Welcome to your CDP Climate Change Questionnaire 2022

C0. Introduction

C0.1

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

First Solar is a leading American solar technology company and global provider of responsibly-produced eco-efficient solar modules advancing the fight against climate change. We are unique among the world's ten largest solar manufacturers for being the only US-headquartered company and for not using a crystalline silicon (c-Si) semiconductor. Developed at R&D labs in California and Ohio, First Solar's advanced thin film photovoltaic (PV) modules represent the next generation of solar technologies, providing a competitive, high-performance, lower-carbon alternative to conventional c-Si PV panels. From raw material sourcing and manufacturing through end-of-life module recycling, First Solar's approach to technology embodies sustainability and a responsibility towards people and the planet. Our vision is to lead the world's sustainable energy future and 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 levelized 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

First Solar was founded in 1999 and began commercial production in 2002. Since 2002 and through 2021, we have sold 40 gigawatts (GW) of PV solar modules. Assuming average worldwide irradiance and grid electricity emissions, our products are being used to displace 26 million metric tons of CO2e per year during their 30+ year product life. This is equivalent to powering more than 20 million average homes, planting over 430 million trees and saving over 75 billion liters of water (or 30,000 Olympic swimming pools) per year based on worldwide averages. Every year, First Solar products are displacing more than 10 times the amount of greenhouse gas emissions we emit through our global operations and supply chain.

C0.2

(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
Reporting year	January 1, 2021	December 31, 2021	No

C0.3

(C0.3) Select the countries/areas in which you operate.

Chile
Germany
India
Japan
Malaysia
Samoa
United States of America
Viet Nam

C0.4

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

USD

C0.5

(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 chosen approach for consolidating your GHG inventory.

Equity share

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, a Ticker symbol	FSLR

C1. Governance

C1.1

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

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	Pursuant to its charter, the Nominating and Governance Committee, one of the four committees of the Board of Directors, reviews the Company's environmental, social, and governance (ESG) strategy, policies and initiatives (other than initiatives delegated to other committees), which include climate-related issues. First Solar's ESG Steering Committee, led by our Chief Executive Officer and consisting of our Executive Leadership Team, reports into the Nominating and Governance Committee on a biannual or more frequent basis. The Board's Nominating and Governance Committee recently reviewed the company's science-based targets and the decision to have them independently validated by the Science-Based Target Initiative.
Board-level committee	The Audit Committee, one of the four committees of the Board of Directors, oversees financial risks, legal and compliance risks, information security risks (including cybersecurity), and other risk management functions. First Solar's annual enterprise risk assessment process includes identifying risks that would impact the company's achievement of strategic objectives which includes considering climate-related physical and transition risks and opportunities. The Audit committee of the Board receives enterprise risk management updates and reviews risks on a biannual or more frequent basis. Identified climate-related risks identified include as potential disruption of our manufacturing process or facilities, facility outages and infrastructure breakdown, ESG disclosure requirements and investor expectations, changes in market incentives and demand for our low carbon solar products, insurance coverage, and the carbon intensity of our operations and supply chain.

C1.1b

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

Frequency with which climate-related issues	Governance mechanisms into	Please explain

are a scheduled agenda item	which climate-related issues are integrated	
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding risk management policies Monitoring implementation and performance of objectives Monitoring and overseeing progress against goals and targets for addressing climate-related issues	The Board's Nominating and Governance Committee reviews and guides the company's climate change strategy, goals and targets. In 2021, First Solar set science-based targets to reduce our absolute scope 1 and scope 2 emissions by 2028 and achieve Net Zero by 2050. First Solar's ESG Steering Committee, led by our Chief Executive Officer and consisting of our Executive Leadership Team, reports into the Nominating and Governance Committee on a biannual or more frequent basis. Updates to the Nominating and Governance Committee include reviewing the ESG dashboard to monitor progress on targets and our energy, water and greenhouse gas emissions intensity. The ESG Steering Committee also provides updates on opportunities related to our approach Responsible Solar. Our commitment to 'Responsible Solar' is underpinned by the belief that solar should never come at the price of people or the planet and drives our company's environmental, social, governance (ESG) strategy and differentiation. Our approach to Responsible Solar is interwoven into every aspect of our business and product life cycle- from raw material sourcing to end-of-life recycling: • Operating a responsible supply chain with zero tolerance for forced labor • Manufacturing using less energy, water and semiconductor • Enabling faster decarbonization through lower embodied carbon • Maximizing resource recovery to enhance circularity oversees financial risks, legal and compliance risks, information security risks (including cybersecurity), and other risk management functions. The Audit committee of the Board receives enterprise risk management updates on a biannual or more frequent basis and reviews climate-related risks and key mitigation approaches for potential disruption of our manufacturing process or facilities, facility outages and infrastructure breakdown, ESG disclosure requirements and investor expectations, changes in market incentives and demand for our low carbon

		solar products, insurance coverage, and the carbon intensity of our operations and supply chain.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues
Row 1	Yes	Criteria used to assess board members, including incumbent board members, include "relevant knowledge and diversity of perspective and experience in such areas as business, technology, finance and accounting, marketing, international business, government and other disciplines relevant to the Company's business." This includes experience in the renewable energy industry, low carbon energy technology, sustainability, or in climate finance and infrastructure. Based on these criteria, four Directors on our Board have competence on climate-related issues including our Chairman, Chief Executive Officer, and two independent Directors including the Chair of the Board's Technology Committee and a Director who is a member of the Technology Committee.

C1.2

(C1.2) Provide the highest management-level 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 Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	Half-yearly

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 (do not include the names of individuals).

First Solar has fully integrated environmental, social, governance (ESG) oversight, which includes climate-related issues, at the executive and board levels. First Solar's Chief Executive Officer (CEO) has overall responsibility for climate-related issues within the company and leads the company's ESG Steering Committee which consists of the company's Executive Leadership Team. Led by the CEO, the ESG Steering Committee provides sustainability and

climate-related updates to the Nominating and Governance Committee of the Board of Directors on a biannual or more frequent basis. Members of the ESG Steering Committee hold operational responsibility for climate change actions and other ESG priorities which are driven by a cross-functional taskforce of ESG focus leaders. First Solar's ESG and Sustainability team coordinates the cross-functional taskforce of ESG focus leaders responsible for defining, measuring and reporting on progress to the ESG Steering Committee on a quarterly or more frequent basis. The quarterly updates include assessing progress on company targets relating to greenhouse gas emissions reductions, renewable energy use, manufacturing energy and water intensity, product carbon footprint and scope 3 emissions, among other topics. First Solar's ESG focus leaders help advance the company's approach to Responsible Solar by driving progress on key strategic ESG areas including: Energy, Emissions & Resource Efficiency; Circular Economy; Inclusion, Diversity & Belonging; Innovative Products; Public Policy and Public Sentiment; Reliable Products; Responsible Sourcing and Human Rights. Our commitment to 'Responsible Solar' is underpinned by the belief that solar should never come at the price of people or the planet and drives our company's environmental, social, governance (ESG) strategy and differentiation. Our approach to Responsible Solar is interwoven into every aspect of our business and product life cycle- from raw material sourcing to end-of-life recycling.

C1.3

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	First Solar incentivizes associates across the company to manage climate-related issues and make progress against its energy and GHG targets.

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity incentivized	Comment
All employees	Monetary reward	Other (please specify) Renewable energy products	The 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 is part of the overall scope of employment for the company's associates. Our annual manufacturing capacity has grown from 25 megawatts (MW) in 2005 to to 7.9 gigawatts (GW) as

			of December 31, 2021, with a path to increase to 16 GW by the end of 2023 based on our recently announced expansion plans.
All employees	Monetary reward	Other (please specify) Renewable energy cost	First Solar incentivizes initiatives which drive reductions in PV solar module manufacturing and/or operating costs and in turn reduce the costs of PV solar, enabling PV solar to be cost competitive with conventional technologies and become more widely deployed and accepted.
Other, please specify Business departments	Monetary reward	Efficiency target	First Solar provides incentives to encourage our Quality & Reliability, manufacturing, R&D, and EHS associates to drive the company's environmental strategy and continuous improvement. Improvements in PV solar module efficiency 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. In 2021, we increased our top Series 6 production bin to 465 watts, a 20-watt increase year-over-year, and reduced our 30-year warranted power output degradation rate from 0.5% to 0.3% per year. Additionally, our commercial production lines manufactured record modules confirmed at 19.2% glass area efficiency by the US National Renewable Energy Laboratory (NREL).
All employees	Monetary reward	Other (please specify) Expansion of renewable energy	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.
All employees	Monetary reward	Emissions reduction project Energy reduction project Efficiency project	First Solar's Supernova and Excellence in Action awards recognizes exceptional individual and team-based contributions that go beyond the scope of the team or individual's regular day-to-day activities. These can include environmental impact reduction projects. Incentives are in the form of a cash payout. First Solar also offers Radiance spot awards to recognize individual contributions in the moment with points that can be redeemed for a gift.
Facilities manager	Monetary reward	Energy reduction target	Energy saving targets are included in the performance goals of our facilities team. In 2021, our manufacturing energy intensity (energy consumption per watt produced) decreased by approximately 8% compared to 2020 primarily due to the greater

			throughput and enhanced energy efficiency of our Series 6 manufacturing process. In 2021, we set a target to improve global energy efficiency per watt produced by 74% by 2028, from a 2009 baseline (or by 30% relative to 2020).
Corporate executive team	Monetary reward	Emissions reduction target Energy reduction target	Members of the ESG Steering Committee hold operational responsibility for energy and GHG emissions reduction targets and other ESG priorities which are driven by a cross-functional taskforce of ESG focus leaders. Bonus payouts for all associates, including the executive leadership team, are based on the achievement of their operational goals and objectives.
All employees	Non-monetary reward	Behavior change related indicator	First Solar's internal Sustainability Ambassadors Program enables First Solar associates at various sites to identify and implement local sustainability initiatives while encouraging sustainable behavior change across the organization. First Solar Sustainability Ambassadors are recognized for their efforts to minimize energy and water use, recycle and reduce waste as part of the company's global reduce-reuse-recycle campaign, engage in local communities, and minimize both the company's and their personal environmental footprints. Despite the pandemic and many associates working remotely, our Sustainability Ambassadors helped identify opportunities to save energy and water at our global manufacturing locations, participated in site clean-ups in California and Ohio, volunteered at a local orphanage in Vietnam, implemented 3R projects in Malaysia, and organized green challenges and photo contests for Earth Day in 2021.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	5	As part of our Enterprise Risk Management (ERM) approach, on a semi-annual basis risk scorecards capture the company leadership's view of enterprise risks and risk trends over a 5 year horizon. Time horizon for assessing short-term climate-related risks and opportunities is aligned with other business practice time horizons.
Medium-term	5	10	We have used forward-looking scenario analyses in considering climate-related risks and opportunities over medium and long-term horizons. To help manage climate-related risks, we have committed to being 100% renewably powered by 2028 and have set a near-term science-based target to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028, relative to 2020. This target is in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. We leveraged the company's targets to define the time horizon of ~2030-2050 for the scenario analysis.
Long-term	10	30	We have used forward-looking scenario analyses in considering climate-related risks and opportunities over medium and long-term horizons. We have set a long-term target to achieve net zero emissions by 2050, relative to 2020. This target is in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. We leveraged the company's targets to define the time horizon of ~2030-2050 for the scenario analysis. For physical risks, we used IPCC's assessment of 1.5°C global warming (consistent with RCP 2.6), as well as the U.S. National Climate Assessment evaluation of RCP 4.5 and RCP 8.5. For transition risks, we used evaluations by IEA and Princeton University of net zero pathways by 2050 globally and for the U.S., respectively. These transition pathways are consistent with RCP 2.6. These time horizons are relevant to our organization since First Solar has committed to RE100 and has set a target to purchase all electricity from renewables by 2028. First Solar has also committed to science-based climate targets for 2028 and 2050. The scenario analysis considered First Solar-owned facilities and assets - specifically manufacturing, recycling, and R&D facilities. However, some aspects, such as future policy or market changes were considered in terms of their impact on the company as a whole.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

Our definition for a substantive financial impact is a major impact on business, strategy, reputation, operational milestones, talent loss, or financial loss e.g. direct loss or opportunity cost of more than $50 million (medium-high impact) to more than $100 million (high

impact). Physical climate risks (e.g. natural disasters at our manufacturing facilities or our suppliers' sites) that affect a plant's ability to produce and perform process development activities that could generate substantive change to our business. These risks would likely result in us losing some production for a while, until we are able to bring the affected buildings back to production. In this case, substantive risk is defined in terms of its impact on our overall production. Our annual manufacturing capacity has grown from 25 megawatts (MW) in 2005 to 7.9 gigawatts (GW) as of December 31, 2021.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

As part of its Enterprise Risk Management (ERM) approach, First Solar has identified various risk areas across the company with specific risk owners and risk domains. The risk owners review risk scorecards for each risk area on a semi-annual basis with certain members of the executive leadership team including the Chief Executive Officer (CEO). The risk scorecards capture the company leadership's view of enterprise risks and risk trends over an up to 3-5 years horizon. Medium-term and long- term risks may be identified where relevant.

Enterprise-impacting, emerging, transient and cross-functional risks are assessed on their trend and risk priority, which considers mitigation efforts. Key risk domains include but are not limited to regulatory, operational, financial, reputational, market, technology, supply chain, organizational adaptability, and environmental, social governance (ESG) risks. Climate-related risks and opportunities such as potential disruption of our manufacturing process or facilities, facility outages and infrastructure breakdown, ESG disclosure requirements and investor expectations, changes in market incentives, demand for our low carbon solar products, insurance coverage, the carbon intensity of our operations and supply chain are included across a number of risk domains.

Enterprise risks are grouped by Perceived Organizational Priority (Priority 1, 2 and 3). Priority 1 risks are defined as having potential for significant negative consequences to the business, e.g. disruptions to production which result in loss of sales, loss of market share and/or reputational damage.

A risk balancing assessment has also been implemented to evaluate the impact of risks in the company's operating and monetization model, and to determine which risks to mitigate, transfer, accept or control, and how. 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 are provided to the Board's Audit Committee on a semi-annual basis. Impacts, risks, and opportunities related to climate change may be included in these updates if they could have a significant potential impact on the company's business and operations.

First Solar's ERM process leverages existing functional operating systems and embedded risk management activities to manage risks within each domain. A cross-functional ESG taskforce, consisting of ESG focus leaders and other internal experts, is responsible for identifying strategic ESG risks and opportunities (including transitional and physical climate-related risks and opportunities), gaps and challenges, anticipating ESG trends that could impact the company, and proposing new ESG policies, practices, targets, metrics and disclosures. First Solar's ESG focus leaders help advance the company's approach to Responsible Solar by driving progress on key strategic ESG areas including: Energy, Emissions & Resource Efficiency; Circular Economy; Inclusion, Diversity & Belonging; Innovative Products; Public Policy and Public Sentiment; Reliable Products; Responsible Sourcing and Human Rights. The ESG Steering Committee, consisting of the Executive Leadership Team, meets on a quarterly basis to review ESG progress and capitalize on climate-related opportunities such enabling demand for our low carbon solar modules through ecolabels and responsible procurement practices.

Our facility risk scorecards assess physical climate-related risks due to weather and other extreme events 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 annually or more frequently if needed.

