope 1 and scope 2 greenhouse gas emissions amounted to approximately 0.3 million metric tons of CO2 equivalent. Assuming world-wide average irradiance and grid electricity emissions, we conservatively estimate that our 2017 products are being used to displace over 1.6 million metric tons CO2e per year for the 25+ year product life.

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**C12.1c**

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**(C12.1c) Give details of your climate-related engagement strategy with other partners in the value chain.**

We engage with equipment vendors, external R&D groups and institutions, recycling vendors and industry peers on climate-related issues through our leadership of the International Thin-Film Solar Industry Association (PVthin) and its mission to strengthen global energy security, help create sustainable energy infrastructures, and promote the social, economic and environmental benefits of thin-film solar photovoltaic technologies by developing messaging and communicating on energy security, climate change mitigation, and the sustainability benefits of increased deployment of thin-film PV, in addition to promoting policies that reward PV thin-film companies for investments in sustainable business practices such as resource efficiency and advanced closed-loop recycling schemes. Through our leadership of Committees and Taskforces in Industry Associations (SolarPower Europe, AmCham EU), we engage a broad audience of value chain players, including inverter manufacturers, BOS manufacturers, installers, and financial institutions, on topics such as climate change, industrial policy and sustainable finance.

**C12.3**

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**(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?**

- Direct engagement with policy makers
- Trade associations
- Funding research organizations
- Other

**C12.3a**

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**(C12.3a) On what issues have you been engaging directly with policy makers?**

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Clean energy generation	Support with minor exceptions	First Solar actively supported clean energy generation policies in state legislatures and regulatory proceedings in a large number of states including CA, NV, UT, AZ, IL, NC, VA, OH, MD, DE, NJ, NY. First Solar engages directly by providing comments, testimony, and meeting with legislators, regulators and staff. First Solar also engages indirectly through trade associations.	First Solar has advocated for expanded Renewable Portfolio Standards (RPSs) and clean energy procurement requirements for utilities in states that don't have existing RPS policies. First Solar has also defended existing policies where they are under threat (e.g. OH). We supported clean energy generation policies in line with our business objectives of promoting large-scale solar.
Climate finance	Support	First Solar sponsored Senate Bill 639 that aimed to amend the Revenue and Taxation Code to clarify that utility-scale solar projects in California which sell their output to energy service providers are assessed for property tax purposes by the local taxation authority rather than the State Board of Equalization, thereby eliminating an uncertainty about the applicability of the state's property tax exemption for such projects.	First Solar supported the bill with no exceptions as it provides the financial certainty needed for the construction utility-scale renewable energy projects . The bill was signed into law in September 2017.
Other, please specify (Integrated resource planning)	Support	First Solar engages directly and indirectly through trade associations with utilities and regulators to improve integrated resource planning for clean energy generation, specifically for utility scale PV. First Solar regularly provides utilities with updated pricing and technology information to ensure that their integrated resource planning processes have the most up to date (often the most competitive) pricing information available.	This is a regulatory matter that directly influences procurement strategy for conventional, vertically integrated utilities and their regulators.

**C12.3b**

**(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?**

Yes

**C12.3c**

**(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.**

**Trade association**

Business Council for Sustainable Energy (BCSE)

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

The Business Council for Sustainable Energy (BCSE) is committed to advancing the solution technologies and policies that will help reduce emissions. BCSE supports market-based climate change legislation that allows for flexibility and cost-effective emissions reductions, including carbon offsets. The Council has long supported the development and use of output-based emissions regulations as effective ways to promote long-term air quality and to encourage cost-effective emissions reductions. The BCSE has represented the views of clean energy industries in the United Nations Framework Convention on Climate Change (UNFCCC) since 1992. In 2015, BCSE supported an ambitious international climate change agreement as a means of driving low-carbon investment and innovation. In 2017, BCSE sent a letter to President Donald J. Trump urging the United States to remain engaged in the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC). The letter stated that the Paris Agreement benefits American businesses and protects American jobs.

**How have you, or are you attempting to, influence the position?**

As a board member, First Solar contributes to position papers which promote the adoption of energy policies that support the adoption of solar energy and other renewable energy technologies to reduce CO2 emissions and mitigate the impacts of climate change. First Solar was one of BCSE's 52 corporate and trade association members which supported the letter strongly encouraging the United States government to remain engaged in both the Paris Agreement and the UNFCCC.

