Welcome to your CDP Climate Change Questionnaire 2023

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 2022, we have sold approximately 50 gigawatts (GW) of PV solar modules and have an additional backlog of ~70 GW. Assuming average worldwide irradiance and grid electricity emissions, our products will be used to displace 78 million metric tons of CO2e per year during their 30+ year product life. This is equivalent to powering more than 60 million average homes, planting 1.3 billion trees and saving over 225 billion liters of water (or 90,000 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 and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date

January 1, 2022

End date

December 31, 2022

Indicate if you are providing emissions data for past reporting years

No

C0.3

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

Chile
Germany
India
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 or committee	Responsibilities for climate-related issues
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. The Board's Nominating and Governance committee takes an active role in reviewing and overseeing the company's climate change goals and strategy, monitoring progress on environmental targets, as well as reviewing and overseeing the company's human rights due diligence efforts. 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 roadmap to Net Zero.

C1.1b

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

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing innovation/R&D priorities Reviewing and guiding strategy Overseeing and guiding the	The Board's Nominating and Governance Committee reviews and guides the company's climate change strategy, goals and targets. In 2022, First Solar submitted its science-based targets for validation by the Science-Based Targets Initiative and set a target to reduce its scope 3 GHG emissions intensity from purchased goods and services by 45% per MW produced by 2028, relative to 2020.

	development of a transition plan Monitoring the implementation of a transition plan Monitoring progress towards corporate targets Reviewing and guiding the risk management process	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 energy, water and greenhouse gas emissions targets. The ESG Steering Committee also provides updates on opportunities related to our approach Responsible Solar, which includes manufacturing ultra low-carbon solar modules and continuously driving down the environmental footprint of our products by designing for sustainability. In the context of the fight against climate change, all PV technologies are not created equal. Where and how a PV module and its components are manufactured significantly impacts its environmental profile and determines how many greenhouse gas emissions they will be able to avoid and displace. 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 and manufacturing to end-of-life recycling: • Operating a responsible supply chain with zero tolerance for forced labor • Manufacturing using less energy, water and semiconductor material • Enabling faster decarbonization through lower embodied carbon • Maximizing resource recovery to enhance circularity The Audit committee of the Board oversees financial risks, legal and compliance risks, information security risks (including cybersecurity), and other risk management functions. The Audit committee 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.

Position or committee

Chief Executive Officer (CEO)

Climate-related responsibilities of this position

Managing annual budgets for climate mitigation activities
Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
Managing climate-related acquisitions, mergers, and divestitures
Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets

Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Reports to the board directly

Frequency of reporting to the board on climate-related issues via this reporting line

Quarterly

Please explain

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, reviewing and approving global renewable energy project opportunities, monitoring manufacturing energy and water intensity, driving down the product carbon footprint and setting scope 3 emissions targets and engaging with carbon intensive suppliers, 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 and manufacturing 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

All employees

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary
Salary increase

Performance indicator(s)

Increased share of revenue from low-carbon products or services in product or service portfolio

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

First Solar's 2022 corporate bonus plan included a metric on net bookings of our low-carbon products. The Net bookings metric accounted for 25% of the 2022 Bonus Plan.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

First Solar is a global provider of responsibly produced eco-efficient solar modules advancing the fight against climate change. 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. Since 2002 and through 2022, we have sold approximately 50 gigawatts (GW) of PV solar modules and have an additional backlog of ~70 GW. Assuming average worldwide irradiance and grid electricity emissions, our products will be used to displace 78 million metric tons of CO2e per year

during their 30+ year product life. This is equivalent to powering more than 60 million average homes, planting 1.3 billion trees and saving over 225 billion liters of water (or 90,000 Olympic swimming pools) per year based on worldwide averages.
In the context of the fight against climate change, all PV technologies are not created equal. Where and how a PV module and its components are manufactured significantly impacts its environmental profile and determines how many greenhouse gas emissions they will be able to avoid and displace. Due to our resource-efficient manufacturing process, First Solar modules have the lowest carbon and water footprint and fastest energy payback time in the industry. Our Series 7 module has an even lower environmental footprint- with a carbon and water footprint that is nearly 4X lower than conventional crystalline silicon modules manufactured in China and an energy payback time that is approximately 5X faster.

Entitled to incentive

Corporate executive team

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary
Shares

Performance indicator(s)

Other (please specify)
Reducing the cost of low-carbon products

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

First Solar's corporate bonus plan (short-term incentive) and its Executive Performance Equity Plan (long-term incentive) included a metric on driving down the cost per watt of the company's low-carbon products.

Explain how this incentive contributes to the implementation of your organization’s climate commitments and/or climate transition plan

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.

Entitled to incentive

All employees

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary
Salary increase

Performance indicator(s)

Increased investment in low-carbon R&D

Incentive plan(s) this incentive is linked to

Short-Term Incentive Plan

Further details of incentive(s)

First Solar's 2022 corporate bonus plan included metrics on driving research and development in new low-carbon products such as CuRe and bifacial solar modules.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

We currently produce monofacial solar modules and, based on recent R&D activities, expect to produce bifacial solar modules in the near term. Bifaciality compromises nameplate efficiency, but by converting both front and rear side irradiance, such technology may improve the overall energy production of a module relative to nameplate efficiency when applied in certain applications, which could potentially lower the overall levelized cost of energy of a PV system when compared to systems using conventional solar modules, including the modules we currently produce. Increasing the overall energy production of our low-carbon products maximizes the amount of CO2 they can displace.

Entitled to incentive

Facilities manager

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary
Salary increase

Performance indicator(s)

Energy efficiency improvement
Reduction in total energy consumption

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

Energy saving targets are included in the performance goals of our facilities team. Bonus payouts and salary increases are based on the achievement of a department's operational goals and objectives.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

In 2022, our manufacturing energy intensity (energy consumption per watt produced) decreased by approximately 8% compared to 2021 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). Increased manufacturing throughput combined with module efficiency improvements and energy conservation initiatives have enabled us to cut our manufacturing energy intensity per watt by more than 65% since 2009. In 2022, our energy conservation projects in Malaysia and Vietnam resulted in annual savings of 3,405 MWh.

Entitled to incentive

Management group

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary
Salary increase

Performance indicator(s)

Progress towards a climate-related target
Implementation of an emissions reduction initiative
Reduction in absolute emissions
Reduction in emissions intensity
Energy efficiency improvement
Increased share of renewable energy in total energy consumption
Increased investment in low-carbon R&D
Increased engagement with suppliers on climate-related issues
Company performance against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

ESG targets are included in the performance goals of our ESG focus leaders and their teams. Although these performance indicators are not included in our corporate bonus metrics. Bonus payouts and salary increases are based on the achievement of a department's operational goals and objectives.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

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. First Solar's ESG focus leaders help advance the company's approach to Responsible Solar by driving progress on key strategic ESG areas which help to competitively differentiate the company and create long-term value including:

• Energy, Emissions & Resource Efficiency
• Circular Economy
• Inclusion, Diversity & Belonging
• Innovative Products
• Public Policy and Public Sentiment
• Reliable Products
• Responsible Sourcing and Human Rights

Entitled to incentive

All employees

Type of incentive

Non-monetary reward

Incentive(s)

Internal company award
Internal team/employee of the month/quarter/year recognition

Performance indicator(s)

Implementation of an emissions reduction initiative
Energy efficiency improvement
Implementation of employee awareness campaign or training program on climate-related issues

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

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.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

This incentive encourages associates to identify and implement local sustainability initiatives that drive resource efficiency and reduce environmental impacts. 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. In 2022, our Sustainability Ambassadors

participated in site clean-ups and turned used coffee grounds into fertilizer, organized a local blood drive in Vietnam, and diverted glass fines from landfill by recycling and transforming them into bricks. Our Sustainability Ambassadors celebrated Earth Day in 2022 by collecting over 1,000 pounds of litter in Ohio and California, sharing an environmental education video in Vietnam, and hosting an upcycling competition in Malaysia.

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 a medium-term horizon. 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 a long-term horizon. We have set a long-term target to reduce absolute scope 1 and scope 2 GHG emissions by 95% and 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 15 megawatts (MW) in 2002 to 9.8 gigawatts (GW) as of December 31, 2022.