C2.2a

(C2.2a) Which 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 which could result in decreased demand for our products) are captured through market risk reviews and are always included for evaluation in the company's ERM process.

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 process.
Technology	Relevant, always included	Technology risks (e.g. failing to enhance our technology and reduce costs could render our solar modules or systems uncompetitive) are always included for evaluation in the company's ERM process.
Legal	Relevant, always included	Legal and compliance 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 process.
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 additional demand for solar modules takes longer to develop than we anticipate), market-specific barriers (such as tariffs, local content requirements, etc.), and incentives are captured through market risk reviews and always included for evaluation in the company's ERM process.
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 which could cause us to incur significant and/or unexpected contractual damages and/or warranty and related expenses, damage our market reputation, and prevent us from maintaining or increasing our market share.
Acute physical	Relevant, always included	Acute physical risks due to natural disasters and other extreme events which could potentially disrupt our manufacturing operations or our supply chain's ability to deliver raw materials are assessed in the context of operational and/or business continuity risks as part of our ERM process and are included in annual risk scorecards for our manufacturing sites.
Chronic physical	Relevant, always included	Chronic physical climate change risks such as water shortages and widespread extreme climates are included for evaluation in the company's ERM process and the annual risk scorecards for our manufacturing sites which assess operational and/or business continuity risks. Long-term changes in weather patterns can also affect the functionality of our products. The energy yield of our products are a function of atmospheric variables such as solar irradiation, temperature, humidity, and soiling. If we increase the number of installations in extreme climates, we may experience increased failure

		rates due to deployment into such field conditions. Any widespread product failures may damage our market reputation, cause our net sales to decline, require us to repair or replace the defective modules or provide financial remuneration, and result in us taking voluntary remedial measures beyond those required by our standard warranty terms to enhance customer satisfaction, which could have a material adverse effect on our operating results.

C2.3

(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

(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 & Primary climate-related risk driver

Current regulation

Other, please specify

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 public policies

Primary potential financial impact

Decreased revenues due to reduced demand for products and services

Company-specific description

Various proposed and contemplated environmental and tax policies may create regulatory uncertainty in the
renewable energy sector, including the solar energy sector, and may lead to a reduction or removal of various clean
energy programs and initiatives designed to curtail climate change. 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 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 limit our growth or lead to a reduction in our net sales or increase our costs, thereby adversely impacting our operating results. Changes or threatened changes in U.S.

regulatory policy may subject us to significant risks, including the following:
• a reduction or removal of clean energy programs and initiatives and the incentives they provide may diminish the market for future solar energy off-take agreements, slow the retirement of aging fossil fuel plants, including the retirements of coal generation plants, and reduce the ability for solar project developers to compete for off-take agreements, which may reduce PV solar module sales;
• any limitations on the value or availability to potential investors of tax incentives that benefit solar energy projects, such as the ITC, which is currently scheduled to decrease to 22% in 2023 and 10% in 2024, and accelerated depreciation deductions, could result in reducing such investors' economic returns, causing a reduction in the availability of affordable financing, thereby reducing demand for PV solar modules; and
• any effort to overturn federal and state laws, regulations, or policies that are supportive of solar energy generation or that remove costs or other limitations on other types of electricity generation that compete with solar energy projects could negatively impact our ability to compete with traditional forms of electricity generation and materially and adversely affect our business.
Application of U.S. trade laws, or trade laws of other countries, may also impact, either directly or indirectly, our operating results. In some instances, the application of trade laws is currently beneficial to the Company, and changes in their
application could have an adverse impact.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

0

Potential financial impact figure – maximum (currency)

2,456,597,000

Explanation of financial impact figure

Changes or threatened changes in U.S. regulatory policy may subject us to significant risks. The U.S. market represented 84% (or approximately $2.46 billion) of our total net sales in 2021 which amounted to approximately $2.92 billion. The maximum potential financial impact figure is based on our 2021 net sales in the U.S.

Cost of response to risk

170,000,000

Description of response and explanation of cost calculation

The costs of managing this risk are included in our selling, general and administrative expense which amounted to approximately $170 million in 2021. We engage with policymakers to manage policy risks in the U.S. and internationally as applicable to the solar industry. In 2021, we supported the Build Back Better Act and continue to support legislation such as the Solar Energy Manufacturing for America Act and the Inflation Reduction Act that would help build a healthy domestic solar manufacturing industry and supply chain. We consistently advocate for an industrial policy that identifies clean tech manufacturing as a national strategic priority to advance US energy independence. We believe that this type of policy would be promoted through incentives for domestic manufacturing, continued investment in advanced technologies, closing Buy American loopholes, and tariff reform.

Comment

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Market

Increased cost of raw materials

Primary potential financial impact

Increased direct costs

Company-specific description

First Solar is exposed to price risks for the raw materials, components, services, and energy costs used in the manufacturing and transportation of our solar modules. Our failure to obtain raw materials and components that meet our quality, quantity, and cost requirements in a timely manner could interrupt or impair our ability to manufacture our solar modules or increase our manufacturing costs. Additionally, some of our raw materials and components are sourced from a limited number of suppliers or a single supplier. In some cases, we also enter into long-term supply contracts for raw materials and components. Accordingly we are exposed to price changes in the raw materials and components used in our solar modules. For example, 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. In addition, the failure of a key supplier could disrupt our supply chain, which could result in higher prices and/or a disruption in our manufacturing process. We may be unable to pass along changes in the costs of the raw materials and components for our modules, or the costs associated with logistics services for the distribution of our modules, to our customers and may be

in default of our delivery obligations if we experience a manufacturing disruption.

Time horizon

Long-term

Likelihood

About as likely as not

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

76,000,000

Potential financial impact figure – maximum (currency)

126,000,000

Explanation of financial impact figure

To estimate the range for the financial implications of a carbon tax over a long-term time horizon, we used the Interagency Working Group on Social Cost of Carbon's estimates for a ton of CO2 emitted $51 per metric ton of CO2 emissions (at a 3 percent discount rate), increasing to $85 per metric ton in 2050. Assuming a carbon price of $51 and $85 metric ton applied to our 2021 scope 3 emissions for purchased goods and services (1,487,991 metric tons CO2-eq), the cost of our purchased goods and services could increase by approximately $76 million to approximately $126 million respectively.

Cost of response to risk

0

Description of response and explanation of cost calculation

To mitigate risks associated with a carbon tax, we have begun engaging with key suppliers to assess their ability to increase the recycled content of the materials we use in our products and reduce their carbon intensity. To mitigate supply chain price risks, we strive to qualify multiple suppliers using a robust qualification process and diversify the geographic diversity of our suppliers. 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. We also stock a supply of raw materials onsite in the event of supply disruption at one of our facilities. From time to time, we may utilize derivative hedging instruments to mitigate raw material price changes. The cost of response to this risk is $0 since supplier qualification and engagement is included in our normal operating costs.

Comment

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical

Tornado

Primary potential financial impact

Decreased revenues due to reduced production capacity

Company-specific description

Our solar modules are currently produced at our facilities in Perrysburg, Ohio; Lake Township, Ohio; Kulim, Malaysia; and Ho Chi Minh City, Vietnam. Damage to or disruption of these facilities could interrupt our business and adversely affect our ability to generate net sales. Our manufacturing risk scorecards, which generally consider risks over a 5 year time horizon, have identified natural disasters (such as earthquakes, tornadoes, hurricanes, building collapses, floods, etc.) as a key risk driver that can impact our manufacturing plant's abilities to operate in Ohio. Any damage to or disruption of our facilities would result in an inability to maintain maximum production levels. With regards to our operations in Malaysia and Vietnam, we do have occasional road flooding affecting associates commute to work but it has never been significant enough to cause interruption to production due to headcount shortage. There has been no direct physical impact to buildings from heavy rain and we have not experienced earthquakes or hurricanes that have impacted the sites. A third-party risk assessment conducted at our manufacturing site in Malaysia in 2021 concluded the risks of natural disasters such as earthquakes, floods, storm surges, tsunamis, windstorms or tornadoes were low or very low which is why the financial impact assessment focuses only on our Ohio operations. However, we expect storm intensity to increase by 2030 in a 2-degree Celsius or higher warming scenario.

Time horizon

Short-term

Likelihood

Unlikely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

0

Potential financial impact figure – maximum (currency)

670,000,000

Explanation of financial impact figure

Based on a third-party loss expectancy study conducted at our manufacturing site i in 2021, the maximum potential financial impact would be approximately $670 million in the event of a total loss which could be caused by a natural disaster such as a tornado. This figure takes the loss of the property, equipment, inventory, and business interruption impacts into account. There have been no insurable losses at this facility in the last 5 years. The likelihood is unlikely as Ohio does not experience as many tornadoes as other states in the Midwest and Great Plains. In a 1.5-degree Celsius warming scenario, we expect to see impacts of weather changes similar in intensity to what we face now over the coming decades; with increased storms, heat, drought, wildfires, and the like. However, under a 2-degree Celsius warming scenario, we anticipate greater storm intensity and more frequent extreme heat near 2030, with this risk roughly doubling by 2060. Under a 3-degree or higher Celsius warming scenario, we expect physical climate risks to be of significant impact. We anticipate storms that are worse near 2030 than those we expect under a 2-degree scenario in 2060, with this risk roughly doubling by 2060.

Cost of response to risk

2,000,000

Description of response and explanation of cost calculation

To mitigate the impacts of a natural disaster on our operations in Ohio, we separate our manufacturing capabilities across several buildings and purchase insurance to cover losses arising from such natural disasters. The cost of the response is based on our approximate annual insurance costs in Ohio. We have implemented our management method (i.e. separating manufacturing capabilities across several buildings) to reduce and minimize this risk.

Comment

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Upstream

Risk type & Primary climate-related risk driver

Acute physical

Cyclone, hurricane, typhoon

Primary potential financial impact

Decreased revenues due to reduced production capacity

Company-specific description

Disruption in the raw material supply to our manufacturing facilities could interrupt our business and adversely affect our ability to generate net sales. Our manufacturing risk scorecard for our operations in Malaysia, which generally considers risks over a 5-year time horizon, has identified natural disasters at supplier sites as a key risk due to the potential disruption to our supply and shipment channels. The failure of a key supplier could disrupt our supply chain, which could result in higher prices and/or a disruption in our manufacturing process. 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. We may be unable to pass along changes in the costs of the raw materials and components for our modules, or the costs associated with logistics services for the distribution of our modules, to our customers and may be in default of our delivery obligations if we experience a manufacturing disruption.

Time horizon

Short-term

Likelihood

More likely than not

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

0

Potential financial impact figure – maximum (currency)

727,000,000

Explanation of financial impact figure

Interruption of supply to our manufacturing facilities in Malaysia caused by physical climate drivers could significantly affect the company's production levels. Assuming a contracted module backlog of 21.9 GW for an aggregate transaction price of $5.9 billion as of December 31, 2021, and a 2021 nameplate capacity in Malaysia of 2.7 GW, the maximum potential revenue impact if our production in Malaysia was down for an entire year would be approximately $727 million. Such a worst-case scenario, however, is unlikely. We would likely lose some production for a while in the event of a natural disaster interrupting our supply. In a 1.5-degree Celsius warming scenario, we expect to

see impacts of weather changes similar in intensity to what we face now over the coming decades; with increased storms, heat, drought, wildfires, and the like. However, under a 2-degree Celsius warming scenario, we anticipate greater storm intensity and more frequent extreme heat near 2030, with this risk roughly doubling by 2060. Under a 3-degree or higher Celsius warming scenario, we expect physical climate risks to be of significant impact. We anticipate storms that are worse near 2030 than those we expect under a 2-degree scenario in 2060, with this risk roughly doubling by 2060.

Cost of response to risk

0

Description of response and explanation of cost calculation

To mitigate supply chain price risks, we strive to qualify multiple suppliers using a robust qualification process. As part of our sourcing strategy, we are enabling suppliers that are near to our manufacturing locations, thereby reducing the transportation costs, environmental footprint as well as the lead times for such materials. As part of our sourcing strategy, we are actively working on regionalizing supply at our manufacturing facilities. We also stock a supply of raw materials onsite in the event of supply disruption at one of our facilities. The cost of response to this risk is $0 since supplier qualification is included in our normal operating costs.

Comment

C2.4

(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

(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

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

With a record 17.5 GW of net bookings in 2021, and an end-of-year backlog of 21.9 GW, we had an excellent year from a commercial perspective. The bookings momentum has continued in 2022, with 18.9 GW of YTD bookings through June 30, 2022. Two of our largest deals signed during 2021, up to 5.4 GW ordered by Lightsource bp and bp and up to 2.4 GW ordered by Intersect Power, reflect the efforts of project developers to mitigate their procurement risks. We continue to see an increase in multi-year module sale agreements, driven by our customers' need for certainty, in terms of the technology they are investing in, and their supplier's integrity and ethics. We continue to focus on key geographic markets, particularly in areas with abundant solar resources and sizable electricity demand, and additional customer relationships to diversify our customer base. The wholesale commercial and industrial market continues to represent a promising opportunity for the widespread adoption of PV solar technology as corporations undertake certain sustainability commitments. The demand for corporate renewables continues to accelerate, with corporations worldwide committing to the RE100 campaign. We believe we also have a competitive advantage in the commercial and industrial market due to many customers' sensitivity to the sustainability, experience, and financial stability of their suppliers and geographically diverse operating locations. With our sustainability advantage, financial strength, and global footprint, we are well positioned to meet these needs.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2,900,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

100% of our revenue comes from the sale of clean energy products. Net sales for 2021 amounted to approximately $2.9 billion, an 8% increase compared to $2.7 billion in 2020. As of December 31, 2021 we had 7.9 GWDC of total installed nameplate module production capacity across all our facilities. In 2021, we produced 7.9 GWDC of solar

modules, which represented an approximate 29% increase compared to 2020. The increase in production was primarily driven by the incremental Series 6 production capacity added in Malaysia in early 2021 and higher throughput at our manufacturing facilities. We expect to produce between 8.5 GWDC and 9 GWDC of Series 6 and Series 6 Plus modules during 2022. In 2021, we announced plans to expand our manufacturing capacity by 6.6 GWDC by constructing our third manufacturing facility in the U.S. and our first manufacturing facility in India. These new facilities are expected to commence operations in the first half of 2023 and the second half of 2023, respectively.

Cost to realize opportunity

2,200,000,000

Strategy to realize opportunity and explanation of cost calculation

We continually evaluate forecasted global demand and seek to balance our manufacturing capacity with such demand. We recently announced our plans to invest approximately $1.4 billion to expand our solar manufacturing capacity by 6.6 GWDC by constructing our third manufacturing facility in the U.S. and our first manufacturing facility in India. These new facilities are expected to commence operations in the first half of 2023 and the second half of 2023, respectively. In addition, we continue to increase the nameplate production capacity of our existing manufacturing facilities by improving our production throughput, increasing module wattage (or conversion efficiency), and improving manufacturing yield losses. During 2022, we expect to spend $0.9 billion to $1.1 billion for capital expenditures, including the new facilities mentioned above and upgrades to machinery and equipment that we believe will further increase our module wattage and expand capacity and throughput at our manufacturing facilities. In 2021, our total cost of sales amounted to approximately $2.2 billion. Our modules business cost of sales includes the cost of raw materials and components for manufacturing solar modules, such as glass, transparent conductive coatings, CdTe and other thin film semiconductors, laminate materials, connector assemblies, edge seal materials, and frames. In addition, our cost of sales includes direct labor for the manufacturing of solar modules and manufacturing overhead, such as engineering, equipment maintenance, quality and production control, and information technology. Our cost of sales also includes depreciation of manufacturing plant and equipment, facility-related expenses, environmental health and safety costs, and costs associated with shipping, warranties, and solar module collection and recycling (excluding accretion).