**Trade association**

Large-Scale Solar Association (LSA)

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

LSA works with its member companies to represent the utility-scale solar industry in important policy discussions, furthering support for large-scale solar development. LSA's principal jurisdictional focus is in California, although LSA sometimes engages with respect to legislation and regulatory matters in other western U.S. states. Key policy areas of focus include recognition of the societal value and economic benefits of climate mitigation policies; progressive utility procurement policies; progressive pricing and tax policies; rational and environmentally sound land use policy; and transmission reform and expansion.

**How have you, or are you attempting to, influence the position?**

As a member of LSA's Board, First Solar participates in developing LSA's advocacy positions with respect to legislation and regulatory matters concerning climate change, clean energy policy and related infrastructure issues.

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**Trade association**

American Council on Renewable Energy (ACORE)

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

ACORE, a 501(c)(3) non-profit membership organization, is dedicated to building a secure and prosperous America with clean, renewable energy. ACORE convenes thought leadership forums and creates energy industry partnerships to communicate the economic, security and environmental benefits of renewable energy. ACORE's policy work focuses on key tax, finance, grid modernization and other issues that are important for renewable energy expansion. ACORE is focused on the accelerated transition to a renewable energy economy to reduce emissions and mitigate risks associated with climate change. ACORE's analysis suggests that the U.S. federal government's prior climate goals for 2025 remain achievable, despite reduced regulation of greenhouse emissions through a 50 percent reduction in power sector emissions. To achieve a 50 percent reduction in power sector greenhouse emissions by 2025, ACORE focuses on strategically promoting the most viable measures that facilitate growth and investment for renewables and enabling technologies, including carbon pricing or other stable long-term policies that incentivize innovation and investment in carbon-free electricity generation.

**How have you, or are you attempting to, influence the position?**

As a board member, First Solar contributes to and supports position papers on tax and energy policies that affect the financing, development, and procurement of renewable energy. First Solar supported and contributed to ACORE's comments on the Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. First Solar and ACORE proposed suggestions to give states the tools and incentives necessary to deploy low-cost renewable solutions e.g. state-specific renewable energy goals.

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**Trade association**

Advanced Energy Economy

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

Advanced Energy Economy (AEE) is a national association of business leaders who are making the global energy system more secure, clean, and affordable. AEE's vision is of a prosperous world that runs on secure, clean, affordable energy. Advanced energy encompasses a broad range of products and services including energy efficiency, demand response, natural gas electric generation, solar, wind, hydro, nuclear, electric vehicles, biofuels and smart grid. In 2016, AEE supported SB 32 which would aim to advance California's energy and climate leadership by requiring the California Air Resources Board (ARB) to establish a statewide GHG emissions limit of 40% below 1990 emissions levels, to be achieved by 2030.

**How have you, or are you attempting to, influence the position?**

As a board member, First Solar participates in and is supportive of the association's overall mission and programs to advance the clean energy agenda.

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**Trade association**

Texas Solar Power Association

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

TSPA works with its member companies to represent the solar industry in important policy discussions in Texas, furthering solar development at the Legislature, Public Utilities Commission and the Electric Reliability Council of Texas. Key policy areas of focus include recognition of the economic benefits of solar development including reducing greenhouse gas emissions; the need for regulatory certainty, including developing a state based CPP compliance plan; transmission expansion; and leveraging competitive

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market forces to increase the deployment of solar in the state.

**How have you, or are you attempting to, influence the position?**

As a member of TSPA's Board, First Solar participates in developing TSPA's advocacy positions with respect to legislation and regulatory matters concerning climate change, clean energy policy and related infrastructure issues.

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**Trade association**

Georgia Large Scale Solar Association (GLSSA)

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

Georgia Large Scale Solar Association (GLSSA), is a non-profit trade association consisting of businesses that promote the economic and environmental benefits of solar energy generation in Georgia. First Solar formed GLSSA along with other solar developers active in Georgia to intervene in Georgia Power's IRP with a goal of expanding utility-scale solar markets in the state. GLSSA promotes low carbon energy generation like utility-scale solar as a means of tackling climate change.