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. We are subject to various federal, state, local, and international laws and regulations, and are often subject to oversight and regulation in accordance with national and local ordinances relating to building codes, safety, and other matters. The impact of these laws and requirements may increase our overall costs and may delay, prevent, or increase the cost of manufacturing PV modules. We expect certain financial benefits as a result of tax incentives provided by the Inflation Reduction Act of 2022. If these expected financial benefits vary significantly from our assumptions, our business, financial condition, and results of operations could be adversely affected. Existing regulations and policies, changes thereto, and new regulations and policies may present technical, regulatory, and economic barriers to the purchase and use of PV solar products, which may significantly reduce demand for our modules.
Emerging regulation	Relevant, always included	Risks associated with emerging regulations (e.g. new regulations and policies may present technical, regulatory, and economic barriers to the purchase and use of PV solar products, which may significantly reduce demand for our modules) are captured under regulatory risks and are always included for evaluation in the company's ERM process. The market for electricity generation products is heavily influenced by federal, state, local, and foreign government regulations and policies

		concerning the electric utility industry, as well as policies promulgated by electric utilities. These regulations and policies often relate to electricity pricing and interconnection of customer-owned electricity generation. In the United States and certain other countries, these regulations and policies have been modified in the past and may be modified again in the future, which could deter end-user purchases of PV solar products. For example, without a mandated regulatory exception for PV solar power systems, system owners are often charged interconnection or standby fees for putting distributed power generation on the electric utility grid. To the extent these interconnection standby fees are applicable to PV solar power systems, it is likely that they would increase the cost of such systems, which could make the systems less desirable, thereby adversely affecting our business, financial condition, and results of operations.
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. Our failure to further refine our technology and develop and introduce improved PV products, including as a result of delays in implementing planned advancements, could render our solar modules uncompetitive and reduce our net sales, profitability, and/or market share.
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. Competition in solar markets globally and across the solar value chain is intense and could remain that way for an extended period of time. The solar industry may experience periods of structural imbalance between global PV module supply and demand that result in periods of pricing volatility. If our competitors reduce module pricing to levels near

		or below their manufacturing costs, or are able to operate at minimal or negative operating margins for sustained periods of time, or if global demand for PV modules decreases relative to installed production capacity, our business, financial condition, and results of operations could be adversely affected.
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. Damage to or disruption of our manufacturing facilities could interrupt our business and adversely affect our ability to generate net sales.
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 manufacturers or potential investors of tax incentives that benefit solar energy production, sales, or projects, such as the Section 45X advanced manufacturing production credit, ITC, and PTC, could result in reducing such manufacturers or investors' economic returns and could cause a reduction in the availability of financing, thereby reducing demand for PV solar modules.

• any incentives contingent upon domestic production of modules, such as tax incentives set forth under the Inflation Reduction Act (IRA), could limit our ability to sell modules manufactured in certain foreign jurisdictions, which may adversely impact our module average selling prices and could require us to record significant charges to earnings.

• 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.

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)

2,193,619,000

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 $2.2 billion) of our total net sales in 2022 of approximately $2.6 billion. The maximum potential financial impact figure is based on our 2022 net sales in the U.S.

Cost of response to risk

165,000,000

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 $165 million in 2022. We engage with policymakers to manage policy risks in the U.S. and internationally as applicable to the solar industry. In 2022, we supported the Inflation Reduction Act and the advanced manufacturing production credit under Section 45X of the Internal Revenue Code, which provides certain specified benefits for solar modules and solar module components manufactured in the United States and sold to third parties. We consistently advocate for an industrial policy that identifies clean tech manufacturing as a national strategic priority to advance US energy independence.

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)

98,000,000

Potential financial impact figure – maximum (currency)

149,000,000

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 $56 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 $56 and $85 metric ton applied to our 2022 scope 3 emissions for purchased goods and services (1,755,131 metric tons CO2-eq), the cost of our purchased goods and services could increase by approximately $98 million to approximately $149 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. 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 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)

670,000,000

Potential financial impact figure – maximum (currency)

2,000,000,000

Explanation of financial impact figure

Based on a third-party loss expectancy study conducted on our first manufacturing facility, the maximum probable financial impact ranges from approximately $670 million (one facility) to approximately $2 billion (3 facilities) 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

3,000,000

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 (approximately $3 million). The increase in our insurance costs compared to 2021 is primarily due to the addition of our third manufacturing facility in Ohio. We have implemented our management method (i.e. separating manufacturing capabilities across several buildings) to reduce and minimize this risk.

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 48.3 GW of net bookings in 2022, and an end-of-year backlog of 61.4 GW, we had an excellent year from a commercial perspective. The bookings momentum has continued in 2023, with 113 GW of the total 113 GW bookings opportunities in mid-to-late stage as stated in our Q1 2023 Earnings call. Since the beginning of 2022, large developers such as Intersect Power, Lightsource bp, National

Grid, Origis Energy, Savion, Silicon Ranch, and Swift Current, among others, have placed orders of at least 2 GW. 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)

17,700,000,000

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. As of December 31, 2022, we had entered into contracts with customers for the future sale of 61.4 GWDC of solar modules for an aggregate transaction price of $17.7 billion, which we expect to recognize as revenue through 2029 as we transfer control of the PV modules to the customers.

Cost to realize opportunity

3,500,000,000

Strategy to realize opportunity and explanation of cost calculation

As of December 31, 2022, we had 9.8 GWDC of total installed nameplate module production capacity across all our facilities. We are in the process of expanding our manufacturing nameplate capacity to reach approximately 14 GW in the US and 25 GW globally in 2026. Our third manufacturing facility in the United States commenced commercial production of modules in early 2023 and our first manufacturing facility in India is expected to commence operations in the second half of 2023. In 2022, we announced a 0.9 GW increase in nameplate capacity at our Ohio factories and a new 3.5 GW Series 7 factory in Alabama, which is expected to be operational in 2025. In July 2023, we announced our intention to build a fifth manufacturing facility in the United States. The planned fully vertically integrated facility is expected to grow the company's nameplate manufacturing capacity by 3.5 GW to reach approximately 14 GW in 2026. In aggregate, we expect to invest approximately $3.5 billion for these facilities and upgrades.

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. Our Series 7 module has an even lower environmental footprint- with a carbon and water footprint that is nearly 4X lower than conventional crystalline silicon modules manufactured in China and an energy payback time that is approximately 5X faster. In just two months under high irradiation conditions, First Solar Series 7 PV modules produce more energy than was required to create them. This corresponds to a 180-fold energy return on investment (EROI) over a 30-year project lifetime, providing an abundant net energy gain to the electricity grid. In 2022, France continued to represent our third largest market.

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 2022, France represented our third largest market and provided 2.5% of our net sales or $68 million. Since 2018, our solar modules' carbon footprint advantage resulted in more than $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

1,650,000

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 $165 million in 2022. Since the EMEA region represented ~1% of our global workforce in 2022, we estimate the cost to realize this opportunity to be approximately $1.65 million. One of our key points of differentiation is our sustainability advantage which has further improved with our Series 7 technology. 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

Development of new products or services through R&D and innovation

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Solar energy is one of the fastest growing forms of renewable energy with numerous economic and environmental
benefits that make it an attractive complement to and/or substitute for traditional forms of energy generation. In
recent years, the cost of producing electricity from PV solar power systems has decreased to levels that are
competitive with or below the wholesale price of electricity in many markets. This price decline has opened new
possibilities to develop systems in many locations with limited or no financial incentives, thereby promoting the
widespread adoption of solar energy.

In addressing the overall global demand for electricity, our modules provide energy at a lower levelized cost of
electricity (“LCOE”), meaning the net present value of a system’s total life cycle costs divided by the quantity of
energy that is expected to be produced over the system’s life, when compared to traditional forms of energy
generation. With over $1 billion in cumulative R&D investments in the last 10 years

alone, we have a demonstrated
history of innovation and continuous improvement. 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.

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)

2,400,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Our primary segment is our modules business, which involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. Net sales from our solar modules business amounted to approximately $2.4 billion in 2022. Net sales from our modules segment increased by $96.9 million in 2022 primarily due to a 20% increase in the volume of watts sold, partially offset by a 13% decrease in the average selling price per watt.

Cost to realize opportunity

2,100,000,000

Strategy to realize opportunity and explanation of cost calculation

We have a demonstrated history of innovation, continuous improvement, and manufacturing success driven by our significant investments in various R&D initiatives. We continue to invest significant financial resources in such initiatives, including approximately $0.3 billion for a dedicated R&D facility in the United States to support the implementation of our technology roadmap. We expect such R&D facility to feature a high-tech pilot manufacturing line, allowing for the production of full-sized prototypes of thin film and tandem PV modules. Such R&D facility is expected to be completed in 2024. During 2023, we expect to spend $1.9 billion to $2.1 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.

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 63 GWAC, approximately 30 GWAC of projects under various stages
of construction, and over 19 GWAC 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 GWAC by 2030 and establishing a net-zero carbon emissions
target by 2070. Based on these targets, it is projected that the installed solar energy generation capacity will be
350 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. As a result of such market opportunities, we are in the process of expanding our manufacturing capacity by an additional 3.4 GW 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 2.2 GWDC of modules sold 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)

980,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

We generally price and sell our solar modules on a per watt basis. As of December 31, 2022, we had entered into
contracts with customers for the future sale of 61.4 GWDC of solar modules for an aggregate transaction price of
$17.7 billion, which we expect to recognize as revenue through 2029 as we transfer control of the modules to the
customers. Assuming a contracted module backlog of 61.4 GWDC for an aggregate transaction price of $17.7 billion as of December 31, 2022, and an anticipated nameplate capacity in India of 3.4 GW, the potential annual financial opportunity would amount to up to $980 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 3.4 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 2.2 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. We remain on track to complete construction and commence the ramp at our Series 7 factory in India during 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

In August 2022, the U.S. President signed the Inflation Reduction Act (IRA) into law, which is intended to accelerate the country's ongoing transition to clean energy. The provisions of the IRA are generally effective for tax years beginning after 2022. The IRA offers various tax credits, including the advanced manufacturing production credit, pursuant to Section 45X of the Internal Revenue Code, for solar modules and solar module components manufactured in the United States and sold to third parties. Such credit, which may be refundable or transferable to a third party, is available through 2032, subject to phase down beginning in 2030. For eligible components, the credit is equal to (i) $12 per square meter for a PV wafer, (ii) 4 cents multiplied by the capacity of a PV cell, and (iii) 7 cents multiplied by the capacity of a PV module. Such credit is expected to increase domestic manufacturing of solar modules and solar module components in the near term. Based on the current form factor of our modules, we expect to qualify for a credit of approximately 17 cents per watt for each module produced in the United States and sold to a third
party. Such credit may be refundable or transferable to a third party and is available from 2023 to 2032, subject to phase down beginning in 2030.