Comment

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

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

In Europe, renewable energy targets, in conjunction with tenders for utility-scale PV solar and other support measures, have contributed to growth in PV solar markets. Renewable energy targets prescribe how much energy consumption must come from renewable sources, while incentive policies and competitive tender policies are intended to support new supply development by providing certainty to investors. Various EU directives on renewable energy have set targets for all EU member states in support of the goal of a 55% share of energy from renewable sources in the EU by 2030. In addition to these targets, certain markets in Europe, such as France, have adopted regulations for public tenders of renewable energy to prioritize PV solar power systems that utilize solar modules produced in low-carbon manufacturing processes. Such regulations require developers to provide information about the carbon footprint of PV solar modules used in their utility-scale projects and precludes the use of module technology that does not meet certain minimum carbon footprint thresholds. Our lower-carbon solar technology not only has positive environmental benefits, but also provides a competitive advantage in commercial discussions. As a result of our resource-efficient thin film PV manufacturing process, the carbon footprint of our solar modules is 2.5X lower than conventional crystalline silicon modules manufactured in China and a fraction of the carbon footprint of conventional energy sources. In 2021, France represented our third largest market after the U.S. and Japan.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

121,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

In 2021, France represented our third largest market and provided 4% of our net sales or $122 million. Since 2018, our solar modules' carbon footprint advantage resulted in nearly $500 million in sales in France. Due to our resource-efficient manufacturing process, First Solar modules have a carbon footprint that is up to 2.5 times lower, a water footprint that is up to 3 times lower and an energy payback time that is up to 2 times faster than conventional crystalline silicon solar panels manufactured in China on a life cycle basis.

Cost to realize opportunity

1,700,000

Strategy to realize opportunity and explanation of cost calculation

We continue to pursue module sales activities in France, which is running tenders where utility-scale PV solar projects can bid for capacity. Cost to realize the opportunity are associated with our government affairs and business development activities, which are part of our global selling, general and administrative costs, which were approximately $170 million in 2021. Since the EMEA region represented ~1% of our global workforce in 2021, we estimate the cost to realize this opportunity to be approximately $1.7 million. One of our key points of differentiation is our sustainability advantage which has further improved with our Series 6 technology. As a result of our resource-efficient manufacturing process, the carbon footprint of our modules is up to 2.5 times lower than conventional crystalline silicon modules and a fraction of the carbon footprint of conventional energy sources. On a lifecycle basis, our thin film module technology inherently has the smallest carbon footprint, fastest energy payback time, and lowest water use of any PV solar technology on the market.

Comment

Identifier

Opp3

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

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

In addressing the overall global demand for electricity, our advanced thin film modules, which leverage our Series 6 Plus module technology, compete favorably on an

economic basis with traditional forms of electricity generation and provide low cost electricity to end users. Our diverse capabilities facilitate the sale of these solutions and the adoption of our technology in key markets around the world. We believe our strategies and points of differentiation provide the foundation for our competitive position and enable us to remain one of the preferred providers of PV solar modules. Our Series 6 module technology, with its combination of high wattage, low manufacturing costs, a larger form factor, and balance of systems ("BoS") component compatibility, has further enhanced our competitive position since the launch of such technology in 2018. We are focusing on markets and energy applications in which solar power can be a least-cost, best-fit energy solution, particularly in regions with high solar resources, significant current or projected electricity demand, and/or relatively high existing electricity prices. We differentiate our product offerings by geographic market and localize the solution, as needed.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2,300,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Net sales from our solar modules business amounted to approximately $2.3 billion in 2021. Net sales from our modules segment increased by $595.3 million in 2021 primarily due to a 48% increase in the volume of watts sold, partially offset by a 10% decrease in the average selling price per watt.

Cost to realize opportunity

1,900,000,000

Strategy to realize opportunity and explanation of cost calculation

The cost of sales of our modules segment amounted to approximately $1.9 billion in 2021 as stated in our annual report. Our modules segment costs of sales increased by $551.5M from 2020 to 2021. The main driver of that was a $608M increase from a higher volume of modules sold. Our modules business cost of sales includes the cost of raw materials and components for manufacturing solar modules, direct labor for the

manufacturing of solar modules, manufacturing overhead, depreciation of manufacturing plant and equipment, facility-related expenses, environmental health and safety costs, and costs associated with shipping, warranties, and solar module collection and recycling (excluding accretion). We have dedicated, and intend to continue to dedicate, significant capital and human resources to reduce the total installed cost of PV solar energy and to ensure that our solutions integrate well into the overall electricity ecosystem of each specific market. We continually evaluate forecasted global demand, competition, and our addressable market and seek to effectively balance manufacturing capacity with market demand and the nature and extent of our competition. In 2021, we produced 7.9 GWDC of solar modules, which represented an approximate 29% increase compared to 2020. The increase in production was primarily driven by the incremental Series 6 production capacity added in Malaysia in early 2021 and higher throughput at our manufacturing facilities. We expect to produce between 8.5 GWDC and 9 GWDC of Series 6 and Series 6 Plus modules during 2022.

Comment

Identifier

Opp4

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

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Multiple markets within the United States, which accounted for 84% of our 2021 net sales, exemplify favorable characteristics for a solar market, including (i) sizeable electricity demand, particularly around growing population centers and industrial areas; (ii) strong demand for renewable energy generation; and (iii) abundant solar resources. In those areas and applications in which these factors are more pronounced, our PV solar modules compete favorably on an economic basis with traditional forms of energy generation. The market penetration of PV solar is also impacted by certain federal and state support programs, including the federal investment tax credit. Tax incentive programs exist in the United States at both the federal and state level and can take the form of investment and production tax credits, accelerated depreciation, and sales and property tax exemptions and abatements. The majority of states in the United States have also enacted legislation adopting Renewable Portfolio Standard (RPS) mechanisms. For example, California’s RPS program, which is one of the most

significant in the United States in terms of the volume of renewable electricity required to meet its RPS mandate, currently requires utilities and other obligated load serving entities to procure 60% of their total retail electricity demand from eligible renewable resources by 2030 and 100% of such electricity demand from carbon-free resources by 2045.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2,500,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

During 2021, our third-party module sales represented approximately 80% of our total net sales, and we sold the majority of our solar modules to developers and operators of systems in the United States. Overall, the United States accounted for 84% of our 2021 net sales, or approximately $2.5 billion.

Cost to realize opportunity

680,000,000

Strategy to realize opportunity and explanation of cost calculation

As a result of such market opportunities in the U.S., in 2021 we announced we were investing $680 million to expand our manufacturing capacity by 3.3 GWDC by constructing our third U.S. manufacturing facility, which is expected to commence operations in the first half of 2023. Upon completion of this facility, which commenced construction in late 2021, we expect our U.S. manufacturing capacity to be approximately 6 GWDC. Our Ohio manufacturing footprint makes us the largest solar manufacturer in the United States and the Western Hemisphere. The $680 million investment is a one time cost compared to the opportunity which would be annual once the plant is operational in 2023.

Comment

Identifier

Opp5

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Markets

Primary climate-related opportunity driver

Access to new markets

Primary potential financial impact

Increased revenues through access to new and emerging markets

Company-specific description

India continues to represent one of the largest and fastest growing markets for PV solar energy with an installed generation capacity of approximately 45 GW AC, approximately 45 GW AC of projects under various stages of construction, and over 20 GW AC of new projects being contracted under active procurement programs. In addition, the government has established aggressive renewable energy targets, which include increasing the country's overall renewable energy capacity to 500 GW AC by 2030 and establishing a net-zero carbon emissions target by 2070. Based on these targets, it is projected that the solar energy generation capacity will be 300 GWAC by 2030. The government has also announced a series of policy and regulatory measures to incentivize domestic manufacturing of PV solar modules. These targets, policies, and regulatory measures are expected to help create significant and sustained demand for PV solar energy. In addition to these factors, our CdTe solar technology is well suited for the India market given its hot and humid climate conditions. In India, we have a history that spans a whole decade and 2 GW of installed capacity, and our CdTe technology is uniquely advantaged in the country due to our temperature coefficient and spectral response advantages which can result in higher lifecycle energy per watt installed as compared to crystalline silicon due to the effects of heat and humidity. As a result of such market opportunities, we recently announced plans to expand our manufacturing capacity by an additional 3.3 GWDC by constructing our first manufacturing facility in India.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

889,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Assuming a contracted module backlog of 21.9 GW for an aggregate transaction price of $5.9 billion as of December 31, 2021, and an anticipated nameplate capacity in India of 3.3 GW, the potential annual financial opportunity amounts to approximately $889 million.

Cost to realize opportunity

684,000,000

Strategy to realize opportunity and explanation of cost calculation

In 2021 we announced plans to invest $684 million to expand our manufacturing capacity by an additional 3.3 GW DC by constructing our first manufacturing facility in India, which is expected to commence operations in the second half of 2023. Such expansion builds upon our existing presence of approximately 2 GWDC of modules sold in India. The investment is a one time cost compared to the opportunity which would be annual once the plant is operational in 2023.

Comment

Identifier

Opp6

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Markets

Primary climate-related opportunity driver

Use of public-sector incentives

Primary potential financial impact

Increased revenues resulting from increased production capacity

Company-specific description

Just as our customers have responded to uncertainty and risk by adopting long-term supply frameworks, a growing number of governments are seeking to de-risk their clean energy transitions by either diversifying or localizing critical supply chains, including solar. This is reflective of a growing political inclination for autonomy and supply security as political leaders around the world contend with a fast-evolving geopolitical

environment and risk of dependencies on adversarial nations. Significantly, the Indian government has adopted a multi-pronged approach to growing domestic manufacturing capacity. In addition to well defined solar deployment targets that could see 25 GW of new capacity added every year for the rest of
this decade, it has created a level playing field for domestic manufacturers to compete with imported alternatives by imposing a basic customs duty on imported modules and cells effective April 2022. It also offers production-linked incentives designed to encourage higher levels of domestic content, while prioritizing advanced technologies, in addition
to state-level incentives that are tied to capital investment and job creation. In the U.S., 2021 saw the introduction of the Solar Energy Manufacturing for America Act (SEMA) by Senator Jon Ossoff. By incentivizing every step of the solar value chain, SEMA's framework of manufacturing tax credits would be a powerful tool in establishing a meaningful, durable long-term solar industrial policy in the US. In July 2022, the announcement of the Inflation Reduction Act made a clear reference to investment in energy security and technology-neutral climate change solutions. While we are still reviewing the full legislative text, we are hopeful that the advanced manufacturing production credit, based on the SEMA framework, if passed, helps deliver the incentives required to boost domestic solar manufacturing and secure our nation's energy independence. The combination of durable industrial policy and smart trade policy are some of the factors considered when expanding our manufacturing footprint in countries such as India and the US. This is expected to result in increased revenues due to increased production capacity.

Time horizon

Short-term

Likelihood

More likely than not

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1,780,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

We recently announced plans to expand our manufacturing capacity by 6.6 GWDC by constructing our third manufacturing facility in the U.S. and our first manufacturing facility in India. These new facilities are currently under construction and are expected to

commence operations in the first half of 2023 and the second half of 2023, respectively. Assuming a contracted module backlog of 21.9 GW for an aggregate transaction price of $5.9 billion as of December 31, 2021, and an anticipated expanded nameplate capacity of 6.6 GW in India and the US, the potential annual financial opportunity amounts to approximately $ 1.78 billion.

Cost to realize opportunity

1,400,000,000

Strategy to realize opportunity and explanation of cost calculation

Our current capacity expansion plans include plans to invest $1.4 billion in the aggregate for these new facilities. First Solar considers several factors when looking to expand our manufacturing footprint in a market. This includes close geographic proximity to demand; the ability to export cost competitively into other markets; access to cost competitive labor, low energy costs and low real estate costs; and access to or the ability to build a cost competitive supply chain to support the sourcing of raw materials and components. It also includes an evaluation of domestic and international policy to ensure any such expansion is well positioned. In the U.S., First Solar continues to advocate for SEMA because we firmly believe that the US needs a combination of durable industrial policy and smart trade policy in order to restore American solar manufacturing and innovation leadership. In July 2022, the announcement of the Inflation Reduction Act made a clear reference to investment in energy security and technology-neutral climate change solutions. While we are still reviewing the full legislative text, we are hopeful that the advanced manufacturing production credit, if passed, helps deliver the incentives required to boost domestic solar manufacturing and secure our nation's energy independence. Should the Inflation Reduction Act get passed with consistent language on solar-related tax credits, we plan to pivot quickly to reevaluate U.S. manufacturing expansion.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization’s strategy include a transition plan that aligns with a 1.5°C world?

Row 1

Transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future

In 2021, First Solar publicly disclosed science based greenhouse gas reduction targets in its annual sustainability report in line with limiting the global temperature rise to well below 2 degrees Celsius, and pursuing efforts to limit it to 1.5 degrees Celsius above preindustrial levels. In 2022, First Solar committed to the Science Based Targets Initiative (SBTi) and aligned its science-based targets, including a 2050 net zero commitment, with a 1.5 degree Celsius world. In 2022, First Solar also plans a TCFD climate report including transition planning considering both physical and transition scenarios. As part of its ESG operating system, the SBTi targets and progress and TCFD climate report will be shared with First Solar's executive leadership team and board of directors for regular feedback.