**How have you, or are you attempting to, influence the position?**

As a member of GLSSA's Executive Committee, First Solar participates in developing GLSSA's advocacy positions with respect to legislation and regulatory matters concerning climate change, clean energy policy and related infrastructure issues.

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**Trade association**

Solar Power Europe

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

SolarPower Europe (formerly known as EPIA or the European Photovoltaic Industry Association) aims to shape the regulatory environment and enhance business opportunities for solar power in Europe. SolarPower Europe supports policies that advance an energy system based on renewable energy and energy efficiency to remain below a 2°C temperature increase.

**How have you, or are you attempting to, influence the position?**

As a board member and Vice-Chair of the Strategy Committee, First Solar contributes to PV industry position papers to promote further renewable energy deployment in Europe through ambitious targets and consistent PV energy policies.

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**Trade association**

International Thin Film Solar Industry Association PVThin a.i.s.b.l.

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

PVthin is an international, not-for-profit coalition representing global leaders in the thin-film solar industry. Its objective is to strengthen global energy security and support the transition to a low carbon economy by promoting the social, economic and environmental benefits of thin-film solar photovoltaic technologies. The activities of the coalition currently focus on: • Advocating thin film PV as a solution for energy security, climate change and water scarcity • Promoting policies that reward sustainable business practices such as resource efficiency and advanced closed-loop recycling schemes • Sharing and promoting best practices in environment, health and safety management • Advancing a recycling standard for PV modules under the EU WEEE Directive • Participating in the development of the European Commission's Product Environmental Footprint Category Rules for PV electricity generation • Supporting the development of an EU Ecolabel for PV based on Life Cycle Assessment (LCA) approach.

**How have you, or are you attempting to, influence the position?**

As Board Member and President of the Association, First Solar supports and drives the engagement of the Association in relevant policy discussions related to solar energy.

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**Trade association**

Climate Leadership Council

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

The Climate Leadership Council promotes a carbon dividends framework as the most cost-effective, equitable and politically-viable climate solution. The plan calls for a substantial, gradually rising, revenue-neutral carbon tax with the revenue distributed to

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citizens.

**How have you, or are you attempting to, influence the position?**

As a founding member, First Solar supports the Climate Leadership Council's mission and carbon dividends plan. "First Solar is uniquely positioned as a leader in the world's sustainable energy future. Our commitment to enabling national energy grids, corporate procurement groups and local communities worldwide to incorporate clean, renewable energy is squarely aligned with the Climate Leadership Council's mission. We see this effort as a crucial forum for informed advocacy of realistic climate protection solutions that make sense for global environmental and economic interests." — Mark Widmar, Chief Executive Officer

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**Trade association**

Utah Clean Energy Association

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

Utah Clean Energy leads and accelerates the clean energy transformation with vision and expertise. They are committed to creating a future that ensures healthy, thriving communities for all, empowered and sustained by clean energy. Through advocacy, education, and diverse partnerships, Utah Clean Energy continues to advance renewable energy and energy efficiency in Utah and the Western Region. Today, Utah Clean Energy has become Utah's independent resource for clean energy policy, regulatory, and consumer information.

**How have you, or are you attempting to, influence the position?**

As a board member, First Solar participates in and is supportive of the association's overall mission and programs to advance the clean energy agenda.

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**Trade association**

North Carolina Clean Energy Business Association

**Is your position on climate change consistent with theirs?**

Consistent

**Please explain the trade association's position**

The NC Clean Energy Business Alliance strengthens the political voice for clean energy through education, outreach, and direct lobbying of decision-makers. NCCEBA advocates for a business-friendly environment for clean energy businesses at all levels, from the North Carolina Utilities Commission, Public Staff, and other agencies, to Federal, County, and local levels. NCCEBA's team of lobbyists work with legislators and government officials to make sure clean energy business interests are well represented at the North Carolina General Assembly and with the Governor's Office.

**How have you, or are you attempting to, influence the position?**

As a board member, First Solar participates in and is supportive of the association's overall mission and programs to advance the clean energy agenda.