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)

2,380,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Based on the current form factor of our modules, we expect to qualify for a credit of approximately 17 cents per watt for each module produced in the United States and sold to a third party. Such credit may be refundable or transferable to a third party and is available from 2023 to 2032, subject to phase down beginning in 2030. We are in the process of expanding our manufacturing capacity in the U.S. and expect to have a U.S. nameplate capacity of approximately 14 GW in 2026. Assuming a manufacturing credit of 17 cents per watt and a U.S. capacity of 14GW, the potential financial impact amounts to approximately $2.38 billion per year.

Cost to realize opportunity

2,800,000,000

Strategy to realize opportunity and explanation of cost calculation

We are in the process of expanding our manufacturing capacity in the U.S. Our third U.S. manufacturing facility commenced commercial production of modules in early 2023. In 2022, we announced a 0.9 GW increase in nameplate capacity at our Ohio factories and a new 3.5 GW Series 7 factory in Alabama which is expected to be operational in 2025. In July 2023, we announced our intention to build a fifth manufacturing facility in the United States. The planned fully vertically integrated facility is expected to grow the company's nameplate manufacturing capacity by 3.5 GW to reach approximately 14 GW in 2026. Over the past year and including this announcement, First Solar has committed to over $2.8 billion in capital investment and 7.9 GW of additional manufacturing capacity in the US.

Comment

C3. Business Strategy

C3.1

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

Row 1

Climate transition plan

Yes, we have a climate transition plan which aligns with a 1.5°C world

Publicly available climate transition plan

Yes

Mechanism by which feedback is collected from shareholders on your climate transition plan

We have a different feedback mechanism in place

Description of feedback mechanism

We have regular ESG calls with investors which enables us to collect their feedback on our GHG emissions reduction targets, climate transition plan, and other ESG initiatives and topics. Our climate transition plan is included in our 2023 sustainability report available on our website.

Frequency of feedback collection

More frequently than annually

Attach any relevant documents which detail your climate transition plan (optional)

https://www.firstsolar.com/en/Resources/Sustainability-Documents?ty=Documents&re=&ln=

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 9.8 gigawatts (GW) as of December 31, 2022. 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 48.3 GW of net bookings in 2022, and an end-of-year backlog of 61.4 GW. Net sales for 2022 amounted to $2.6 billion. To meet this growing demand, we are expanding our manufacturing operations (capital expenditures) over the next two years.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Indicate the level at which you identify the alignment of your spending/revenue with a sustainable finance taxonomy
Row 1	Yes, we identify alignment with both our climate transition plan and a sustainable finance taxonomy	At both the company and activity level

C3.5a

(C3.5a) Quantify the percentage share of your spending/revenue that is aligned with your organization's climate transition.

Financial Metric

Revenue/Turnover

Type of alignment being reported for this financial metric

Alignment with a sustainable finance taxonomy

Taxonomy under which information is being reported

EU Taxonomy for Sustainable Activities

Objective under which alignment is being reported

Total across all objectives

Amount of selected financial metric that is aligned in the reporting year (unit currency as selected in C0.4)

2,619,319,000

Percentage share of selected financial metric aligned in the reporting year (%)

100

Percentage share of selected financial metric planned to align in 2025 (%)

100

Percentage share of selected financial metric planned to align in 2030 (%)

100

Describe the methodology used to identify spending/revenue that is aligned

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. Our primary segment is our modules business, which involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. This aligns with the EU Taxonomy activity of: Manufacture of renewable energy

technologies. In 2022, revenue from our modules business amounted to $2,428,278,000 (or 92.71%).

Our residual business operations include certain project development activities, O&M services, the results of operations from PV solar power systems we owned and operated in certain international regions, and the sale of such systems to third-party customers. This aligns with the EU Taxonomy activity of: Electricity generation using solar photovoltaic technology (Construction or operation of electricity generation facilities that produce electricity using solar photovoltaic (PV) technology). In 2022, revenue from our residual business operations amounted to $191,041,000 (or 7.29%).

C3.5b

(C3.5b) Quantify the percentage share of your spending/revenue that was associated with eligible and aligned activities under the sustainable finance taxonomy in the reporting year.

Economic activity

Manufacture of renewable energy technologies

Taxonomy under which information is being reported

EU Taxonomy for Sustainable Activities

Taxonomy Alignment

Taxonomy-aligned

Financial metric(s)

Turnover

Taxonomy-aligned turnover from this activity in the reporting year (unit currency as selected in C0.4)

2,428,278,000

Taxonomy-aligned turnover from this activity as % of total turnover in the reporting year

92.71

Taxonomy-aligned turnover from this activity that substantially contributed to climate change mitigation as a % of total turnover in the reporting year

100

Taxonomy-aligned turnover from this activity that substantially contributed to climate change adaptation as a % of total turnover in the reporting year

100

Taxonomy-eligible but not aligned turnover from this activity in the reporting year (unit currency as selected in C0.4)

Taxonomy-eligible but not aligned turnover from this activity as % of total turnover in the reporting year

Taxonomy-aligned CAPEX from this activity in the reporting year (unit currency as selected in C0.4)

Taxonomy-aligned CAPEX from this activity as % of total CAPEX in the reporting year

Taxonomy-aligned CAPEX from this activity that substantially contributed to climate change mitigation as a % of total CAPEX in the reporting year

Taxonomy-aligned CAPEX from this activity that substantially contributed to climate change adaptation as a % of total CAPEX in the reporting year

Taxonomy-eligible but not aligned CAPEX associated with this activity in the reporting year (unit currency as selected in C0.4)

Taxonomy-eligible but not aligned CAPEX associated with this activity as % of total CAPEX in the reporting year

Taxonomy-aligned OPEX from this activity in the reporting year (unit currency as selected in C0.4)

Taxonomy-aligned OPEX from this activity as % of total OPEX in the reporting year

Taxonomy-aligned OPEX from this activity that substantially contributed to climate change mitigation as a % of total OPEX in the reporting year

Taxonomy-aligned OPEX from this activity that substantially contributed to climate change adaptation as a % of total OPEX in the reporting year

Taxonomy-eligible but not aligned OPEX associated with this activity in the reporting year (unit currency as selected in C0.4)

Taxonomy-eligible but not aligned OPEX associated with this activity as % total OPEX in the reporting year

Type(s) of substantial contribution

Activity enabling mitigation
Activity enabling adaptation

Calculation methodology and supporting information

Based on financial information reported in our 2022 Form 10-K, we have assigned our primary revenue generating activities to the EU Taxonomy activity ‘Manufacture of renewable energy technologies’. Our primary segment is our modules business, which involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. This aligns with the EU Taxonomy activity of: Manufacture of renewable energy technologies. In 2022, revenue from our modules business amounted to $2,428,278,000 (or 92.71%).Since 2002 and through 2022, we have sold approximately 50 gigawatts (GW) of PV solar modules and have an additional backlog of ~70 GW.

Our PV products contribute to climate adaption and mitigation. Assuming average worldwide irradiance and grid electricity emissions, our products will be used to displace 78 million metric tons of CO2e per year during their 30+ year product life. This is equivalent to powering more than 60 million average homes, planting 1.3 billion trees and saving over 225 billion liters of water (or 90,000 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.

Technical screening criteria met

Yes

Details of technical screening criteria analysis

Photovoltaic solar modules fall within the definition of "renewable energy technologies" under Directive (EU) 2018/2001. Therefore, the manufacture of solar PV technologies meets the technical screening criteria requirement for activities falling under ‘Manufacture of renewable energy technologies’ outlined in Annex I of the Climate Delegated Act.

Do no significant harm requirements met

Yes

Details of do no significant harm analysis

To address the DNSH criteria under ‘Manufacture of renewable energy technologies’, we performed a climate scenario analysis to assess climate risks and vulnerability, including water stress. Although our PV manufacturing facilities in the U.S., Malaysia and Vietnam operate in areas with low to very low baseline water stress, our first

manufacturing facility near Chennai in Tamil Nadu, India which will become operational in 2023, faces high baseline water stress. To minimize impacts on local water resources, we are designing a Net Zero Water Withdrawal PV manufacturing facility that will rely entirely on tertiary treated reverse osmosis water from the city's sewage treatment plant and have zero wastewater discharge. Instead of being discharged, the wastewater will be treated onsite and converted into freshwater so it can be reused in our operations.

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, using less energy, water and semiconductor material than conventional crystalline silicon PV manufacturing. In addition to having the lowest carbon and water footprint in the PV industry, First Solar modules are designed for high-value recycling and closed loop semiconductor recovery. First Solar's high-value PV recycling process maximizes material recovery at end-of-life and recover more than 90% of module materials for reuse, providing high quality secondary resources for new solar panels, glass, rubber and aluminum products.