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy
Row 1	Yes, qualitative and quantitative

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Physical climate scenarios RCP 2.6	Company-wide		For physical risks, we used IPCC's assessment of 1.5°C global warming (consistent with RCP 2.6) to conduct a quantitative analysis of potential impacts on our manufacturing, recycling, R&D and testing facilities over a 2030-2050 time horizon. These time horizons are relevant to our organization since First Solar has set a target to purchase all electricity from renewables by 2028 and committed to science-based climate targets to reduce scope 1 and scope 2 emissions by 34% by 2028 and achieve Net Zero by 2050, in line with a 1.5 degree C world. We leveraged the Shared Socioeconomic Pathway scenarios including SSP1-2.6 (low emissions), SSP2-4.5 (intermediate emissions), and SSP.5-8.5 (very high emissions) to cover a broad range of emissions pathways to assess physical risks at our facilities in the U.S., Malaysia, Vietnam, and our new manufacturing facility which is under construction in India. Relative to other pathways, SSP1 has high income and reduced inequalities, environmentally-friendly technologies, and low challenges to mitigation

			and low challenges to adaptation which would increase demand for our low-carbon solar products in near-term.
Physical climate scenarios RCP 4.5	Company-wide		For physical risks, we used IPCC's assessment of 2°C global warming (consistent with RCP 4.5) to conduct a quantitative analysis of potential impacts on our manufacturing, recycling, R&D and testing facilities over a 2030-2050 time horizon. These time horizons are relevant to our organization since First Solar has set a target to purchase all electricity from renewables by 2028 and committed to science-based climate targets to reduce scope 1 and scope 2 emissions by 34% by 2028 and achieve Net Zero by 2050, in line with a 1.5 degree C world. We leveraged the Shared Socioeconomic Pathway scenarios including SSP1-2.6 (low emissions), SSP2-4.5 (intermediate emissions), and SSP.5-8.5 (very high emissions) to cover a broad range of emissions pathways to assess physical risks at our facilities in the U.S., Malaysia, Vietnam, and our new manufacturing facility which is under construction in India. Relative to other pathways, SSP2 has medium income, technological progress and has medium challenges to mitigation and medium challenges to adaptation. In this scenario, demand for solar increases but not as fast or as much as in the SP1 scenario.
Physical climate scenarios RCP 8.5	Company-wide		For physical risks, we used IPCC's assessment of 3°C or higher global warming (consistent with RCP 8.5) to conduct a quantitative analysis of potential impacts on our manufacturing, recycling, R&D and testing facilities over a 2030-2050 time horizon. These time horizons are relevant to our organization since First Solar has set a target to purchase all electricity from renewables by 2028 and committed to science-based climate targets to reduce scope 1 and scope 2 emissions by 34% by 2028 and achieve Net Zero by 2050, in line with a 1.5 degree C world. We leveraged the Shared Socioeconomic Pathway scenarios including SSP1-2.6 (low emissions), SSP2-4.5 (intermediate emissions), and SSP.5-8.5 (very high emissions) to cover a broad range of emissions pathways to assess physical risks at our facilities in the U.S., Malaysia, Vietnam, and our new manufacturing facility which is under construction in India. In an RCP8.5 scenario, climate mitigation policies and air quality legislation are absent. SSP5 includes high income, reduced inequalities, free trade, resource-intensive production with high challenges to mitigation. These scenarios would

			increase demand for fossil-fueled development and decrease demand for our low-carbon solar products in the near-term. Solar demand would only start to increase after 2050.
Transition scenarios IEA NZE 2050	Company-wide		For transition risks, we used evaluations by IEA and Princeton University of net zero pathways by 2050, globally and for the U.S. respectively, to assess potential climate-related risks and opportunities to our company.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

What are the potential physical climate-related risks facing our manufacturing, recycling, R&D and testing facilities?
What are the potential climate-related transition risks and opportunities to our business?

Results of the climate-related scenario analysis with respect to the focal questions

We leveraged a broad range of emissions pathways in our scenarios to assess potential climate-related risks and opportunities in an uncertain future. We evaluated possible projections under a 1.5-degree, 2-degree, and 3-degree Celsius or higher scenario.
Physical risks include:
1) Damage to our facilities or slowdowns caused by flooding, either chronic or acute.
2) Disruptions to supply chain and logistics caused by increased frequency or intensity of weather, both acute events, and chronic changes in weather patterns.
3) Threats to the available supply and quality of water which is necessary for our operations.
4) Threats to human health arising due to the effects of climate change, including those caused by air quality, extreme heat, water-borne illness, and the like.
5) Atmosphere-Solar Interactions: Climate change impacts that affect the functionality of our solar products

Even reaching an optimistic 1.5-degree Celsius warming scenario, we expect to see impacts from weather changes similar in intensity to what we face now over the coming decades; with increased storms, heat, drought, wildfires, and the like. Under a 2-degree Celsius warming scenario, we anticipate greater storm intensity and more frequent extreme heat near 2030. These risks roughly double by 2060.
Under a 3-degree or higher Celsius warming scenario, we expect physical climate risks to be of significant impact. We anticipate storms that are worse near 2030 than those we expect under a 2-degree scenario in 2060. This risk roughly doubles by 2060. Extreme

heat is slightly worse under a 3-degree warming scenario than a 2-degree on throughout the coming decades in areas near First Solar's U.S. operations.

As a result of the scenario analysis, we aligned our near-term and long-term science-based targets with keeping global temperatures to 1.5 degrees C.

Transition risks and opportunities include:
1) Increased demand for our low carbon products to meet net zero carbon emissions goals worldwide in order to reduce the adverse effects of climate change.
2) Increased demand for our Responsible Solar offering to ensure a sustainable and equitable clean energy transition, rejecting solar modules made with forced labor and in carbon intensive grids such as those in China.
3) Reduced demand for products due to risks arising from inflexible or under capacity grid infrastructure.

As a result of the scenario analysis of transition, we continue to view our approach to Responsible Solar as a competitive differentiator.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	Climate-related opportunities have influenced our product strategy with a time horizon of present day through 2050. As more companies and governments set net zero targets to limit global temperatures to 1.5 degrees C, there is a growing awareness that not all solar technologies are created equal. How and where solar modules and their components are manufactured determines how many greenhouse gas emissions they will be able to avoid and displace. For example, our thin film CdTe solar modules manufactured in the U.S. have a carbon footprint that is 2.5 times lower than conventional crystalline silicon modules manufactured in China. The adoption of environmental performance criteria in tender schemes, such as the French carbon footprint criteria, is creating a market pull for low-carbon PV products. By increasing the efficiency of our modules and manufacturing process, we have successfully reduced our product carbon footprint which directly

		translates into business opportunities in France as well as with corporate renewable energy buyers. Our climate scenario analysis further confirmed that pursuing the development of low-carbon solar will help increase demand for our products to ensure a sustainable and equitable transition. Climate mitigation strategies such as going 100% renewable by 2028 will further enable us to reduce the carbon footprint of our solar modules by approximately 40%. Further opportunities such as increasing the recycled content of the materials we use in our products will help reduce their carbon footprint further. As a leading American solar technology company and global provider of responsibly-produced eco-efficient solar modules advancing the fight against climate change, First Solar's derives 100% of its revenues from clean energy products.
Supply chain and/or value chain	Yes	Climate-related risks such as natural disasters that disrupt the utility and raw material supply to our manufacturing facilities influence our supply chain management strategy with a time horizon of present day through 2030. Disruptions to our supply chain and logistics caused by increased frequency or intensity of weather, both acute events, and chronic changes in weather patterns were confirmed in our climate scenario analysis. The most substantial decision to date has been enabling suppliers that are near to our manufacturing locations, thereby reducing the transportation costs, environmental footprint, lead times and potential logistics disruptions for such materials. Climate-related opportunities are starting to influence our supply chain. We began engaging with key suppliers to assess their ability to increase the recycled content of the materials we use in our products which would help reduce the carbon footprint of our products. The most substantial decision to date has been establishing a project roadmap to reduce the life cycle environmental impacts of our supply chain (scope 3) by 2030. The opportunity of decreasing the embodied carbon of our solar products was confirmed by our climate scenario analysis.
Investment in R&D	Yes	Our R&D investments are driven by climate-related risks which impact the functionality of our products as well as climate-related opportunities which create demand for our solar modules. Long-term changes in weather patterns can also affect the functionality of our products. The time horizon is over 30 years, which corresponds to the lifetime of our products The energy yield of our products are a function of atmospheric variables such as solar irradiation, temperature, humidity, and soiling. First Solar designs

		products to be resilient to atmospheric-solar interactions by minimizing the PV module's temperature coefficient and utilizing an optimal band-gap semiconductor that is less sensitive to infrared light absorption by humidity than our competitors. Our products go through extended reliability testing to evaluate long-term durability in extremes of temperature, wind, irradiation, humidity and precipitation. First Solar modules are the only PV module in the industry warranted against cell cracking and micro-cracking, which can be caused by excessive thermal and mechanical stress. First Solar modules have also consistently ranked as "Top Performer" in PVEL's reliability scorecard which evaluates long-term durability and performance. We continue to devote substantial resources to continually improving the wattage and energy yield of our solar modules. Improvements in PV solar module efficiency drive reductions in the costs of PV solar thereby expanding PV markets and displacing electricity generated by fossil fuels. We also focus our R&D activities on continuously improving module durability and manufacturing efficiencies, including throughput improvement, volume ramp, and material cost reduction. Based on publicly available information, we are one of the leaders in R&D investment among PV solar module manufacturers, maintaining a rate of innovation that enables rapid wattage gains and cost reductions. Climate change impacts that affect product functionality were informed by our climate scenario analysis.
Operations	Yes	Climate-related risks and opportunities influence our manufacturing operations strategy in the near-, medium- and long-term. Climate mitigation strategies drive demand for our products our climate scenario confirmed growth opportunities in high climate mitigation scenarios such as RCP 2.6. As a result of the growing demand for our solar products, our annual manufacturing capacity has grown from 25 megawatts (MW) in 2005 to 7.9 gigawatts (GW) as of December 31, 2021. The most substantial decision in 2021 was setting the foundation to reach approximately 16 GW of capacity in 2024 with the announced plans for new factories in Ohio and India to produce our next generation of solar panels, which we are calling Series 7. The two Series 7 factories are expected to come online in 2023. We assess climate-related risks such as flooding and natural disasters which have the potential to affect our manufacturing operations. We mitigate such risks by distributing our manufacturing capability across several sites. Stable access

		to electricity and water are also taken into account when siting new manufacturing facilities. As part of our own mitigation strategy we committed to being powered by 100% renewable electricity by 2028 and are considering renewable energy access into consideration for our new manufacturing sites. First Solar implements energy efficiency and low carbon initiatives as part of our standard manufacturing system design. We have installed onsite PV installations at our production sites in Ohio and Malaysia and at our recycling facility in Frankfurt Oder, Germany. We have set science-based targets to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028 and achieve net zero emissions by 2050, relative to 2020. These targets are in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. We aim to achieve this by increasing our energy efficiency, going 100% renewable across our U.S. operations by 2026, enabling the offsite solar market in Malaysia and Vietnam, and purchasing bundled RECs and offsets as a last resort.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Access to capital Assets	Both climate change risks and opportunities have influenced our financial planning. We are focused on minimizing risks for our factory locations and supply chain as it relates to the dollars that we are putting to work in manufacturing capex. Increases in the cost of electricity to power our manufacturing facilities (direct costs) or impacts to our supply chain which increase the cost of raw materials (indirect costs) can be impacted by climate change. As part of our own mitigation strategy we committed to being powered by 100% renewable electricity by 2028. As climate risks worsen, this increases awareness on the speed in which climate initiatives need to be implemented and in turn increases the overall demand for low carbon solar. The growing demand for renewable energy and our low carbon solar products directly influences our revenues. We continue to see strong demand for our solar products driven by climate mitigation strategies, with a record 17.5 GW of net

		bookings in 2021, and an end of- year backlog of 22 GW. Net sales for 2021 amounted to $2.9 billion, an approximate 8% increase compared to 2020. To meet this growing demand we are expanding our manufacturing operations (capital expenditures) over the next two years.

C4. Targets and performance

C4.1

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

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number

Abs 1

Year target was set

2021

Target coverage

Company-wide

Scope(s)

Scope 1

Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

Base year

2020

Base year Scope 1 emissions covered by target (metric tons CO2e)

7,037

Base year Scope 2 emissions covered by target (metric tons CO2e)

495,234

Base year Scope 3 emissions covered by target (metric tons CO2e)

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

502,271

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2028

Targeted reduction from base year (%)

33.6

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

333,507.944

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

8,536

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

551,674

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

560,210

% of target achieved relative to base year [auto-calculated]

-34.3315660271

Target status in reporting year

Underway

Is this a science-based target?

Yes, we consider this a science-based target, and we have committed to seek validation of this target by the Science Based Targets initiative in the next two years

Target ambition

1.5°C aligned

Please explain target coverage and identify any exclusions

After surpassing our 2021 intensity-based target three years early, we set a new science-based target to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028, relative to 2020. This target is in line with science-based climate goals to limit the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. Our 2028 absolute emissions reduction target is based on the Science Based Targets SBTi Target Setting Tool-v.2.0 “Absolute Contraction Approach".

Plan for achieving target, and progress made to the end of the reporting year

We have identified two possible paths to achieve our science-based target: 1) purchasing 100% renewable electricity in all manufacturing facilities by 2028; or 2) purchasing 100% renewable electricity in U.S. manufacturing facilities by 2026, purchasing 100% renewable electricity in India manufacturing facilities by 2028, and improving energy usage per watt produced by 30% by 2028, relative to 2020. First Solar is committed to driving down our carbon footprint even as we continue to increase our manufacturing capacity and module throughput. While our production increased by 29% during 2021, our absolute scope 1 and 2 emissions only increased by 12% from 502,271 metric tons CO2-eq in the base year (2020) to 560,210 metric tons CO2-eq in 2021.

List the emissions reduction initiatives which contributed most to achieving this target

---

Target reference number

Abs 2

Year target was set

2021

Target coverage

Company-wide

Scope(s)

Scope 1
Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

Base year

2020

Base year Scope 1 emissions covered by target (metric tons CO2e)

7,037

Base year Scope 2 emissions covered by target (metric tons CO2e)

495,234

Base year Scope 3 emissions covered by target (metric tons CO2e)

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

502,271

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2050

Targeted reduction from base year (%)

90

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

50,227.1

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

8,536

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

551,674

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

560,210

% of target achieved relative to base year [auto-calculated]

-12.8171179835

Target status in reporting year

Underway

Is this a science-based target?

Yes, we consider this a science-based target, and we have committed to seek validation of this target by the Science Based Targets initiative in the next two years

Target ambition

1.5°C aligned

Please explain target coverage and identify any exclusions

We committed to achieving net zero emissions by 2050 across scopes 1 and 2, in line with a 1.5°C warming scenario. Our 2050 net zero target is based on the SBTi Net-Zero Tool (v.1.0.3).

Plan for achieving target, and progress made to the end of the reporting year

The plan for achieving this target is to purchase 100% renewable electricity for all manufacturing sites.

List the emissions reduction initiatives which contributed most to achieving this target

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to increase low-carbon energy consumption or production
Net-zero target(s)

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number

Low 1

Year target was set

2020

Target coverage

Company-wide

Target type: energy carrier

Electricity

Target type: activity

Consumption

Target type: energy source

Renewable energy source(s) only

Base year

2020

Consumption or production of selected energy carrier in base year (MWh)

834,804

% share of low-carbon or renewable energy in base year

1

Target year

2028

% share of low-carbon or renewable energy in target year

100

% share of low-carbon or renewable energy in reporting year

1

% of target achieved relative to base year [auto-calculated]

0

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes. We set new science-based targets to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028 and achieve net zero emissions by 2050, relative to 2020. These targets are in line with science-based climate goals to limit the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. We aim to achieve this through increased energy efficiency, purchasing 100% renewable electricity across our U.S. operations by 2026, and purchasing 100% renewable electricity across our global operations by 2028 by working on enabling the offsite solar market in Malaysia and Vietnam, and purchasing bundled renewable energy credits (RECs) and offsets as a last resort.

Is this target part of an overarching initiative?

RE100

Please explain target coverage and identify any exclusions

In 2020, we joined RE100 and committed to powering our global operations with 100% renewable electricity by 2028. We have installed onsite PV installations at our production sites in Ohio and Malaysia and at our recycling facility in Frankfurt Oder, Germany. We are now investigating opportunities to procure offsite solar electricity as part of our renewable energy strategy.

Plan for achieving target, and progress made to the end of the reporting year

We aim to achieve this through increased energy efficiency, going 100% renewable across our U.S. operations by 2026, working on enabling the offsite solar market in Malaysia, Vietnam, and India, and purchasing bundled renewable energy credits (RECs) and offsets as a last resort.