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**C12.3d**

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**(C12.3d) Do you publicly disclose a list of all research organizations that you fund?**

No

**C12.3e**

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**(C12.3e) Provide details of the other engagement activities that you undertake.**

1. IEA Photovoltaic Power Systems (PVPS) Program

i) First Solar engages through a group by participating in the IEA's PV task committee 12.

ii) IEA PVPS Task 12 aims to foster international collaboration on PV safety and sustainability by quantifying the environmental profile of PV in comparison to other energy technologies and defining and addressing Environmental, Health, and Safety (EHS) and sustainability issues that are important for market growth.

iii) First Solar engages by contributing to the development of methodology guidelines, best practice white papers, reports, scientific articles, and participation in international expert workshops. First Solar was a contributing author to a publication on end-of-life management of photovoltaic panels, which was published by the IEA PVPS Task 12 and the International Renewable Energy Agency (IRENA). Through its leadership of the Strategy Committee of SolarPower Europe (a member organization of the IEA PVPS), First Solar co-leads the task 12 as deputy operating agent.

iv) First Solar supports the development of internationally accepted and harmonized standards for life cycle assessment, along with minimum standards for EHS in manufacturing and deployment of PV power systems, and best practice exchange within the industry and policymakers.

2. International Renewable Energy Agency (IRENA)

i) First Solar engages through a group of leading renewable energy advocates from both industry and civil society.

ii) IRENA focuses on enabling the transition to renewable energy for a sustainable energy future.

iii) As a Coalition for Action member organization, First Solar has committed to supporting the energy transition by promoting the sustainable use of renewable energy technologies; making a compelling case for renewable energy by collectively compiling the latest knowledge and examples; communicating renewable energy with the public through clear, truthful messages; addressing public concerns over renewable energy technologies by applying best practices and engaging concerned parties; sharing evidence, communications material, ideas and contacts with fellow Coalition members to strengthen the cases and support for renewable energy.

iv) As a founding member of the coalition, First Solar supports all objectives and commitments to promote the energy transition through the sustainable use of renewable energy technologies.

**C12.3f**

**(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?**

Our vision "to lead the world's sustainable energy future" drives every aspect of our business strategy from developing sustainable solar markets, reducing our operational impacts, increasing the efficiency of our products, reducing the levelized cost of solar electricity to compete with fossil fuels, and improving the environmental benefits offered by our technology on a life cycle basis. First Solar established a global Sustainability program in 2011 to bring together all sustainability related activities across the company under one initiative. First Solar's Sustainability program drives the company's environmental, social, and economic priorities; including life cycle carbon footprint analysis and GHG intensity reduction goal, responsible land use, waste management, supply chain sustainability and our industry-leading recycling services. First Solar's strategy includes engagement with key policy makers in all our markets and at regional and international level to promote the development and deployment of PV solar as a solution to climate change and energy security, and advocate policies that facilitate these goals. First Solar's Public Affairs team is responsible for guiding public policy that drives demand for solar in target markets, monitoring relevant legislative and regulatory proceedings, advancing First Solar's project pipeline, and managing worldwide stakeholder engagement. First Solar's Public Affairs team works closely with Business Development, the Sustainability/EHS team, and the Executive Leadership Team to support the development of solar PV energy projects in various markets as part of our mission to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership, and operational excellence.

## C12.4

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**(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

First Solar AR Web Posting PDF\_v1.pdf

**Content elements**

Strategy

Risks & opportunities

Other, please specify (Sustainability advantage)

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**Publication**

In voluntary communications

*Our updated sustainability metrics will be available at the following link: <http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/First-Solar-Sustainability-Metrics.ashx?dl=1>*

**Status**

Underway – previous year attached

**Attach the document**

First-Solar-Sustainability-Metrics.pdf

**Content elements**

Emissions figures

Emission targets

Other metrics

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**Publication**

In voluntary sustainability report

**Status**

Underway – previous year attached

**Attach the document**

FirstSolar\_SustainabilityReport 2017.pdf

**Content elements**

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

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## C14. Signoff

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## C-FI

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(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

## C14.1

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(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Senior Vice President, Global Technical Services	Business unit manager

## Submit your response

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In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to
I am submitting my response	Public	Investors

Please confirm below

I have read and accept the applicable Terms