Our Series 6 and Series 6 Plus products were awarded an EPEAT Silver rating, certifying that they exceeded the basic but stringent environmental and social criteria of a Bronze rating. 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.

We used the WWF biodiversity risk filter to screen our manufacturing locations for impacts on biodiversity. None of our manufacturing facilities are located in or near biodiversity-sensitive areas.

Minimum safeguards compliance requirements met

Yes

Details of minimum safeguards compliance analysis

First Solar is committed to complying with the laws established to protect human rights in each country where we operate and respecting the rights set forth in the International Labour Organization (ILO) 1998 Declaration on Fundamental Principles and Rights at Work and the UN Guiding Principles on Business and Human Rights, which provide further instruction to companies dedicated to preventing adverse impacts on the communities with which they are involved. From our policy, supplier contracts, screening, mapping and auditing, to training and reporting, First Solar takes a comprehensive approach to responsible sourcing and supply chain management in order to identify, prevent and mitigate potential adverse human rights and environmental impacts, in accordance with OECD due diligence guidelines.

C3.5c

(C3.5c) Provide any additional contextual and/or verification/assurance information relevant to your organization's taxonomy alignment.

The information is based on data reported in our 2022 Form 10-K. Our primary segment is our modules business, which involves the design, manufacture, and sale of CdTe solar modules, which convert sunlight into electricity. This aligns with the EU Taxonomy activity of: Manufacture of renewable energy technologies. In 2022, revenue from our modules business amounted to $2,428,278,000 (or 92.71%). More information on the environmental benefits of our products and their alignment with the EU Taxonomy can be found in our sustainability report.

C4. Targets and performance

C4.1

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

Absolute target
Intensity target

C4.1a

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

Target reference number

Abs 1

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

1.5°C aligned

Year target was set

2022

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, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)

12,323,017

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)

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

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

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

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

12,825,288

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, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)

100

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)

Base year total 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]

8,515,991.232

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

7,690

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

563,652

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)

1,755,131

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)

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

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

Total 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)

571,343

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

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

284.360666246

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

After surpassing our 2021 intensity-based target three years early, we 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 science-based climate goals to limit the global temperature rise to 1.5 degrees Celsius above pre-industrial levels and

has been approved by the Science Based Targets initiative (SBTi). 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

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 over 49% by 2022 as compared to the base year (2020), our absolute scope 1 and 2 emissions only increased by 14% from 502,271 metric tons CO2-eq in the base year (2020) to 571,343 metric tons CO2-eq in 2022. Since 2020, we have approximately doubled our manufacturing capacity, resulting in an increase in our absolute GHG emissions. With the addition of new manufacturing plants in India and the United States, we expect our global manufacturing capacity to more than triple through 2026, compared to 2020. The products we manufacture directly contribute to climate mitigation and adaptation. 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. Nevertheless, we remain committed to reducing our operational impact.

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

Target reference number

Abs 2

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

1.5°C aligned

Year target was set

2022

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, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)

1,232,301

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)

295,327

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)

139,049

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)

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

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

Base year total 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, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)

97

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)

97

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

97

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)

Base year total 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)

7,690

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

563,652

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)

1,755,131

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)

640,511

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)

181,645

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)

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

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

Total 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)

571,343

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

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

-15.2799318827

Target status in reporting year

Underway

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). Our long-term GHG emissions reduction target has been assessed against the Science Based Targets initiative (SBTi) Net-Zero Standard and has been approved by SBTi.

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

In the long-term, we aim to reduce our scope 1 and scope 2 emissions by 90% by increasing our energy efficiency by 30% and going 100% renewable electricity across our global operations. The residual 5% scope 1 emissions can be neutralized with high quality carbon offsets to get to Net Zero, in accordance with the SBTi's Net Zero Standards.

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

C4.1b

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

Target reference number

Int 1

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

1.5°C aligned

Year target was set

2022

Target coverage

Company-wide

Scope(s)

Scope 3

Scope 2 accounting method

Scope 3 category(ies)

Category 1: Purchased goods and services

Intensity metric

Other, please specify

Metric Tons CO2e per megawatt (MW) produced

Base year

2020

Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

201.2

Intensity figure in base year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for total Scope 3 (metric tons CO2e per unit of activity)

295

Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

201.2

% of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

% of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

% of total base year emissions in Scope 3, Category 1: Purchased goods and services covered by this Scope 3, Category 1: Purchased goods and services intensity figure

100

% of total base year emissions in Scope 3, Category 2: Capital goods covered by this Scope 3, Category 2: Capital goods intensity figure

% of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) covered by this Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) intensity figure

% of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution covered by this Scope 3, Category 4: Upstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 5: Waste generated in operations covered by this Scope 3, Category 5: Waste generated in operations intensity figure

% of total base year emissions in Scope 3, Category 6: Business travel covered by this Scope 3, Category 6: Business travel intensity figure

% of total base year emissions in Scope 3, Category 7: Employee commuting covered by this Scope 3, Category 7: Employee commuting intensity figure

% of total base year emissions in Scope 3, Category 8: Upstream leased assets covered by this Scope 3, Category 8: Upstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution covered by this Scope 3, Category 9: Downstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 10: Processing of sold products covered by this Scope 3, Category 10: Processing of sold products intensity figure

% of total base year emissions in Scope 3, Category 11: Use of sold products covered by this Scope 3, Category 11: Use of sold products intensity figure

% of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products covered by this Scope 3, Category 12: End-of-life treatment of sold products intensity figure

% of total base year emissions in Scope 3, Category 13: Downstream leased assets covered by this Scope 3, Category 13: Downstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 14: Franchises covered by this Scope 3, Category 14: Franchises intensity figure

% of total base year emissions in Scope 3, Category 15: Investments covered by this Scope 3, Category 15: Investments intensity figure

% of total base year emissions in Scope 3, Other (upstream) covered by this Scope 3, Other (upstream) intensity figure

% of total base year emissions in Scope 3, Other (downstream) covered by this Scope 3, Other (downstream) intensity figure

% of total base year emissions in Scope 3 (in all Scope 3 categories) covered by this total Scope 3 intensity figure

70

% of total base year emissions in all selected Scopes covered by this intensity figure

100

Target year

2028

Targeted reduction from base year (%)

45

Intensity figure in target year for all selected Scopes (metric tons CO2e per unit of activity) [auto-calculated]

110.66

% change anticipated in absolute Scope 1+2 emissions

0

% change anticipated in absolute Scope 3 emissions

46

Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

193.36

Intensity figure in reporting year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for total Scope 3 (metric tons CO2e per unit of activity)

295

Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

193

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

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

9.0567704882

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

In 2022, we set a target to reduce our Scope 3 GHG emissions intensity from purchased goods and services by 45% per Megawatt produced by 2028, relative to 2020. Our 2028 Scope 3 target is based on the SBTi Net-Zero Tool (v.1.0.3). Our near-term target is in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-

industrial levels and has been approved by the SBTi.

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

We aim to achieve our targets by increasing the recycled content of our glass and aluminum materials, switching to lower carbon materials such as steel, and leveraging our suppliers' science-based targets. In 2022, Scope 3 GHG emissions intensity from purchased goods and services decreased by 4% relative to the 2020 base year.

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

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Target reference number

Int 2

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

1.5°C aligned

Year target was set

2022

Target coverage

Company-wide

Scope(s)

Scope 3

Scope 2 accounting method

Scope 3 category(ies)

Category 1: Purchased goods and services
Category 2: Capital goods
Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)

Intensity metric

Other, please specify

Metric Tons CO2e per megawatt (MW) produced

Base year

2020

Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

201.2

Intensity figure in base year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

48.2

Intensity figure in base year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

22.7

Intensity figure in base year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for total Scope 3 (metric tons CO2e per unit of activity)

285

Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

272.15

% of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

% of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

% of total base year emissions in Scope 3, Category 1: Purchased goods and services covered by this Scope 3, Category 1: Purchased goods and services intensity figure

100

% of total base year emissions in Scope 3, Category 2: Capital goods covered by this Scope 3, Category 2: Capital goods intensity figure

100

% of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) covered by this Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) intensity figure

100

% of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution covered by this Scope 3, Category 4: Upstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 5: Waste generated in operations covered by this Scope 3, Category 5: Waste generated in operations intensity figure

% of total base year emissions in Scope 3, Category 6: Business travel covered by this Scope 3, Category 6: Business travel intensity figure

% of total base year emissions in Scope 3, Category 7: Employee commuting covered by this Scope 3, Category 7: Employee commuting intensity figure

% of total base year emissions in Scope 3, Category 8: Upstream leased assets covered by this Scope 3, Category 8: Upstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution covered by this Scope 3, Category 9: Downstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 10: Processing of sold products covered by this Scope 3, Category 10: Processing of sold products intensity figure

% of total base year emissions in Scope 3, Category 11: Use of sold products covered by this Scope 3, Category 11: Use of sold products intensity figure

% of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products covered by this Scope 3, Category 12: End-of-life treatment of sold products intensity figure

% of total base year emissions in Scope 3, Category 13: Downstream leased assets covered by this Scope 3, Category 13: Downstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 14: Franchises covered by this Scope 3, Category 14: Franchises intensity figure

% of total base year emissions in Scope 3, Category 15: Investments covered by this Scope 3, Category 15: Investments intensity figure

% of total base year emissions in Scope 3, Other (upstream) covered by this Scope 3, Other (upstream) intensity figure

% of total base year emissions in Scope 3, Other (downstream) covered by this Scope 3, Other (downstream) intensity figure

% of total base year emissions in Scope 3 (in all Scope 3 categories) covered by this total Scope 3 intensity figure

95

% of total base year emissions in all selected Scopes covered by this intensity figure

100

Target year

2050

Targeted reduction from base year (%)

97

Intensity figure in target year for all selected Scopes (metric tons CO2e per unit of activity) [auto-calculated]

8.1645

% change anticipated in absolute Scope 1+2 emissions

0

% change anticipated in absolute Scope 3 emissions

-89

Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

193

Intensity figure in reporting year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

71

Intensity figure in reporting year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

20

Intensity figure in reporting year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for total Scope 3 (metric tons CO2e per unit of activity)

295

Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

284

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

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

-4.4888829121

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

In 2022, we set a target to reduce our Scope 3 GHG emissions intensity from purchased goods and services, capital goods, and fuel- and energy-related activities by 97% per Megawatt produced by 2050, relative to 2020. In 2022, these Scope 3 categories accounted for more than 95% of our Scope 3 emissions. Our long-term target is in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-industrial levels and has been approved by the SBTi.