List the actions which contributed most to achieving this target

Target reference number

Low 2

Year target was set

2020

Target coverage

Country/region

Target type: energy carrier

Electricity

Target type: activity

Consumption

Target type: energy source

Renewable energy source(s) only

Base year

2020

Consumption or production of selected energy carrier in base year (MWh)

263,589

% share of low-carbon or renewable energy in base year

1

Target year

2026

% share of low-carbon or renewable energy in target year

100

% share of low-carbon or renewable energy in reporting year

1

% of target achieved relative to base year [auto-calculated]

0

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes. We set new science-based targets to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028 and achieve net zero emissions by 2050, relative to 2020. These targets are in line with science-based climate goals to limit the global temperature rise to 1.5 degrees Celsius above pre-industrial levels. We aim to achieve this through increased energy efficiency, purchasing 100% renewable electricity across our U.S. operations by 2026, and purchasing 100% renewable electricity across our global operations by 2028 by working on enabling the offsite solar market in Malaysia and Vietnam, and purchasing bundled renewable energy credits (RECs) and offsets as a last resort.

Is this target part of an overarching initiative?

RE100

Please explain target coverage and identify any exclusions

In 2020, we joined RE100 and committed to powering our global operations with 100% renewable electricity by 2028, with an interim goal of transitioning our facilities in the United States to 100% renewable electricity by 2026.

Plan for achieving target, and progress made to the end of the reporting year

We aim to achieve this through increased energy efficiency and going 100% renewable across our U.S. operations by 2026. At the end of the reporting year, 1% of electricity consumption in U.S. operations was from renewable electricity through onsite solar arrays.

List the actions which contributed most to achieving this target

C4.2c

(C4.2c) Provide details of your net-zero target(s).

Target reference number

NZ1

Target coverage

Company-wide

Absolute/intensity emission target(s) linked to this net-zero target

Abs1
Abs2

Target year for achieving net zero

2050

Is this a science-based target?

Yes, we consider this a science-based target, and we have committed to seek validation of this target by the Science Based Targets initiative in the next 2 years

Please explain target coverage and identify any exclusions

We committed to a science-based target to reduce our absolute scope 1 and scope 2 GHG emissions by 34% by 2028, relative to 2020, and achieving net zero emissions by 2050 across scopes 1 and 2, both in line with a 1.5°C warming scenario. Our 2028 target is based on SBTi Target Setting Tool-v.2.0 “Absolute Contraction Approach", and our 2050 net zero target is based on the SBTi Net-Zero Tool (v.1.0.3).

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?

Yes

Planned milestones and/or near-term investments for neutralization at target year

Purchasing high quality carbon credits to neutralize residual emissions at target year consistent with SBTi guidance.

Planned actions to mitigate emissions beyond your value chain (optional)

N/A

C4.3

(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

C4.3a

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

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	4	
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	5	1,387
Not to be implemented	1	

C4.3b

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

Initiative category & Initiative type

Energy efficiency in buildings
Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)

69

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

13,300

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

21-30 years

Comment

Air Conditioning decommission and temperature/humidity control settings in Malaysia manufacturing facility.

Initiative category & Initiative type

Energy efficiency in buildings
Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

136

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

26,124

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

21-30 years

Comment

Optimizing/reducing production lighting in Malaysia manufacturing facility.

Initiative category & Initiative type

Energy efficiency in buildings

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

25

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

2,382

Investment required (unit currency – as specified in C0.4)

500

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Lighting motion sensor in Vietnam manufacturing facility.

Initiative category & Initiative type

Energy efficiency in buildings

Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)

1,082

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

95,912

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Increase production area ambient temperature in Vietnam manufacturing facility.

Initiative category & Initiative type

Energy efficiency in buildings

Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)

74

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

7,068

Investment required (unit currency – as specified in C0.4)

19,141

Payback period

1-3 years

Estimated lifetime of the initiative

3-5 years

Comment

Exhaust fan piping for cold air return in Vietnam manufacturing facility.

C4.3c

(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

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

The IEA Energy Technology Perspectives Clean Energy Technology Guide

Type of product(s) or service(s)

Description of product(s) or service(s)

Solar Photovoltaic, Thin-Film PV modules

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify

IEA 2021 grid electricity emission factors (Year 2019 data) - https://www.iea.org/data-and-statistics/data-product/emissions-factors-2021

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Use stage

Functional unit used

kWh

Reference product/service or baseline scenario used

World average grid electricity (year 2019)

Life cycle stage(s) covered for the reference product/service or baseline scenario

Use stage

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

4,950,000

Explain your calculation of avoided emissions, including any assumptions

Avoided emissions are calculated by multiplying a) annual electricity production (in kWh) from PV modules manufactured in 2021 assuming worldwide average irradiance by b) worldwide average grid electricity emission factor (g CO2-eq/kWh), and converting to metric tons CO2-eq.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

100

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

No

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in methodology	For market-based Scope 2 emissions reporting, we have added use of a market-based grid electricity emission factor for our Vietnam manufacturing facility, in addition to prior use of market-based grid electricity emission factors for U.S. and Malaysia manufacturing facilities. For location-based Scope 2 emissions reporting, we have added use of eGRID2020 grid electricity location-based emission factors for U.S. facilities and IEA (2021) grid electricity location-based emission factors for non-U.S. facilities, rather than the prior use of GHG Protocol Purchased Electricity Tool (V.4.8.0).

C5.1c

(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	No, because the impact does not meet our significance threshold	First Solar utilizes a 5% threshold for structural or methodology changes that may justify recalculating base year emissions. Although there was a methodology change for reporting year 2021, it did not affect the base year because the Vietnam manufacturing facility was not in operation during the base year and the prior use of the GHG Protocol Purchased Electricity Tool was representative of the base year.

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start
January 1, 2008

Base year end
December 31, 2008

Base year emissions (metric tons CO2e)
1,020

Comment

Scope 2 (location-based)

Base year start
January 1, 2008

Base year end
December 31, 2008

Base year emissions (metric tons CO2e)
123,046

Comment

Scope 2 (market-based)

Base year start
January 1, 2008

Base year end
December 31, 2008

Base year emissions (metric tons CO2e)
123,046

Comment

Scope 3 category 1: Purchased goods and services

Base year start
January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

1,227,987

Comment

Scope 3 category 2: Capital goods

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

295,327

Comment

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

17,235

Comment

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

12,558

Comment

Scope 3 category 5: Waste generated in operations

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
5,108

Comment

Scope 3 category 6: Business travel

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
573

Comment

Scope 3 category 7: Employee commuting

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
3,389

Comment

Scope 3 category 8: Upstream leased assets

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

47,250

Comment

Scope 3 category 10: Processing of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Scope 3 category 11: Use of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Scope 3 category 12: End of life treatment of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

1,290

Comment

Scope 3 category 13: Downstream leased assets

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
463

Comment

Scope 3 category 14: Franchises

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 15: Investments

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3: Other (upstream)

Base year start
January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Scope 3: Other (downstream)

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

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

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

8,536

Comment

C6.2

(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

C6.3

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

Reporting year

Scope 2, location-based

562,230

Scope 2, market-based (if applicable)

551,674

Comment

C6.4

(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

C6.5

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

Purchased goods and services

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,487,991

Emissions calculation methodology

Other, please specify

Life cycle assessment method

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

25

Please explain

Bill of materials for PV module manufacturing from a previous year were the basis for the life cycle assessment combined with modules produced in 2021. Specifically, emissions were based on life cycle assessment of First Solar PV module production and supply chain (Series 6 NEPD-2993-1671-EN 2021) and total modules produced in 2021, and subtracting 2021 Scope 1 and 2 emissions.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

382,979

Emissions calculation methodology

Spend-based method

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

25

Please explain

Capital expenditures on purchases of property, plant, and equipment were the basis for the estimate. Specifically, 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 2021 capital goods spend by a CO2 emission factor based on the broad sector of purchase.

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

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

27,584

Emissions calculation methodology

Average data method

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

25

Please explain

Quantities of purchased electricity were the basis for the estimate. Specifically, 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%.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

10,691

Emissions calculation methodology

Distance-based method

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

75

Please explain

GHG Emissions were extrapolated from glass and aluminum supply distances and transport methods combined with data on modules produced in 2021. Specifically, glass and aluminum supply distances to First Solar's manufacturing facilities used in conjunction with 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).

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

4,422

Emissions calculation methodology

Waste-type-specific method

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

100

Please explain

Quantities of disposed non-hazardous and hazardous waste were the basis for the estimate. In 2021, we disposed of 9.1 million kilograms of waste (or 9118 Tonnes). Note that approximately 43,6 million kilograms of waste (or 83% of the 52.7 million kilograms of total waste generated) were recycled in 2021. 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 CO2 generated during combustion processes is 44/12.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

443

Emissions calculation methodology

Supplier-specific method

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

100

Please explain

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 CO2 per passenger mile, respectively

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

3,190

Emissions calculation methodology

Average data method

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

25

Please explain

Number of full-time equivalent employees in 2021 was the basis for this estimate combined with assumptions regarding average employee commuting GHG emissions from the Quantis Scope 3 evaluator tool. A scaling factor of 0.25 was also applied to account for Flex work-from-home programs in 2021 due to the COVID-19 pandemic.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

Leased vehicles had previously been accounted for as part of First Solar's operations and maintenance (O&M) business unit. With the sale of the O&M business unit in a prior reporting year, leased vehicles are no longer relevant.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

67,257

Emissions calculation methodology

Distance-based method

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

25

Please explain

GHG Emissions were estimated from quantity of PV modules produced in 2021 in conjunction with port to port distance. Specifically, finished product (PV module) transport distances and transport methods (ship) from our manufacturing facilities 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).

Processing of sold products

Evaluation status

Not relevant, explanation provided

Please explain

Our products are not further processed. In less than 4 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

Emissions in reporting year (metric tons CO2e)

0

Emissions calculation methodology

Other, please specify

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

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

100

Please explain

Our products (PV modules) are electricity producing rather than energy consuming products, and 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 2021, First Solar produced 7.9 GWdc of PV solar modules. Assuming world-wide average irradiance and grid electricity emissions, we estimate that our 2021 products are being used to displace 5 million metric tons CO2e per year for the 30+ year product life.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

589

Emissions calculation methodology

Other, please specify

Life cycle assessment method

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

25

Please explain

GHG emissions were estimated from quantity of end of life PV modules recycled in 2021 in conjunction with an electricity consumption factor from a previous year's life cycle assessment. Specifically, 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, Vietnam, and Malaysia and market-specific GHG electricity emission factors. 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

Emissions in reporting year (metric tons CO2e)

333

Emissions calculation methodology

Average data method

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

25

Please explain

GHG emissions were estimated based on square footage of leased warehouse facilities. Electricity consumption per square foot for warehouse facilities from EIA CBECS database was used in conjunction with square footage from leased warehouse facilities and eGRID2020 grid electricity emission factor.

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

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

Investments

Evaluation status

Not relevant, explanation provided

Please explain

We had previously accounted for Scope 3 emissions from solar projects in the construction phase. With the sale of the engineering, procurement, and construction (EPC) business unit in a prior reporting year, these emissions are no longer relevant.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Please explain

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

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

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

C-CG6.6

(C-CG6.6) Does your organization assess the life cycle emissions of any of its products or services?

	Assessment of life cycle emissions	Comment
Row 1	Yes	

C-CG6.6a

(C-CG6.6a) Provide details of how your organization assesses the life cycle emissions of its products or services.

	Products/services assessed	Life cycle stage(s) most commonly covered	Methodologies/standards/tools applied	Comment
Row 1	All existing and new products/services	Cradle-to-grave	EU Product Environmental Footprint (EUPEF) French Product Environmental Footprint ISO 14025 ISO 14040 & 14044	

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

No

C6.10

(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

0.000192

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

560,210

Metric denominator

unit total revenue

Metric denominator: Unit total

2,923,377,000

Scope 2 figure used

Market-based

% change from previous year

3

Direction of change

Increased

Reason for change

In 2021, our absolute Scope 1 and 2 GHG emissions (560,210 MT CO2e) increased by 12% relative to 2020 (502,271 CO2e) due to increased manufacturing output with addition of Series 6 PV module production in Malaysia. Total revenue increased by a lesser rate of 8% in 2021 ($2.923 billion) compared to 2020 ($2.711 billion).

Intensity figure

116

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

560,210

Metric denominator

full time equivalent (FTE) employee

Metric denominator: Unit total

4,833

Scope 2 figure used

Market-based

% change from previous year

18

Direction of change

Increased

Reason for change

In 2021, our absolute Scope 1 and 2 GHG emissions (560,210 MT CO2e) increased by 12% relative to 2020 (502,271 CO2e) due to increased manufacturing output with addition of Series 6 PV module production in Malaysia, while FTE decreased by a rate of 5% from 5111 in 2020 to 4833 in 2021.

Intensity figure

71

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

560,210

Metric denominator

Other, please specify

MW of PV modules produced

Metric denominator: Unit total

7,877

Scope 2 figure used

Market-based

% change from previous year

13

Direction of change

Decreased

Reason for change

In 2021, our absolute Scope 1 and 2 GHG emissions (560,210 MT CO2e) increased by 12% relative to 2020 (502,271 CO2e) due to increased manufacturing output with addition of Series 6 PV module production in Malaysia, while production volume increased 29% from 6124 MW in 2020 to 7877 MW in 2021. In 2021, our GHG emissions intensity decreased by 13% compared to 2020 due to the greater throughput, the enhanced energy efficiency of our Series 6 manufacturing process, and emissions reduction initiatives such as energy efficiency measures.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

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	6,622	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	3	IPCC Fourth Assessment Report (AR4 - 100 year)

N2O	4	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	1,908	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	0	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	0	IPCC Fourth Assessment Report (AR4 - 100 year)
NF3	0	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	788
Malaysia	859
United States of America	5,450
Japan	0
Samoa	0
Chile	0
India	0
Viet Nam	1,440

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	8,114
Research and Development	408
Owned Operational Solar Projects	14

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	5,028	41.557058	-83.552515
Frankfurt-Oder, Germany	788	52.312919	14.481102
Kulim, Malaysia	859	5.428624	100.572598
Santa Clara, California, USA	408	37.371053	-121.951931
Mesa, Arizona, USA	0	33.32144	-111.65812
Ho Chi Minh City, Viet Nam	1,440	10.77653	106.70098

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	6,378
Mobile Source Emissions	23
Fugitive Emissions	1,908
Process Emissions	227

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)
Chile	988	988
Germany	822	291
India	115	115
Japan	1	1
Malaysia	225,194	180,453
Samoa	31	31
United States of America	134,092	108,097
Viet Nam	200,989	261,699

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 (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Manufacturing and Recycling	559,767	549,211
Research and Development	1,285	1,285
Owned Operational Solar Projects	1,178	1,178

C7.6b

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

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Perrysburg, Ohio, USA	132,763	106,768
Frankfurt-Oder, Germany	822	291
Kulim, Malaysia	225,194	180,453
Santa Clara, California, USA	1,148	1,148
Mesa, Arizona, USA	137	137
Owned Operational Solar Projects	1,178	1,178
Ho Chi Minh City, Viet Nam	200,989	261,699

C7.6c

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

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Purchased Electricity	562,230	551,674

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?