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

We aim to achieve our targets by increasing the recycled content of our glass and aluminum materials, switching to lower carbon materials such as steel, and leveraging our suppliers' science-based targets. Scope 3 emissions from capital goods will decrease as our manufacturing capacity growth stabilizes in the long-term. In 2022, our Scope 3 GHG emissions intensity from purchased goods and services, capital goods, and fuel- and energy-related activities was 4% higher than the 2020 base year. We are

in the process of expanding our PV manufacturing capacity and have increased our supply chain procurement as a result.

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
Science Based Targets initiative

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. Although we have identified onsite and offsite solar opportunities that could power our Malaysian operations with up to 38% renewable electricity, achieving the 100% renewable energy goal in Malaysia and Vietnam by 2028 will remain a challenge due to the lack of offsite renewable energy options. While we remain committed to our global renewable energy goals and continue to work on enabling the offsite renewable energy market in Malaysia and Vietnam, we also continue to explore ways to achieve our near-term science-based target.

As part of our renewable energy strategy, we are investigating opportunities to procure offsite solar electricity, install PV rooftop and carport arrays, and purchase bundled renewable energy credits (RECs). We are installing a 300kW PV carport array, which is

expected to begin operating in 2023 at our second manufacturing facility in Ohio. We have installed onsite PV installations at our production sites in Ohio and Malaysia and at our recycling facility in Frankfurt Oder, Germany.

List the actions which contributed most to achieving this target

Target reference number

Low 2

Year target was set

2020

Target coverage

Country/area/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

Science Based Targets initiative

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

Int1

Int2

Target year for achieving net zero

2050

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Please explain target coverage and identify any exclusions

First Solar committed to reaching net-zero GHG emissions across the value chain by 2050. This includes reducing our absolute scope 1 and scope 2 GHG emissions 34% by 2028 and 95% by 2050, from a 2020 base year. It also includes reducing Scope 3 GHG emissions from purchased goods and services by 45% per MW by 2028 and reducing Scope 3 GHG emissions from purchased goods and services, capital goods, and fuel- and energy-related activities by 97% per MW produced by 2050, relative to 2020. Our 2050 net-zero target is based on the SBTi Net-Zero Tool (v.1.0.3). Our science-based net-zero target has been verified by SBTi.

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

We aim to achieve our science-based net-zero target by increasing the recycled content of our glass and aluminum materials, switching to lower carbon materials such as steel, leveraging our suppliers' science-based targets and executing on our RE100 targets. The residual 5% scope 1 emissions can be neutralized with high quality carbon offsets to get to net-zero, in accordance with the SBTi's Net-Zero Standards. Scope 3 emissions from capital goods will decrease as our manufacturing capacity growth stabilizes in the long-term.

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	2	847
To be implemented*	0	0
Implementation commenced*	1	0

Implemented*	9	2,254
Not to be implemented	0	0

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

Building Energy Management Systems (BEMS)

Estimated annual CO2e savings (metric tonnes CO2e)

83

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)

9,124

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

6,000

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

21

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)

2,160

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

500

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)

62

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)

48,600

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

0

Payback period

No payback

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes

Wastewater treatment

Estimated annual CO2e savings (metric tonnes CO2e)
470

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)
48,600

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type
Energy efficiency in buildings
Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)
979

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)
101,260

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)

494

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)

76,882

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

0

Payback period

No payback

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

21

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)

3,552

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

4,527

Payback period

1-3 years

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

42

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)

6,629

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

4,046

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

80

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)

12,474

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

21,674

Payback period

1-3 years

Estimated lifetime of the initiative

3-5 years

Comment

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)

Power

Solar PV

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 2022 grid electricity emission factors (Year 2020 data) - https://www.iea.org/data-and-statistics/data-product/emissions-factors-2022

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 2020)

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

5,500,000

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 2022 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 eGRID2021 grid electricity location-based emission factors for U.S. facilities and IEA (2022) 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 and past years' emissions been recalculated as a result of any changes or errors reported in C5.1a and/or C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold	Past years' recalculation
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.	Yes

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)

1,232,301

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)

139,049

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)

69,252

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)

650

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)

4,201

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)

0

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)

7,690

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

605,714

Scope 2, market-based (if applicable)

563,652

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 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)

1,755,131

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 2022. 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 2022, and subtracting 2022 Scope 1 and 2 emissions.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

640,511

Emissions calculation methodology

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 2022 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)

181,645

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

Not relevant, calculated

Emissions in reporting year (metric tons CO2e)

88,923

Emissions calculation methodology

Distance-based method

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

75

Please explain

Well-to-wheel life cycle stages were covered in the calculation. GHG Emissions were extrapolated from glass and aluminum supply distances and transport methods combined with data on modules produced in 2022. 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). 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). In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were estimated with the Argonne GREET WTW Calculator 2022.

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

3,051

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 2022, we disposed of 7.6 million kilograms of waste (or 7,618 Tonnes). Note that approximately 35.5 million kilograms of waste (or 82% of the 43.1 million kilograms of total waste generated) were recycled in 2022. 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)

4,546

Emissions calculation methodology

Supplier-specific method

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

100

Please explain

Well-to-wheel life cycle stages were covered in the calculation. 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. In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were estimated with the Argonne GREET WTW Calculator 2022.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

4,531

Emissions calculation methodology

Average data method

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

25

Please explain

Well-to-wheel life cycle stages were covered in the calculation. Number of full-time equivalent employees in 2022 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. In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were estimated with the Argonne GREET WTW Calculator 2022.

Upstream leased assets

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

323

Emissions calculation methodology

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 eGRID2021 grid electricity emission factor.

Downstream transportation and distribution

Evaluation status

Not relevant, calculated

Emissions in reporting year (metric tons CO2e)

0

Emissions calculation methodology

Distance-based method

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

0

Please explain

Shipment of our products to customer project sites is included in upstream transportation and distribution, hence downstream transportation and distribution emissions category has no emissions.

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 2022, First Solar produced 9.1 GWdc of PV solar modules. Assuming world-wide average irradiance and grid electricity emissions, we estimate that our 2022 products are being used to displace 5.8 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)

976

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 2022 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

Not relevant, calculated

Emissions in reporting year (metric tons CO2e)

0

Emissions calculation methodology

Average data method

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

0

Please explain

Due to the change in calculation methodology in accordance with our most recent Scope 3 audit, the Downstream leased assets have no emissions.

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

0.000218

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

571,343

Metric denominator

unit total revenue

Metric denominator: Unit total

2,619,319,000

Scope 2 figure used

Market-based

% change from previous year

13.8

Direction of change

Increased

Reason(s) for change

Please explain

In 2022, our absolute Scope 1 and 2 GHG emissions (571,343 MT CO2e) increased by 2% relative to 2021 (560,210 CO2e) due to increased manufacturing output. Total revenue decreased by over 10% in 2022 ($2.619 billion) compared to 2021 ($2.923 billion).

Intensity figure

104

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

571,343

Metric denominator

full time equivalent (FTE) employee

Metric denominator: Unit total

5,517

Scope 2 figure used

Market-based

% change from previous year

11

Direction of change

Decreased

Reason(s) for change

Please explain

In 2022, our absolute Scope 1 and 2 GHG emissions (571,343 MT CO2e) increased by 2% relative to 2021 (560,210 CO2e) due to increased manufacturing output, while FTE increased by a rate of 14% from 4,833 in 2021 to 5,517 in 2022.

Intensity figure

63

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

571,343

Metric denominator

Other, please specify

MW of PV modules produced

Metric denominator: Unit total

9,077

Scope 2 figure used

Market-based

% change from previous year

11

Direction of change

Decreased

Reason(s) for change

Please explain

In 2022, our absolute Scope 1 and 2 GHG emissions (571,343 MT CO2e) increased by 2% relative to 2021 (560,210 CO2e) due to increased manufacturing output , while production volume increased 15% from 7877 MW in 2021 to 9077 MW in 2022. In 2022, our GHG emissions intensity decreased by 11% compared to 2021 due to the greater throughput, the enhanced energy efficiency of our Series 6plus and Series 7 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	6,589	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	3	IPCC Fourth Assessment Report (AR4 - 100 year)

N2O	5	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	1,093	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/area/region.