Increased

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 7.2 GWh/yr of electricity for self-consumption
Other emissions reduction activities	1,388	Decreased	0.28	First Solar implemented a lighting and temperature control project at its manufacturing facility in Malaysia, and lighting, ventilation, and temperature control projects at its manufacturing facility in Vietnam . These measures resulted in savings of 1388 metric tons CO2e from avoided electricity consumption in 2021. Our scope 1 and 2 emissions in the previous year (2020) amounted to 502,271 metric tons CO2e. We arrived at a 0.28% decrease in our gross global emissions through (1388/502271) *100 = 0.28%
Divestment	0	No change	0	Not applicable in 2021.
Acquisitions	0	No change	0	Not applicable in 2021.
Mergers	0	No change	0	Not applicable in 2021.
Change in output	143,775	Increased	29	From 2020 to 2021, First Solar increased its production of PV solar modules by 29% from 6.124GW to 7.877GW. This increased output corresponds to a increase of 143,775 metric tons CO2e of emissions, or 29% of the previous year's emissions through (143,775 / 502,271)*100 = 29%.
Change in methodology	387	Decreased	0.1	In 2021, First Solar changed the grid electricity emission factor for its Kulim, Malaysia facility from a supplier specific

				factor of 0.51 kg CO2e/kWh in 2020 to a supplier-specific factor of 0.53 kg CO2e/kWh in 2021. Use of the updated supplier specific factor resulted in a increase of 7,722 metric tons CO2e of emissions compared with using the 2020 factor. In 2021, First Solar changed the grid electricity emission factor for its Frankurt-Oder, Germany facility from a location specific factor of 0.475 kg CO2e/kWh in 2020 to a supplier-specific factor of 0.121 kg CO2e/kWh in 2021. Use of the updated supplier specific factor resulted in a decrease of 836 metric tons CO2e of emissions compared with using the 2020 factor. Also In 2021, First Solar changed the grid electricity emission factor for its Perrysburg, Ohio facility from a supplier specific factor of 0.386 kg CO2e/kWh in 2020 to a supplier-specific factor of 0.359 kg CO2e/kWh in 2021. Use of the updated supplier specific factor resulted in a decrease of 7273 metric tons CO2e of emissions compared with using the 2020 factor. The updated emissions factors for the three facilities account for a net decrease of 387 metric tons CO2e or 0.1% of the previous year's emissions through (-387)/502,271)*100 = -0.1%
Change in boundary	0	No change	0	Not applicable in 2021
Change in physical operating conditions	0	No change	0	Not applicable in 2021
Unidentified	0	No change	0	Not applicable in 2021
Other	84,061	Decreased	16.7	In 2021, higher Series 6 manufacturing throughput led to a reduction of manufacturing electricity usage, as Series 6 modules require less electricity per m2 of PV module production than Series 4 modules. This change led to a decrease

				of 84,061 metric tons CO2e of emissions, or 16.7% of the previous year's emissions through (-84,061/502,271)*100=-16.7%

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

C-CG7.10

(C-CG7.10) How do your total Scope 3 emissions for the reporting year compare to those of the previous reporting year?

Increased

C-CG7.10a

(C-CG7.10a) For each Scope 3 category calculated in C6.5, specify how your emissions compare to the previous year and identify the reason for any change.

Purchased goods and services

Direction of change

Increased

Primary reason for change

Change in output

Change in emissions in this category (metric tons CO2e)

260,004

% change in emissions in this category

21

Please explain

Emissions were calculated based on life cycle assessment of First Solar PV module production and total modules produced in 2021, and subtracting 2021 Scope 1 and 2 emissions. Since manufacturing output increased by 29% in 2021 compared to 2020, emissions from purchased goods and services increased approximately proportionally.

Capital goods

Direction of change

Increased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

87,652

% change in emissions in this category

30

Please explain

Capital expenditures on purchases of property, plant, and equipment were the basis for the estimate. These capital expenditures were 30% higher in 2021 than 2020 due to construction of new manufacturing facilities in USA and India.

Fuel and energy-related activities (not included in Scopes 1 or 2)

Direction of change

Increased

Primary reason for change

Change in methodology

Change in emissions in this category (metric tons CO2e)

10,349

% change in emissions in this category

60

Please explain

GHG emissions from transmission and distribution losses were estimated from market-based Scope 2 GHG emissions from purchased electricity in conjunction with a transmission and distribution loss factor of 5%. In 2021, Scope 2 GHG emissions in Vietnam were estimated with a market-based grid electricity emission factor instead of the location-based factor used in 2020.

Upstream transportation and distribution

Direction of change

Decreased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

1,867

% change in emissions in this category

15

Please explain

Upstream transportation and distribution emissions were estimated based on raw material weight and distance (tonne-km) supplied to First Solar's manufacturing facilities, which were reduced in 2021 compared to 2020 due to increased proportion of

Series 6 manufacturing compared to Series 4, with Series 6 having a lower transport factor (tonne-km per m2 of module) than Series 4.

Waste generated in operations

Direction of change

Decreased

Primary reason for change

Change in material efficiency

Change in emissions in this category (metric tons CO2e)

686

% change in emissions in this category

13

Please explain

Emissions were based on quantity of disposed waste from manufacturing facilities in conjunction with U.S. EPA mixed waste landfilling emission factor of 0.12 Metric Ton Carbon Equivalent /Ton. In 2021, 83% of total waste generated was recycled compared to 81% in 2020.

Business travel

Direction of change

Decreased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

130

% change in emissions in this category

23

Please explain

In 2021, travel restrictions due to the COVID-19 pandemic continued to keep business travel at a limited level.

Employee commuting

Direction of change

Decreased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

199

% change in emissions in this category

6

Please explain

In 2021, Flex telecommuting options due to the COVID-19 pandemic limited employee commuting comparably to 2020.

Downstream transportation and distribution

Direction of change

Increased

Primary reason for change

Change in output

Change in emissions in this category (metric tons CO2e)

20,007

% change in emissions in this category

42

Please explain

In 2021, manufacturing production increased by 29% relative to 2020, resulting in an increase in downstream transportation.

Use of sold products

Direction of change

No change

Please explain

Our products are classified as zero-emission electricity generation technologies.

End-of-life treatment of sold products

Direction of change

Decreased

Primary reason for change

Change in methodology

Change in emissions in this category (metric tons CO2e)

700

% change in emissions in this category

54

Please explain

In 2021, a supplier-specific grid electricity emission factor (0.121 kg CO2-eq/kWh) was used for our Frankfurt-Oder, Germany recycling facility which was lower than the location-specific factor used in 2020 (0.475 kg CO2-eq/kWh).

Downstream leased assets

Direction of change

Decreased

Primary reason for change

Change in methodology

Change in emissions in this category (metric tons CO2e)

130

% change in emissions in this category

28

Please explain

GHG emissions were estimated based on square footage of leased warehouse facilities, which did not change from 2020 to 2021. However, in 2021, eGRID2020 grid electricity emission factor was used instead of the use of the GHG Protocol Purchased Electricity Tool (V. 4.8) in 2020.

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 undertook this energy-related activity in the reporting year
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 (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	30,425	30,425
Consumption of purchased or acquired electricity		0	952,500	952,500
Consumption of self-generated non-fuel renewable energy		7,172		7,172
Total energy consumption		7,172	982,925	990,097

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 heat	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.

Sustainable biomass

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Comment

Biomass fuel was not used in 2021.

Other biomass

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Comment

Biomass fuel was not used in 2021.

Other renewable fuels (e.g. renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Comment

Other renewable fuel was not used in 2021.

Coal

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Comment

Coal was not used in 2021.

Oil

Heating value

HHV

Total fuel MWh consumed by the organization

295

MWh fuel consumed for self-generation of electricity

255

MWh fuel consumed for self-generation of heat

0

Comment

Diesel is used in testing backup power generators at manufacturing facilities and accounts for most of annual oil consumption. The remainder is gasoline for transportation (owned Box Truck).

Gas

Heating value

HHV

Total fuel MWh consumed by the organization

30,131

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

30,131

Comment

Natural gas is used for building heating.

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Comment

Other non-renewable fuel was not used in 2021.

Total fuel

Heating value

HHV

Total fuel MWh consumed by the organization

30,425

MWh fuel consumed for self-generation of electricity

255

MWh fuel consumed for self-generation of heat

30,131

Comment

Oil for testing diesel generators and natural gas heating account for most of annual fuel consumption. The remainder is gasoline for transportation (owned Box Truck).

C8.2d

(C8.2d) 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	7,172	7,172	7,172	7,172
Heat	0	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

C8.2g

(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.

Country/area

United States of America

Consumption of electricity (MWh)

300,822

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

300,822

Is this consumption excluded from your RE100 commitment?

No

Country/area

Malaysia

Consumption of electricity (MWh)

338,688

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

338,688

Is this consumption excluded from your RE100 commitment?

No

Country/area

Viet Nam

Consumption of electricity (MWh)

308,171

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

308,171

Is this consumption excluded from your RE100 commitment?

No

Country/area

Germany

Consumption of electricity (MWh)

2,373

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2,373

Is this consumption excluded from your RE100 commitment?

No

Country/area

India

Consumption of electricity (MWh)

158

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

158

Is this consumption excluded from your RE100 commitment?

No

Country/area

Japan

Consumption of electricity (MWh)

1

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1

Is this consumption excluded from your RE100 commitment?

No

Country/area
Chile

Consumption of electricity (MWh)
2,227

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2,227

Is this consumption excluded from your RE100 commitment?
No

Country/area
Samoa

Consumption of electricity (MWh)
60

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

60

Is this consumption excluded from your RE100 commitment?
No

C8.2h

(C8.2h) Provide details of your organization's renewable electricity purchases in the reporting year by country

Country/area of renewable electricity consumption
United States of America

Sourcing method
Direct procurement from an offsite grid-connected generator e.g. Power Purchase Agreement (PPA)

Renewable electricity technology type

Solar

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)

0

Tracking instrument used

Contract

Total attribute instruments retained for consumption by your organization (MWh)

0

Country/area of origin (generation) of the renewable electricity/attribute consumed

United States of America

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2,021

Vintage of the renewable energy/attribute (i.e. year of generation)

2021

Brand, label, or certification of the renewable electricity purchase

No brand, label, or certification

Comment

First Solar is working with large-scale solar developers to evaluate potential PPA/VPPA terms for procurement of off-site utility-scale solar energy in the USA, but has not yet contracted with a third-party.

Country/area of renewable electricity consumption

Viet Nam

Sourcing method

Direct procurement from an offsite grid-connected generator e.g. Power Purchase Agreement (PPA)

Renewable electricity technology type

Solar

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)

0

Tracking instrument used

Contract

Total attribute instruments retained for consumption by your organization (MWh)

0

Country/area of origin (generation) of the renewable electricity/attribute consumed

Viet Nam

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2,021

Vintage of the renewable energy/attribute (i.e. year of generation)

2021

Brand, label, or certification of the renewable electricity purchase

No brand, label, or certification

Comment

In Viet Nam, First Solar has joined a consortium of 29 brands urging the Viet Nam government to introduce direct power purchase agreements (DPPA) between private buyers and sellers of renewable energy. Currently, energy users can only buy electricity through the national utility or through small-scale projects such as rooftop solar panels, so First Solar has not yet contracted with a third-party for a PPA.

C8.2j

(C8.2j) Provide details of your organization's renewable electricity generation by country in the reporting year.

Country/area of generation

United States of America

Renewable electricity technology type

Solar

Facility capacity (MW)

2.75

Total renewable electricity generated by this facility in the reporting year (MWh)

3,372

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were not issued (MWh)

3,372

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were issued and retired (MWh)

0

Renewable electricity sold to the grid in the reporting year (MWh)

0

Certificates issued for the renewable electricity that was sold to the grid (MWh)

0

Certificates issued and retired for self-consumption for the renewable electricity that was sold to the grid (MWh)

0

Type of energy attribute certificate

Total self-generation counted towards RE100 target (MWh) [Auto-calculated]

3,372

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.

Country/area of generation

Germany

Renewable electricity technology type

Solar

Facility capacity (MW)

2.9

Total renewable electricity generated by this facility in the reporting year (MWh)

2,705

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were not issued (MWh)

2,705

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were issued and retired (MWh)

0

Renewable electricity sold to the grid in the reporting year (MWh)

0

Certificates issued for the renewable electricity that was sold to the grid (MWh)

0

Certificates issued and retired for self-consumption for the renewable electricity that was sold to the grid (MWh)

0

Type of energy attribute certificate

Total self-generation counted towards RE100 target (MWh) [Auto-calculated]

2,705

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.

Country/area of generation

Malaysia

Renewable electricity technology type

Solar

Facility capacity (MW)

0.75

Total renewable electricity generated by this facility in the reporting year (MWh)

1,095

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were not issued (MWh)

1,095

Renewable electricity directly consumed by your organization from this facility in the reporting year for which certificates were issued and retired (MWh)

0

Renewable electricity sold to the grid in the reporting year (MWh)

0

Certificates issued for the renewable electricity that was sold to the grid (MWh)

0

Certificates issued and retired for self-consumption for the renewable electricity that was sold to the grid (MWh)

0

Type of energy attribute certificate

Total self-generation counted towards RE100 target (MWh) [Auto-calculated]

1,095

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.

C8.2k

(C8.2k) Describe how your organization's renewable electricity sourcing strategy directly or indirectly contributes to bringing new capacity into the grid in the countries/areas in which you operate.

Our strategy is to phase in a mix of self-generation, physical and/or virtual PPA, and green tariffs and/or energy attribute certificates to meet RE100 commitments. The first two approaches are our preference and would directly contribute to bringing new renewable capacity into the grid.

C8.2l

(C8.2l) In the reporting year, has your organization faced any challenges to sourcing renewable electricity?

	Challenges to sourcing renewable electricity
Row 1	Yes, in specific countries/areas in which we operate

C8.2m

(C8.2m) Provide details of the country-specific challenges to sourcing renewable electricity faced by your organization in the reporting year.

Country/area	Reason(s) why it was challenging to source renewable electricity within selected country/area	Provide additional details of the barriers faced within this country/area
Malaysia	Lack of electricity market structure supporting bilateral PPAs	Direct power purchase agreements (DPPA) between private buyers and sellers of renewable energy are not currently available in Malaysia.
Viet Nam	Lack of electricity market structure supporting bilateral PPAs	Direct power purchase agreements (DPPA) between private buyers and sellers of renewable energy are not currently available in Viet Nam. First Solar has joined a consortium of 29 brands urging the Viet Nam government to introduce DPPA. Currently, energy users can only buy electricity through the national utility or through small-scale projects such as rooftop solar panels.

C-CG8.5

(C-CG8.5) Does your organization measure the efficiency of any of its products or services?

	Measurement of product/service efficiency	Comment
Row 1	Yes	While PV modules are electricity generating (not energy-consuming) devices, the module conversion efficiency is a standard measurement of product efficiency.

C-CG8.5a

(C-CG8.5a) Provide details of the metrics used to measure the efficiency of your organization's products or services.

Category of product or service

Solar energy equipment

Product or service (optional)

Photovoltaic module

% of revenue from this product or service in the reporting year

80

Efficiency figure in the reporting year

0.181

Metric numerator

Other, please specify

kilowatt

Metric denominator

square meter

Comment

In 2021, First Solar Series 6 Plus PV modules ranged from 17.5-18.7% module conversion efficiency, corresponding to 0.175-0.187 kilowatt per m2, or 440-470 watt per module, given 2.52 m2 per module.