Country/area/region	Scope 1 emissions (metric tons CO2e)
Germany	490
Malaysia	893
United States of America	5,415
Samoa	1
Chile	15
India	1
Viet Nam	876

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	7,303
Research and Development	370
Owned Operational Solar Projects	17

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	5,045	41.557058	-83.552515
Frankfurt-Oder, Germany	490	52.312919	14.481102
Kulim, Malaysia	893	5.428624	100.572598
Santa Clara, California, USA	370	37.371053	-121.951931
Mesa, Arizona, USA	0	33.32144	-111.65812
Ho Chi Minh City, Viet Nam	876	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	6,352
Mobile Source Emissions	24
Fugitive Emissions	1,093
Process Emissions	221

C7.5

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

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Chile	920	920
Germany	744	699
India	109	109
Malaysia	242,177	201,055
Samoa	30	30
United States of America	160,614	129,879
Viet Nam	201,119	230,961

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	603,317	561,256
Research and Development	1,337	1,337
Owned Operational Solar Projects	1,059	1,059

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	159,277	128,542
Frankfurt-Oder, Germany	744	699
Kulim, Malaysia	242,177	201,055
Santa Clara, California, USA	1,218	1,218
Mesa, Arizona, USA	119	119
Owned Operational Solar Projects	1,059	1,059
Ho Chi Minh City, Viet Nam	201,119	230,961

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	605,714	563,652

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

Not relevant as we do not have any subsidiaries

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 in emissions	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	2,254	Decreased	0.4	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 2,254 metric tons CO2e from avoided electricity consumption in 2022. Our scope 1 and 2 emissions in the previous year (2021) amounted to 502,271 metric tons CO2e. We arrived at a 0.28% decrease in our gross global emissions through (2,254/560,210) *100 = 0.4%
Divestment	0	No change	0	Not applicable in 2022.
Acquisitions	0	No change	0	Not applicable in 2022.
Mergers	0	No change	0	Not applicable in 2022.
Change in output	85,344	Increased	15.2	From 2021 to 2022, First Solar increased its production of PV solar modules by 15% from 7.877GW to 9.077GW. This increased output corresponds to an

				increase of 85,344 metric tons CO2e of emissions, or % of the previous year's emissions through (85,344/560,210) *100 =15.2 %.
Change in methodology	24,434	Decreased	4.4	In 2022, First Solar changed the grid electricity emission factor for its Kulim, Malaysia facility from a supplier specific factor of 0.53 kg CO2e/kWh in 2021 to a supplier-specific factor of 0.54 kg CO2e/kWh in 2022. Use of the updated supplier specific factor resulted in a increase of 4,705 metric tons CO2e of emissions compared with using the 2021 factor. In 2022, First Solar changed the grid electricity emission factor for its Dong Nam, Vietnam facility from a supplier specific factor of 0.85 kg CO2e/kWh in 2021 to a supplier-specific factor of 0.72 kg CO2e/kWh in 2022. Use of the updated supplier specific factor resulted in a decrease of 38,409 metric tons CO2e of emissions compared with using the 2021 factor. In 2022, First Solar changed the grid electricity emission factor for its Frankurt-Oder, Germany facility from a location specific factor of 0.121 kg CO2e/kWh in 2021 to a supplier-specific factor of 0.292 kg CO2e/kWh in 2022. Use of the updated supplier specific factor resulted in an increase of 411 metric tons CO2e of emissions compared with using the 2021 factor. Also In 2022, First Solar changed the grid electricity emission factor for its Perrysburg, Ohio facility from a supplier specific factor of 0.359 kg CO2e/kWh in 2021 to a supplier-specific factor of 0.382 kg CO2e/kWh in 2022. Use of the updated supplier specific factor resulted in a increase of 8,859 metric tons CO2e of emissions compared with using the 2021 factor. The updated emissions factors for the three facilities account for a net decrease of 24,434 metric tons CO2e or 4.4% of the previous year's emissions

				through (-24,434/560,210) *100 = -4.4%
Change in boundary	0	No change	0	Not applicable in 2022.
Change in physical operating conditions	0	No change	0	Not applicable in 2022.
Unidentified	0	No change	0	Not applicable in 2022.
Other	48,544	Decreased	8.7	In 2022, 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 48,544 metric tons CO2e of emissions, or 8.7% of the previous year's emissions through (-48,544/560,210)*100=-8.7%

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)

263,442

% change in emissions in this category

18

Please explain

Emissions were calculated based on life cycle assessment of First Solar PV module production and total modules produced in 2022, and subtracting 2022 Scope 1 and 2 emissions. Since manufacturing output increased by 15% in 2022 compared to 2021, 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)

257,532

% change in emissions in this category

67

Please explain

Capital expenditures on purchases of property, plant, and equipment were the basis for the estimate. These capital expenditures were 67% higher in 2022 than 2021 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)

12,826

% change in emissions in this category

8

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%.

Upstream transportation and distribution

Direction of change

Increased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

53

% change in emissions in this category

0.4

Please explain

Life cycle emissions were calculated on a well-to-wheel basis. 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 increased in 2022 compared to 2021 due to increased manufacturing output. 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 2022, 82% of total waste generated was recycled compared to 83% in 2021. In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were calculated using the Argonne GREET W2W Calculator (2022).

Waste generated in operations

Direction of change

Decreased

Primary reason for change

Other emissions reduction activities

Change in emissions in this category (metric tons CO2e)

1,372

% change in emissions in this category

31

Please explain

The proportion of recycled waste in manufacturing operations increased to 82% in 2022 compared with 81% in 2021, resulting in a decrease of waste-related emissions.

Business travel

Direction of change

Increased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

4,043

% change in emissions in this category

805

Please explain

Life cycle emissions were calculated on a well-to-wheel basis. Business travel emissions increased in 2022 based on travel restrictions due to the COVID-19 being lifted. In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were calculated using the Argonne GREET W2W Calculator (2022).

Employee commuting

Direction of change

Increased

Primary reason for change

Change in physical operating conditions

Change in emissions in this category (metric tons CO2e)

577

% change in emissions in this category

15

Please explain

Life cycle emissions were calculated on a well-to-wheel basis. Employee commuting emissions increased in 2022 based on based on travel restrictions due to the COVID-19 being lifted. In addition to use phase (pump-to-wheel) emissions, upstream (well-to-pump) emissions were calculated using the Argonne GREET W2W Calculator (2022).

Upstream leased assets

Direction of change

First year of reporting this category

Downstream 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)

1,386

% change in emissions in this category

2

Please explain

In accordance with the Scope 3 protocol methodology, the downstream T&D emissions from First Solar shipment of finished goods to customer project sites have been combined with upstream T&D emissions; therefore, there are no downstream T&D emissions.

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

Increased

Primary reason for change

Change in methodology

Change in emissions in this category (metric tons CO2e)

387

% change in emissions in this category

66

Please explain

In 2022, a supplier-specific grid electricity emission factor (0.292 kg CO2-eq/kWh) was used for our Frankfurt-Oder, Germany recycling facility which was higher than the supplier-specific grid electricity emission factor used in 2021(0.121 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)

10

% change in emissions in this category

3

Please explain

In accordance with the Scope 3 protocol methodology, the downstream leased asset emissions have been combined with upstream leased asset emissions; therefore, there are no downstream leased asset emissions.

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	32,827	32,827
Consumption of purchased or acquired electricity		0	1,032,664	1,032,664
Consumption of self-generated non-fuel renewable energy		7,172		7,172

Total energy consumption		7,172	1,065,491	1,072,663

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 2022.

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 2022.

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 2022.

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 2022.

Oil

Heating value

HHV

Total fuel MWh consumed by the organization

3,079

MWh fuel consumed for self-generation of electricity

3,079

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 liquified petroleum gas for food service and gasoline for transportation (owned Box Truck).

Gas

Heating value

HHV

Total fuel MWh consumed by the organization

29,749

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

29,749

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 2022.

Total fuel

Heating value

HHV

Total fuel MWh consumed by the organization

32,827

MWh fuel consumed for self-generation of electricity

482

MWh fuel consumed for self-generation of heat

29,749

Comment

Oil for testing diesel generators, liquified petroleum gas for food service, 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 by country/area of your non-fuel energy consumption in the reporting year.

Country/area

United States of America

Consumption of purchased electricity (MWh)

338,925

Consumption of self-generated electricity (MWh)

3,372

Is this electricity consumption excluded from your RE100 commitment?

No

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

27,185

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

369,482

Country/area

Malaysia

Consumption of purchased electricity (MWh)

370,471

Consumption of self-generated electricity (MWh)

1,095

Is this electricity consumption excluded from your RE100 commitment?

No

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

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

371,566

Country/area

Viet Nam

Consumption of purchased electricity (MWh)

318,479

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

No

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

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

318,479

Country/area

Germany

Consumption of purchased electricity (MWh)

2,379

Consumption of self-generated electricity (MWh)

2,705

Is this electricity consumption excluded from your RE100 commitment?