C9. Additional metrics

C9.1

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

Description

Waste

Metric value

6.7

Metric numerator

grams

Metric denominator (intensity metric only)

Watt produced

% change from previous year

9.5

Direction of change

Decreased

Please explain

In 2021, our manufacturing waste intensity decreased by nearly 10% primarily due to increased throughput, manufacturing yield improvements and less waste generated per watt produced.

Description

Energy usage

Metric value

0.12

Metric numerator

kilowatt hours

Metric denominator (intensity metric only)

Watt produced

% change from previous year

7.7

Direction of change

Decreased

Please explain

In 2021, our manufacturing energy intensity (energy consumption per watt produced) decreased by approximately 8% compared to 2020 primarily due to the greater throughput and enhanced energy efficiency of our Series 6 manufacturing process.

Description

Other, please specify

Water

Metric value

0.41

Metric numerator

Liters

Metric denominator (intensity metric only)

Watt produced

% change from previous year

31.7

Direction of change

Decreased

Please explain

In 2021, First Solar's manufacturing water intensity decreased by approximately 32% due to the increased throughput and efficiency of our Series 6 manufacturing process as well as water recycling initiatives.

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	

C-CG9.6a

(C-CG9.6a) Provide details of your organization's investments in low-carbon R&D for capital goods products and services over the last three years.

Technology area

Renewable energy

Stage of development in the reporting year

Large scale commercial deployment

Average % of total R&D investment over the last 3 years

81 - 100%

R&D investment figure in the reporting year (optional)

99,115,000

Comment

Our R&D model differentiates us from much of our competition due to its vertical integration, from advanced research to product development, manufacturing, and applications. We continue to devote substantial resources to our R&D efforts, which generally focus on continually improving the wattage and energy yield of our solar modules. We also focus our R&D activities on continuously improving module durability and manufacturing efficiencies, including throughput improvement, volume ramp, and material cost reduction.

C10. Verification

C10.1

(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

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

Verification or assurance cycle in place
Triennial process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement

First Solar Inc CY 2021 CDP Letter Final issued 20220613.pdf

Page/ section reference
Pages 1-2

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1b

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

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Triennial process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement

First Solar Inc CY 2021 CDP Letter Final issued 20220613.pdf

Page/ section reference

Pages 1-2

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 2 approach

Scope 2 location-based

Verification or assurance cycle in place

Triennial process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

First Solar Inc CY 2021 CDP Letter Final issued 20220613.pdf

Page/ section reference

Pages 1-2

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

C10.2

(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

C11.1

(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

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

No

C11.3

(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

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers

Yes, our customers/clients

Yes, other partners in the value chain

C12.1a

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

Type of engagement

Information collection (understanding supplier behavior)

Details of engagement

Other, please specify

assess conformance to RBA code of conduct including whether supplier has targets in place to reduce energy and GHG emissions among other criteria

% of suppliers by number

1

% total procurement spend (direct and indirect)

9

% of supplier-related Scope 3 emissions as reported in C6.5

7

Rationale for the coverage of your engagement

All new suppliers undergo a rigorous qualification process using a balanced scorecard which focuses on Quality, Cost, Flexibility, Service, Technology and Sustainability. We leverage third-party tools and indexes on environmental, social, governance (ESG) aspects to identify high-risk suppliers based on industry, geography and spend. In 2021, seven audits were conducted on new and high-risk suppliers. The suppliers we engaged represented 9% of our total procurement spend and 7% of our total scope 3 emissions in 2020. This was estimated based on 9% of our 2021 Scope 3 emissions from purchased goods and services (1,487,991 metric tons CO2-eq) which amounts to 133,919 metric tons CO2-eq, divided by total 2021 scope 3 emissions (1,985,479) = 7% of total scope 3 emissions.

Impact of engagement, including measures of success

The impact of the engagement and measures of success included assessing our suppliers' conformance to the Responsible Business Alliance (RBA) code of conduct which includes environmental criteria such as air emissions, energy consumption and GHG, water management, pollution prevention and resource reduction among other topics. Measures of success included putting corrective actions in place when potential negative impacts were identified. There were zero priority non-conformances and only one (or 14%) of the suppliers were identified as having significant actual or potential negative
environmental impacts. Two major environmental non-conformances were identified. Corrective action plans were put in place for the supplier in Malaysia to conduct scheduled waste vendor assessments and revise its environmental discharge management procedure.

Comment

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Run a campaign to encourage innovation to reduce climate impacts on products and services

% of suppliers by number

1

% total procurement spend (direct and indirect)

22

% of supplier-related Scope 3 emissions as reported in C6.5

16

Rationale for the coverage of your engagement

We are engaging with key suppliers that account for more than 50% of our product's carbon footprint to reduce life cycle impacts in our supply chain (scope 3). The suppliers we engaged represented 22% of our total procurement spend and 16 % of our total scope 3 emissions in 2021. This was estimated based on 22% of our 2020 Scope 3 emissions from purchased goods and services (1,487,991 metric tons CO2-eq) which amounts to 327,358 metric tons CO2-eq, divided by total 2020 scope 3 emissions (1,985,479) = 16% of total scope 3 emissions.

Impact of engagement, including measures of success

The impact of the engagement was identifying opportunities to reduce our scope 3 emissions to help meet our science-based targets. Measures of success include reducing the embodied carbon of our product by 44% by 2028. Positive outcome of the engagement was identifying suppliers that have set science-based targets as well as identifying a path forward to further reduce the carbon footprint of our product.

Comment

C12.1b

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

Type of engagement & Details of engagement

Education/information sharing

Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

0

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

We share information about the sustainability advantage and carbon footprint of our product with all our customers whether it is to help them meet government mandated renewable portfolio standards, their own carbon mitigation/neutrality goals, or carbon footprint criteria in solar tenders e.g. in France. We also educate our customers on the importance of considering the embodied carbon of solar PV modules to enable greater decarbonization. All PV technologies are not created equal. Where and how a PV module and its components are manufactured significantly impacts its environmental profile. First Solar’s advanced thin film modules are manufactured in a high throughput, automated environment that integrates all manufacturing steps into a continuous flow operation under one roof, using less energy, water and semiconductor material than

conventional crystalline silicon PV manufacturing. Due to our resource-efficient manufacturing process, First Solar modules have a carbon footprint that is up to 2.5 times lower, a water footprint that is up to three times lower and an energy payback time that is up to two times faster on a life cycle basis than conventional crystalline silicon solar panels manufactured in China. Since our products (solar PV modules) are clean energy producing rather than energy consuming products, they represent 0% of our scope 3 emissions.

Impact of engagement, including measures of success

One of the impacts of engagement is that we see customers driving demand for responsible solar, even in markets without carbon footprint requirements. Corporate renewable energy buyers in particular are increasingly looking to go "Beyond the Megawatt" of renewables that they are purchasing to ensure their projects are as environmentally and socially responsible as possible. Measures of success include customers requesting lower-carbon solar or EPEAT-registered PV modules in their RFPs. These engagements receive high priority as they are commercial opportunities.

Type of engagement & Details of engagement

Collaboration & innovation

Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

0

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

We partner with the Clean Energy Buyer's Institute (CEBI) to raise awareness about the importance of reducing the embodied carbon of solar to help drive demand for low carbon solar. CEBI's Decarbonizing Industrial Supply Chain Energy (DISC-e) program uses the collective power of large consumers to accelerate the market for low-carbon industrial commodities that use carbon-free energy. Since our products (solar PV modules) are clean energy producing rather than energy consuming products, our customers' emissions represent 0% of our scope 3 emissions. The campaign focuses on reducing the embodied carbon of solar because if the growth of solar manufacturing remains concentrated in carbon-intensive grids such as China, emissions from the solar manufacturing industry could exceed those by the aluminum sector by 2040.

Impact of engagement, including measures of success

The impact of the engagement in 2021 was the launch of CEBI's low carbon solar campaign in 2022. This included the development of suite of educational materials for stakeholders along the solar supply chain to consider the impact of embodied carbon emissions. The campaign also shared resources such as A letter for suppliers to signal energy customers' collective intent to prioritize embodied carbon in solar PV procurement and RFP guidance to help integrate low carbon solar preferences into

procurement documents. Measures of success will be seeing customers include low carbon solar criteria in their RFPs. To learn more, please visit: https://cebi.org/programs/disc-e/#:~:text=The%20Decarbonizing%20Industrial%20Supply%20Chain%20Energy%20%28DISC-e%29%20program,for%20low-carbon%20industrial%20commodities%20that%20use%20carbon-free%20energy.

C12.1d

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

Over the past few years, we participated in a multi-stakeholder process led by the Green Electronics Council and NSF international to develop the industry's first sustainability leadership standard for PV modules and inverters (NSF/ANSI 457- 2019) which includes criteria on energy and water efficiency, GHG emissions, and corporate sustainability reporting. PV modules and inverters conforming to NSF 457 are added to the EPEAT registry for sustainable electronics. In 2020, First Solar Series 6 modules became the first PV product to be included in the EPEAT registry for sustainable electronics. EPEAT is a globally recognized and independently validated ecolabel that allows for the easy identification of environmentally preferable products from socially responsible companies. EPEAT addresses the full product life cycle, including managing substances in the product, manufacturing energy and water use, product packaging, end-of-life recycling, corporate responsibility and human rights. Our Series 6 and Series 6 *Plus* products were awarded an EPEAT Silver rating, certifying that they exceed the basic but stringent environmental and social criteria of a Bronze rating. To learn more, please visit: https://www.epeat.net/

In 2020, we joined the Ultra Low-Carbon Solar Alliance (ULCSA) as a founding member. The ULCSA consists of companies across the solar PV value chain and other stakeholders committed to expanded market awareness and deployment of ultra low-carbon PV to accelerate reductions in solar supply chain GHG emissions. The Alliance runs campaigns to educate renewable energy buyers on the importance of taking into account the GHG emissions in the solar supply chain and selecting low-carbon solar solutions. To learn more, please visit: https://ultralowcarbonsolar.org/

In 2021, we participated in the development of the ultra low-carbon solar criteria for EPEAT to help drive demand for low-carbon solar products.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization’s purchasing process?

Yes, climate-related requirements are included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization’s purchasing process and the compliance mechanisms in place.

Climate-related requirement

Complying with regulatory requirements

Description of this climate related requirement

First Solar's supplier agreements require compliance with applicable laws and regulations in addition to First Solar requirements, which may exceed local legal requirements. Under the terms of First Solar's supplier agreements, suppliers must commit to comply with the Responsible Business Alliance (RBA) Code of Conduct and require their suppliers to do
the same. The RBA code of conduct includes climate-related criteria including air emissions management, energy and GHG emissions reduction, and water management among other topics.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Supplier self-assessment
Second-party verification
On-site third-party verification
Grievance mechanism/Whistleblowing hotline
Supplier scorecard or rating

Response to supplier non-compliance with this climate-related requirement

Suspend and engage

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers
Yes, we engage indirectly through trade associations

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

No, but we plan to have one in the next two years

Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

First Solar's VP of Global Policy, Public Sentiment and Sustainability is part of the cross-functional environmental, social, and governance (ESG) taskforce that is responsible for identifying strategic ESG risks, opportunities, gaps and challenges, anticipating ESG trends that could impact the company, and proposing new ESG policies, practices, targets, metrics and disclosures. First Solar's ESG focus leaders help advance the company's approach to Responsible Solar by driving progress on key strategic ESG areas including Public Policy and Public Sentiment among other topics.

Our commitment to 'Responsible Solar' drives our company's ESG strategy and differentiation and is interwoven into every aspect of our business and product lifecycle-from raw material sourcing to end-of-life recycling. This includes manufacturing using less energy, water and semiconductor, enabling faster decarbonization through lower embodied carbon, and maximizing resource recovery to enhance circularity. First Solar engages with universities and the wider scientific community to drive our R&D efforts, reduce the environmental footprint of our products, advance PV recycling technology and enhance circularity in line with our commitment to Responsible Solar and our overarching ESG strategy.

In our external communications, we frequently highlight the urgent need for a responsible approach to solar manufacturing and deployment as the fight against climate change accelerates and companies and governments commit to going Net Zero to limit global warming to 1.5 degrees Celsius. How and where solar panels and their components are manufactured determines how many greenhouse gas emissions they will be able to avoid and displace. Our thin film CdTe solar modules manufactured in the U.S. have a carbon footprint that is 2.5 times lower than conventional crystalline silicon modules manufactured in China.

ESG progress updates, including key areas such as public policy, are provided on a quarterly basis to the ESG steering committee, which consists of our executive leadership team. Updates on ESG focus areas including public policy are provided on a biannual or more frequent basis to the Board's Nominating and Governance committee which, pursuant to its charter, reviews the Company's ESG strategy, policies and initiatives (other than initiatives delegated to other committees). This ESG oversight at the board and executive leadership levels helps ensure alignment across the company.

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?

Focus of policy, law, or regulation that may impact the climate

Other, please specify

incentives for domestic solar manufacturing

Specify the policy, law, or regulation on which your organization is engaging with policy makers

The Solar Energy Manufacturing for America Act (currently included in the Inflation Reduction Act) would establish a tax credit for domestic solar manufacturers to help boost the U.S. solar supply chain, create American jobs, compete with Chinese manufacturers and support energy independence.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

United States of America

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

First Solar supported and continues to support the bill both directly and indirectly as a member of the SEMA coalition. We consistently advocate for an industrial policy that identifies clean tech manufacturing as a national strategic priority to advance US energy independence. To ensure the timely passage and implementation of the tax credit, solar manufacturing companies with U.S. operations came together informally as the SEMA Coalition. Together, the manufacturers within this coalition represent more than 6,100 workers in the United States. The SEMA Act presents a unique opportunity to pass a suite of policies to rebuild a competitive, environmentally friendly, and socially-responsible U.S. solar supply chain.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Renewable energy generation
Subsidies for renewable energy projects
Other, please specify
domestic solar manufacturing tax credits

Specify the policy, law, or regulation on which your organization is engaging with policy makers

In 2021, the U.S. House of Representatives passed the Build Back Better Act, a $1.75 trillion budget deal with historic investments in climate change mitigation and renewable energy. The Act included domestic solar manufacturing credits and an extension of

commercial investment tax credit among other items. Build Back Better could have had a tremendous positive impact on the solar industry if it had been enacted into law.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

United States of America

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

First Solar engaged directly and indirectly with policy makers to support this bill with no exceptions. This engagement was in line with the goals of the Paris Climate Agreement.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Other, please specify

Section 201 Solar Tariffs

Specify the policy, law, or regulation on which your organization is engaging with policy makers

The Section 201 Tariffs were intended provide relief to U.S. manufacturers and impose safeguard tariffs on imported solar cells and modules, based on the investigations, findings, and recommendations of the independent, bipartisan U.S. International Trade Commission (ITC). In February 2022, President Biden announced an extension for an additional four years with a modification which included an exemption for bifacial solar panels. This decision was taken despite the ITC recommending an extension of the safeguard tariffs for an additional four years in November 2021. Bifacial is the dominant Chinese solar product today.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

United States of America

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

First Solar supported the extension of the Section 201 Tariffs without a bifacial exemption. We consistently advocate for an industrial policy that identifies clean tech manufacturing as a national strategic priority to advance US energy independence. We believe that this type of policy would be promoted through incentives for domestic manufacturing, continued investment in advanced technologies, closing Buy American loopholes, and tariff reform. Our position is aligned with the goals of the Paris Agreement. According to a recent study by the U.S. National Renewable Energy Laboratory, continuing to rely on silicon solar modules produced in coal-intensive grids, such as those in China, could consume as much as 14% of the remaining carbon budget that can be emitted before exceeding the 1.5 degrees Celsius limit. In the context of the fight against climate change, it is important to recognize that not all solar panels are created equal - how and where they are manufactured determines how many greenhouse gas emissions they will be able to avoid and displace. Thin film CdTe solar modules manufactured in the U.S. have a carbon footprint that is 2.5 times lower than conventional crystalline silicon modules manufactured in China.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Traceability requirements

Specify the policy, law, or regulation on which your organization is engaging with policy makers

The Uyghur Forced Labor Prevention Act (UFLPA) was enacted to strengthen the existing prohibition against the importation of goods made wholly or in part with forced labor into the United States and to end the systematic use of forced labor in the Xinjiang Uyghur Autonomous Region. The UFLPA establishes a rebuttable presumption that the importation of any goods, wares, articles, and merchandise mined, produced, or manufactured wholly or in part in the Xinjiang Uyghur Autonomous Region of the People's Republic of China, or produced by certain entities, is prohibited by Section 307 of the Tariff Act of 1930 and that such goods, wares, articles, and merchandise are not entitled to entry to the United States. The UPLPA was signed into law by President Biden on December 23, 2021 after it passed with overwhelming bipartisan support in the United States Congress.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

United States of America

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

First Solar submitted public comments to the Forced Labor Enforcement Task Force in response to the Department of Homeland Security's Federal Register notice seeking public comments on methods to prevent the importation into the United States of goods made with forced labor in China, particularly in the Xinjiang Uyghur Autonomous Region. It is a misconception that policymakers have to choose between fighting climate change and nurturing responsible, lower-carbon solar supply chains. According to a recent study by the U.S. National Renewable Energy Laboratory, continuing to rely on silicon solar modules produced in coal-intensive grids, such as those in China, could consume as much as 14% of the remaining carbon budget that can be emitted before exceeding the 1.5 degrees Celsius limit. The choice of solar technologies that will power the clean energy transition directly influences whether the transition is just and sustainable.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3b

(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association

Other, please specify

Clean Energy Buyers Association

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The Clean Energy Buyers Association (CEBA) is a business association that activates a community of energy customers and partners to deploy market and policy solutions for a

carbon-free energy system. CEBA aspires to grow a global community of energy customers will allow its organizations to contribute to decarbonization of worldwide electricity by 60% by 2030 as established by the Intergovernmental Panel on Climate Change (IPCC). We work closely

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Climate Leadership Council

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

As a founding member, First Solar supports the Climate Leadership Council's mission and carbon dividends plan. If enacted, the Bipartisan Climate Roadmap would: a) cut U.S. CO2 emissions in half by 2035; b) provide families of four $2,000 a year; c) reduce unnecessary regulations; d) pay for itself; e) drive growth and innovation; and f) compel other countries to follow. “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

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Chesapeake Solar and Storage Association (CHESSA)

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The Chesapeake Solar & Storage Association seeks to strengthen the market for solar energy, and the storage thereof, in Maryland, Virginia and the District of Columbia. CHESSA strives to advance comprehensive, equitable policy and communications initiatives developed by a robust membership base. CHESSA members commit to industry best practices and responsible community development. Originally named the Maryland-DC-Virginia Solar Energy Industries Association (MDV-SEIA), CHESSA advances policy and regulations that build a robust and equitable solar and storage market in the region. 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.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Texas Solar Power Association

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We are planning to terminate our membership within the next two years

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

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

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

US Chamber of Commerce to the EU

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The American Chamber of Commerce to the EU is the voice of American companies invested in Europe. It is a horizontal association, regrouping companies of all sectors,

but very effective at making the voice of American FDI heard in Brussels. It has over 150 company members, and its policy work is organized in committees on specific policy areas. AmCham EU has always advocated for a stable and predictable framework for investments to tackle climate change. The U.S. Chamber of Commerce has asserted that the climate is changing, humans are contributing to these changes, and that inaction is not an option. In 2021, the Chamber welcomed President Biden's action to rejoin the Paris Climate Agreement. In AmCham EU's view, the Paris Agreement provides clear goals, as well as a balanced and cost-efficient approach to reduce emissions. AmCham EU is committed to sustainable growth and believes the fight against climate change will bring about long-term value creation in the US and EU. Amcham EU also believes U.S.-EU cooperation will be fundamental to ensuring the success of the climate and energy transitions underway.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Carolinas Clean Energy Business Association

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The CCEBA is a trade association for North and South Carolina's clean energy industry. CCEBA represents businesses throughout the clean energy sector, including independent power producers/developers as well as those in the clean energy supply chain. These include manufacturing, engineering, construction, financial and legal services, as well as businesses who want to purchase clean energy. CCEBA supports the clean energy industry and works to ensure that North Carolina and South Carolina have an environment where utility scale solar, energy storage, wind, solar power, bioenergy, and the manufacturing, engineering, and support services that depend on these industries compete fairly within the states' vertically integrated utility environment.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Utility Scale Solar Energy Coalition of Ohio (USSEC)

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

USSEC represents developers, manufacturers and industry leaders in Ohio working to meet the demand for clean energy and drive economic development benefitting Ohio's communities, schools and rural landowners. USSEC promotes the development of utility scale solar in Ohio.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

SolarPower Europe

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

SolarPower Europe (SPE) 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.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

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

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

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 regulatory measures in the context of Eco-Design and Energy Labelling Advocacy on raw materials and resource policy discussions. As a Board Member of the Association, First Solar supports and drives the engagement of the Association in relevant policy discussions related to solar energy.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.4

(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 voluntary sustainability report

Status

Complete

Attach the document

2022_Sustainability_Report_21JUL22.pdf

Page/Section reference

Pages 4-5; 6; 10-13; 18-21; 54

Content elements

Governance
Strategy
Emissions figures
Emission targets
Other metrics

Comment

Publication

In mainstream reports

Status

Complete

Attach the document

First-Solar-Annual-Report-2021-Web-version-(final-from-Merrill).pdf

Page/Section reference

2; 4; 9-10; 17; 19; 21; 134

Content elements

Strategy
Risks & opportunities
Other metrics

Comment

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity
Row 1	Yes, both board-level oversight and executive management-level responsibility	Pursuant to its charter, the Nominating and Governance Committee, one of the four committees of the Board of Directors, reviews the Company's environmental, social, and governance (ESG) strategy, policies and initiatives (other than initiatives delegated to other committees),. This can include biodiversity-related issues. First Solar's ESG Steering Committee, led by our Chief Executive Officer and consisting of our Executive Leadership Team, has the highest level of direct responsibility for ESG matters and reports into the Board of Directors on a biannual or more frequent basis. First Solar's ESG and Sustainability team coordinates the cross-functional taskforce of ESG focus leaders responsible for defining, measuring and reporting on progress to the ESG Steering Committee on a quarterly basis. First Solar's ESG focus leaders help advance

		the company's approach to Responsible Solar by driving progress on key strategic ESG areas.

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Other, please specify Our environmental, health and safety (EHS) policy includes a commitment to conserve natural resources, minimize waste, protect biodiversity and native habitats, and prevent pollution.	Other, please specify We previously worked with WWF to identify best practices for each stage of utility-scale PV power projects– from development to decommissioning- to demonstrate how solar can work in harmony with nature.

C15.3

(C15.3) Does your organization assess the impact of its value chain on biodiversity?

	Does your organization assess the impact of its value chain on biodiversity?
Row 1	Yes, we assess impacts on biodiversity in our downstream value chain only

C15.4

(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?
Row 1	No, we are not taking any actions to progress our biodiversity-related commitments, but we plan to within the next two years

C15.5

(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance

Row 1	No	

C15.6

(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located

C16. Signoff

C-FI

(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.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Chief Quality and Reliability Officer	Other C-Suite Officer

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

First Solar is a leading American solar technology company and global provider of responsibly-produced eco-efficient solar modules advancing the fight against climate change. We are unique among the world's ten largest solar manufacturers for being the only US-headquartered company and for not using a crystalline silicon (c-Si) semiconductor. Developed at R&D labs in California and Ohio, First Solar's advanced thin film photovoltaic (PV) modules represent the next generation of solar technologies, providing a competitive, high-performance, lower-carbon alternative to conventional c-Si PV panels. From raw material sourcing and manufacturing through end-of-life module recycling, First Solar's approach to technology embodies sustainability and a responsibility towards people and the planet. Our vision is to lead the world's sustainable energy future and 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 levelized 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
First Solar was founded in 1999 and began commercial production in 2002. Since 2002 and through 2021, we have sold 40 gigawatts (GW) of PV solar modules. Assuming average worldwide irradiance and grid electricity emissions, our products are being used to displace 26 million metric tons of CO2e per year during their 30+ year product life. This is equivalent to powering more than 20 million average homes, planting over 430 million trees and saving over 75 billion liters of water (or 30,000 Olympic swimming pools) per year based on worldwide averages. Every year, First Solar products are displacing more than 10 times the amount of greenhouse gas emissions we emit through our global operations and supply chain.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	2,923,377,000

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member
Burns & McDonnell

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail

Emissions in metric tonnes of CO2e
70

Uncertainty (±%)
10

Major sources of emissions

Natural gas and propane heat, diesel backup generators, owned vehicles, HVAC refrigerant leakage, and dry ice usage

Verified

Yes

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

65

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific allocation is not required. Scope 1 emissions accounting have low uncertainty due to use of utility bills and other detailed tracking of purchased quantities.

Requesting member

Burns & McDonnell

Scope of emissions

Scope 2

Allocation level

Allocation level detail

Emissions in metric tonnes of CO2e

4,552

Uncertainty (±%)

10

Major sources of emissions

Purchased electricity

Verified

Yes

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

65

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific allocation is not required. Scope 2 emissions accounting have low uncertainty due to use of utility bills.

Requesting member

Burns & McDonnell

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

16,384

Uncertainty (±%)

50

Major sources of emissions

Purchased goods and services and capital goods

Verified

No

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

65

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific allocation is not required. Scope 3 emissions accounting have high uncertainty due to use of screening level estimation methods where supplier data is not available.

Requesting member

Ørsted

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

114

Uncertainty (±%)

10

Major sources of emissions

Natural gas and propane heat, diesel backup generators, owned vehicles, HVAC refrigerant leakage, and dry ice usage

Verified

Yes

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

105

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific allocation is not required. Scope 1 emissions accounting have low uncertainty due to use of utility bills and other detailed tracking of purchased quantities.

Requesting member

Ørsted

Scope of emissions

Scope 2

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

7,354

Uncertainty (±%)

10

Major sources of emissions

Purchased electricity

Verified

Yes

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

105

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific

allocation is not required. Scope 2 emissions accounting have low uncertainty due to use of utility bills.

Requesting member

Ørsted

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

26,466

Uncertainty (±%)

50

Major sources of emissions

Purchased goods and services and capital goods

Verified

No

Allocation method

Allocation based on the number of units purchased

Market value or quantity of goods/services supplied to the requesting member

105

Unit for market value or quantity of goods/services supplied

Other, please specify

Megawatts

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Company-wide verified emissions inventory has been allocated to customer based on quantity of goods supplied in 2021 relative to total goods produced in 2021. Because First Solar only manufactures one product (PV modules), further product-specific allocation is not required. Scope 3 emissions accounting have high uncertainty due to use of screening level estimation methods where supplier data is not available.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Customer base is too large and diverse to accurately track emissions to the customer level	Better coordination between customer and supplier on record-keeping for timing and quantity of goods supplied.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

Better coordination between customer and supplier on record-keeping for timing and quantity of goods supplied.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

Requesting member

Burns & McDonnell

Group type of project

Other, please specify

Renewable energy project

Type of project

Other, please specify

Renewable energy project

Emissions targeted

Actions that would reduce our own operational emissions (our scope 1 & 2)

Estimated timeframe for carbon reductions to be realized

Other, please specify

15 years

Estimated lifetime CO2e savings

700,000

Estimated payback

Cost/saving neutral

Details of proposal

First Solar has committed to RE100 in its U.S. operations by 2026 and globally by 2028. To support these goals, First Solar may develop a request for proposals to source renewable electricity for its manufacturing facilities. For example, a 100 MW solar facility providing renewable electricity to First Solar's Perrysburg, Ohio manufacturing facility via PPA/VPPA could avoid ~700,000 metric tons CO2-eq over a 15 year power purchase agreement.

Requesting member

Ørsted

Group type of project

Other, please specify

Renewable energy project

Type of project

Other, please specify

Renewable energy project

Emissions targeted

Actions that would reduce our own operational emissions (our scope 1 & 2)

Estimated timeframe for carbon reductions to be realized

Other, please specify

15 years

Estimated lifetime CO2e savings

700,000

Estimated payback

Cost/saving neutral

Details of proposal

First Solar has committed to RE100 in its U.S. operations by 2026 and globally by 2028. To support these goals, First Solar may develop a request for proposals to source renewable electricity for its manufacturing facilities. For example, a 100 MW solar

facility providing renewable electricity to First Solar's Perrysburg, Ohio manufacturing facility via PPA/VPPA could avoid ~700,000 metric tons CO2-eq over a 15 year power purchase agreement.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Yes, I will provide data

SC4.1a

(SC4.1a) Give the overall percentage of total emissions, for all Scopes, that are covered by these products.

100

SC4.2a

(SC4.2a) Complete the following table for the goods/services for which you want to provide data.

Name of good/ service

PV module

Description of good/ service

Thin film PV module

Type of product

Final

SKU (Stock Keeping Unit)

kilowatt

Total emissions in kg CO2e per unit

267

±% change from previous figure supplied

Date of previous figure supplied

Explanation of change

First Solar Series 6 product life cycle carbon footprint is from NEPD-2993-1671-EN (https://www.epd-norge.no/solcellepaneler-og-komponenter/series-6-photovoltaic-module-article3438-552.html). Since this is the first environmental product declaration published by First Solar, a previous figure is not supplied.

Methods used to estimate lifecycle emissions

ISO 14025

SC4.2b

(SC4.2b) Complete the following table with data for lifecycle stages of your goods and/or services.

Name of good/ service

PV module

Please select the scope

Scope 1, 2 & 3

Please select the lifecycle stage

Cradle to gate

Emissions at the lifecycle stage in kg CO2e per unit

267

Is this stage under your ownership or control?

Yes

Type of data used

Primary and secondary

Data quality

Good to excellent based on pedigree matrix

If you are verifying/assuring this product emission data, please tell us how

Verified by Right Environment, independent verifier approved by EPD Norge.

SC4.2c

(SC4.2c) Please detail emissions reduction initiatives completed or planned for this product.

Name of good/ service	Initiative ID	Description of initiative	Completed or planned	Emission reductions in kg CO2e per unit

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

No

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below

I have read and accept the applicable Terms