No

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

2,564

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

7,648

Country/area

India

Consumption of purchased electricity (MWh)

157

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

No

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

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

157

Country/area

Chile

Consumption of purchased electricity (MWh)

2,192

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

No

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

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

2,192

Country/area

Samoa

Consumption of purchased electricity (MWh)

60

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

No

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

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

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

60

C8.2h

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

Country/area of consumption of purchased renewable electricity

United States of America

Sourcing method

Financial (virtual) power purchase agreement (VPPA)

Renewable electricity technology type

Solar

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

0

Tracking instrument used

Contract

Country/area of origin (generation) of purchased renewable electricity

United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

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

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

2022

Supply arrangement start year

2022

Additional, voluntary label associated with purchased renewable electricity

No additional, voluntary label

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.

C8.2j

(C8.2j) Provide details of your organization's renewable electricity generation by country/area 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 consumed by your organization from this facility in the reporting year (MWh)

3,372

Energy attribute certificates issued for this generation

No

Type of energy attribute certificate

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 consumed by your organization from this facility in the reporting year (MWh)

2,705

Energy attribute certificates issued for this generation

No

Type of energy attribute certificate

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 consumed by your organization from this facility in the reporting year (MWh)

1,095

Energy attribute certificates issued for this generation

No

Type of energy attribute certificate

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/area-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

92

Efficiency figure in the reporting year

0.184

Metric numerator

Other, please specify

kilowatt

Metric denominator

square meter

Comment

In 2022, First Solar Series 6 Plus PV modules ranged from 18.1-19.0% module conversion efficiency, corresponding to 0.181-0.190 kilowatt per m2, or 455-480 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

4.8

Metric numerator

grams

Metric denominator (intensity metric only)

Watt produced

% change from previous year

28

Direction of change

Decreased

Please explain

In 2022, our manufacturing waste intensity decreased by approximately 28% primarily due to increased throughput, manufacturing yield improvements and less waste generated per watt produced.

Description

Energy usage

Metric value

0.11

Metric numerator

kilowatt hours

Metric denominator (intensity metric only)

Watt produced

% change from previous year

6

Direction of change

Decreased

Please explain

In 2022, our manufacturing energy intensity (energy consumption per watt produced) decreased by approximately 8% compared to 2021 primarily due to the greater throughput and enhanced energy efficiency of our Series 6 manufacturing process.

Description

Other, please specify

Water

Metric value

0.33

Metric numerator

Liters

Metric denominator (intensity metric only)

Watt produced

% change from previous year

18

Direction of change

Decreased

Please explain

While our production increased by nearly 15% in 2022, our absolute water withdrawals decreased by approximately 7% and our manufacturing water intensity decreased by approximately 20% 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	Over 92% of our revenue is derived from the sale of low carbon products (thin film PV modules). Our Research and development investment is directly contributing to the same.

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

100

R&D investment figure in the reporting year (unit currency as selected in C0.4) (optional)

112,804

Average % of total R&D investment planned over the next 5 years

100

Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

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. We continue to invest significant financial resources in such initiatives, including approximately $0.3 billion for a dedicated R&D facility in the United States to support the implementation of our technology roadmap. We expect such R&D facility to feature a high-tech pilot manufacturing line, allowing for the production of full-sized prototypes of thin film and tandem PV modules. Such R&D facility is expected to be completed in 2024. Based on publicly available information, we are one of the leaders in R&D investment among PV solar module manufacturers. With over $1 billion in cumulative R&D investments in the last 10 years alone, we have a demonstrated history of innovation and continuous improvement.

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

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

First Solar Inc - CY 2022 - CDP Letter Final issued 20230713.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 2022 - CDP Letter Final issued 20230713.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 2022 - CDP Letter Final issued 20230713.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 canceled any project-based carbon credits within the reporting year?

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

Collect GHG emissions data at least annually from suppliers
Collect targets information at least annually from suppliers
Collect other climate related information at least annually from suppliers
Other, please specify

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

% of suppliers by number

2

% total procurement spend (direct and indirect)

53

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

64

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 also assess the social and environmental performance of our raw material and goods and services suppliers on an annual basis. In 2022, the suppliers we engaged on their environmental performance represented 53% of our total procurement spend and 98% of our total spend on purchased goods and services, 64% of our 2022 total scope 3 emissions. This was estimated based on 98% of our 2022 Scope 3 emissions from purchased goods and services (1,755,131 metric tons CO2-eq) which amounts to 1,720,028 metric tons CO2-eq, divided by total 2022 scope 3 emissions (2,679,637) = 64% of total scope 3 emissions. In 2022, we set a target to reduce our scope 3 GHG emissions intensity from purchased goods and services by 45% per MW produced by 2028, relative to 2020. By 2050, we aim to reduce our scope 3 GHG emissions from purchased goods and services, capital goods, and fuel- and energy-related activities by 97% per MW produced, relative to 2020. In 2022, purchased goods and services, capital goods, and upstream fuel- and energy-related activities accounted for more than 95% of our 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 engaging with suppliers through business reviews and putting corrective actions in place, such as setting a GHG emissions targets, to improve supplier performance.

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)

28

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

34

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 28% of our total procurement spend and 34% of our total scope 3 emissions in 2022. This was estimated based on 52% of our 2022 Scope 3 emissions from purchased goods and services (1,755,131 metric tons CO2-eq) which amounts to 912,668 metric tons CO2-eq, divided by total 2022 scope 3 emissions (2,679,637) = 34% of total scope 3 emissions. In 2022, we set a target to reduce our scope 3 GHG emissions intensity from purchased goods and services by 45% per MW produced by 2028, relative to 2020.

Impact of engagement, including measures of success

The impact of the engagement included exchanging information on our science-based targets including our scope 3 emissions intensity target and identifying opportunities to reduce their GHG emissions to help drive down the embodied carbon of our products and help meet our science-based targets. Measures of success include meeting our near-term scope 3 emissions intensity reduction target and reducing the embodied carbon of our product by up to 45% by 2028 by increasing the recycled content of our glass and aluminum materials, switching to lower carbon materials such as steel, and leveraging our suppliers' science-based targets. A positive outcome of the engagement included alignment on our scope 3 targets and interest in potentially partnering on renewable energy opportunities.

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. In the context of the fight against climate change, all PV technologies are not created equal. Where and how a PV module and its components are manufactured significantly impacts its environmental profile and determines how many greenhouse gas emissions they will be able to avoid and displace.

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 the lowest carbon and water footprint and fastest energy payback time in the industry. Our Series 7 module has an even lower environmental footprint- with a carbon and water footprint that is nearly 4X lower than conventional crystalline silicon modules manufactured in China and an energy payback time that is approximately 5X faster. In just two months under high irradiation conditions, First Solar Series 7 PV modules produce more energy than was required to create them. This corresponds to a 180-fold energy return on investment (EROI) over a 30-year project lifetime, providing an abundant net energy gain to the electricity grid. 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 is the research arm of the Clean Energy Buyers Alliance which includes more than 350 of the world's largest energy buyers. 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. In 2022, First Solar became a proud foundational funder of the Clean Energy Buyers Institute's (CEBI) Beyond the Megawatt Initiative, which aims to create a resilient, equitable, and environmentally sustainable energy system by leveraging energy customer demands for clean energy. The initiative is developing procurement guidance to help energy buyers embed environmental sustainability, social equity and resilience in energy buyers' clean energy procurement process. 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.

Impact of engagement, including measures of success

In June 2023, First Solar joined more than 18 other leading companies representing over $498 billion in annual revenues to become a signatory of the Principles for Purpose Driven Energy Procurement ("the Principles"). The Environment Sustainability pillar of the Principles include a commitment to procure industrial commodities, materials, and clean energy equipment with low embodied carbon, such as ultra-low-carbon photovoltaic panels. All renewable energy is not created equal, and there's an opportunity for purpose-driven procurement, when embedded into energy buying processes, to create a powerful demand signal for more sustainable, just, and resilient renewable energy projects.

The Principles are available online: http://cebi.org/programs/beyond-the-megawatt/principles/?utm_source=linkedin&utm_medium=social&utm_campaign=BTMP

C12.1d

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

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 and 2022, we participated in the development of the ultra low-carbon solar criteria for EPEAT to help drive demand for low-carbon solar products. The Ultra Low-Carbon Solar Criteria were adopted by EPEAT in 2023. We are currently working towards meeting the new Ultra Low-Carbon Solar Criteria and plan to register our Series 7 modules in EPEAT in 2023.

As of December 31, 2022, First Solar Series 6 and Series 6 *Plus* modules are the first and only PV products 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 exceeded the basic but stringent environmental and social criteria of a Bronze rating.

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

Implementation of emissions reduction initiatives

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 requirements such as air emissions management, energy efficiency improvements, corporate-wide scope 1 and 2 GHG emissions reduction goal, public disclosure on progress towards the goal, water management, and efforts to minimize their energy consumption and greenhouse gas emissions.

% 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

Retain 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

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers
Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may impact the climate

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 external engagement activities are consistent with your climate commitments and/or climate transition plan

First Solar's VP of Global Policy, Marketing 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 nearly 4 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?

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

The Inflation Reduction Act ("IRA") established tax credits for domestic solar manufacturers to help boost the U.S. solar supply chain, create American jobs, compete with Chinese manufacturers and support energy independence, and created incentives to drive more renewable project buying decisions to low-carbon solutions and domestic content.

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

Carbon pricing, taxes, and subsidies

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

Other, please specify

incentives for domestic solar manufacturing; ; incentives to drive deployment of low emissions renewable projects

Policy, law, or regulation geographic coverage

National

Country/area/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

In 2022, we supported the Inflation Reduction Act and the advanced manufacturing production credit under Section 45X of the Internal Revenue Code, which provides certain specified benefits for solar modules and solar module components manufactured in the United States and sold to third parties. First Solar supported the bill directly and indirectly as a member of the Solar Energy Manufacturing for America (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. In August 2022, the U.S. President signed the IRA into law.

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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

The IRA is central to our climate transition plan as it is intended to accelerate the country's ongoing transition to clean energy. The provisions of the IRA are generally effective for tax years beginning after 2022. Among other things, the financial incentives provided by the IRA are expected to significantly increase demand for modules manufactured in the United States. The IRA offers various tax credits, including the advanced manufacturing production credit, pursuant to Section 45X of the Internal Revenue Code (the "IRC"), for solar modules and solar module components manufactured in the United States and sold to third parties. The Inflation Reduction Act was the key catalyst that led the company to choose the U.S. for our latest factory. We are in the process of expanding our manufacturing capacity in the U.S. and by 2026, we expect to have a U.S. nameplate capacity of approximately 14 GW in 2026. Over the past year and including this announcement, First Solar has committed to over $2.8

billion in capital investment and 7.9 GW of additional manufacturing capacity in the US. By expanding America's solar manufacturing base, and the value chains that support it, we are working to ensure that the US enters the next decade in a position of strength, fully capable of producing the technology it needs to complete its transition to a sustainable energy future.

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.

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

Low-carbon products and services

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

Other, please specify

Section 201 Solar Tariffs

Policy, law, or regulation geographic coverage

National

Country/area/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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

Upholding trade laws and promoting domestic manufacturing is central to the achievement of our climate transition plan. The reduction, elimination, or expiration of 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. In the context of the fight against climate change, all PV technologies are not created equal. Where and how a PV module and its components are manufactured significantly impacts its environmental profile and determines how many greenhouse gas emissions they will be able to avoid and displace. According to a 2022 study by the National Renewable Energy Laboratory (NREL), CdTe PV modules manufactured in the U.S. have a carbon footprint that is more than 2.5X lower than crystalline silicon modules manufactured in China. Relying on crystalline silicon modules produced in coal-intensive grids could consume as much as 14% of the remaining carbon budget for a 1.5°C world, resulting in 68 billion metric tons of CO2. For perspective, the world emits approximately 50 billion metric tons of CO2 per year. Our position is therefore aligned with the goals of the Paris Agreement.

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

In September 2022, the EU Commission published a proposal for a Regulation on prohibiting products made with forced labor on the European Union market. The provisions of the proposal would apply to products of any type, including their components, regardless of the sector or industry. It is particularly relevant for solar because civil society has linked the Chinese PV industry to forced labor practices.

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

Low-carbon products and services

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

Other, please specify

Forced labor ban to ensure a just energy transition

Policy, law, or regulation geographic coverage

Regional

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

Europe

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

Support with no exceptions

Description of engagement with policy makers

First Solar welcomed the European Commission's proposal for a regulation to effectively ban products produced, extracted or harvested with forced labor and submitted public comments on the proposed regulation in November 2022. Europe needs solar, but not at any human or environmental cost. It is a misconception that policymakers must choose between fighting climate change and respecting human rights.

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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

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 position is aligned with the goals of the Paris Agreement. According to a 2022 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. This policy is central to the achievement of our climate transition plan and determines whether the transition is just and sustainable.

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

In 2022, Europe moved towards spurring domestic manufacturing with the introduction of a legislative framework for its 'Green Deal Industrial Plan.' The Green Deal Industrial Plan enhances the competitiveness of Europe's net-zero industry and is accelerating the transition to climate neutrality by creating a more supportive environment for scaling up the manufacturing of clean technologies in the European Union to meet Europe's ambitious climate targets. In March 2023, the European Commission proposed the Net-Zero Industry Act, an initiative stemming from the Green Deal Industrial Plan.

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

Carbon pricing, taxes, and subsidies

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

Other, please specify

Incentives for clean energy manufacturing; definition of sustainability criteria for PV modules

Policy, law, or regulation geographic coverage

Regional

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

Europe

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

Support with no exceptions

Description of engagement with policy makers

First Solar supported the EU's Green Deal Industrial Plan in 2022. We supported it both directly and indirectly as a member of Solar Power Europe (SPE) in 2022 as well as the European Solar Manufacturing Council (ESMC) in 2023.

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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

The Green Industrial Plan would enhance the competitiveness of Europe's net-zero industry and accelerate the transition to climate neutrality. Such industrial policies are central to our manufacturing expansion strategy and climate transition plan. Although we do not currently manufacture in Europe, such policies would support our scope 3 targets by enabling our suppliers in Europe to achieve their clean energy and GHG emissions reduction targets and ensure that only sustainably and socially responsibly manufactured PV equipment are used to use the achieve the EU climate goals.

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

In November 2022, the government of India, through its Ministry of Environment, Forest and Climate Change (MOEFCC) and the Ministry of New and Renewable Energy (MNRE), introduced legislation intended to expand the scope of existing electronic waste ("e-waste") regulations, including PV solar modules. This regulation, as subsequently amended in January 2023, will also create extended producer obligations for mandatory recycling of PV solar waste at the end of its useful life. These regulations are expected to come into effect on April 1, 2023, but the actual recycling obligations are effective in 2034 when the waste streams reach sizeable proportions. In the interim,

voluntary recycling or storage of the waste is envisaged for which detailed regulations are awaited.

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

Low-carbon products and services

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

Extended Producer Responsibility (EPR)

Other, please specify

Sustainable supply chains

Policy, law, or regulation geographic coverage

National

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

India

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

Support with no exceptions

Description of engagement with policy makers

First Solar's engagement was primarily on two fronts (a) fiscal policy and regulations to incentivize domestic PV module manufacturing with an emphasis on full value chain integration and (b) creating a policy on circularity of the PV supply chain especially on mandatory high value recycling of PV waste streams as opposed to landfilling.

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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

Our position is aligned with the goals of the Paris Agreement. Projections of 2050 PV demand call for up to 80 TW installed in the next 25 year. This requires continued growth rates (~25%/year) and innovation. PV innovation requires new material combinations. Limiting options will only slow the energy transition. This law is central to our climate transition plan as we are constructing our first PV manufacturing facility in India which will become operational in 2023.

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

The government of India introduced several measures to incentivize supply chain diversification in critical industries like solar in India. Amongst this was the Production Linked Incentive Scheme (PLI) wherein through Federal budgetary support an amount of $600 million was initially earmarked for supporting the local manufacturing of PV in India with an emphasis on vertical integration and local component eco-system creation. The scheme was announced in 2021, through the Ministry of New and Renewable Energy (MNRE) and attracted investor interest for 55GW of new production capacity in India.

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

Carbon pricing, taxes, and subsidies

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

Other, please specify

Production Linked Incentives for Solar PV manufacturing in India

Policy, law, or regulation geographic coverage

National

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

India

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

Support with no exceptions

Description of engagement with policy makers

While the initial incentive was allotted to 3 companies with a total of 12GW of new manufacturing capacity, First Solar along with other industry stakeholders advocated for additional budgetary support, and in 2022, the Federal Government announced incremental $2.4 billion of subsidy. First Solar was allotted $143Mn of this subsidy in March 2023 for its 3.4GW fully integrated manufacturing facility in the state of Tamil Nadu, India. These incentives will enable supply chain diversification for the solar industry in India (which was largely dependent on imported equipment from 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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

This law is central to our climate transition plan as we are constructing our first PV manufacturing facility in India which will become operational in 2023. With more than 50GW of PV solar modules sold worldwide and additional backlog of 70 GW, every year First Solar PV modules are displacing more than 10 times the amount of greenhouse gas emissions we emit through our global operations and supply chain. We set an

ambitious target to achieve 100% renewable energy across our global operations by 2028 in order to reduce our absolute scope 1 and scope 2 greenhouse gas emissions by 34% by 2028 and achieve Net Zero emissions by 2050, relative to 2020.

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

The State Government of Tamil Nadu's industrial policy that incentivizes manufacturing and has specific incentives for production of green technologies (Like Solar PV, Wind and batteries). These include capital subsidy, training grants and grants towards R&D activities.

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

Low-carbon products and services

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

Low-carbon innovation and R&D

Policy, law, or regulation geographic coverage

National

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

India

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

Support with no exceptions

Description of engagement with policy makers

First Solar worked directly with the State Government of Tamil Nadu towards a new industrial policy that incentivizes manufacturing and has specific incentives for production of green technologies (Like Solar PV, Wind and batteries). The new industrial policy also encourages recycling and reuse of water and mandates industrial units to install zero-liquid discharge facilities, for which the state government provides capital subsidy.

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 on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

This law is central to our climate transition plan as we are constructing our first PV manufacturing facility in India which will become operational in 2023. With more than 50GW of PV solar modules sold worldwide and additional backlog of 70 GW, every year First Solar PV modules are displacing more than 10 times the amount of greenhouse

gas emissions we emit through our global operations and supply chain. We set an ambitious target to achieve 100% renewable energy across our global operations by 2028 in order to reduce our absolute scope 1 and scope 2 greenhouse gas emissions by 34% by 2028 and achieve Net Zero emissions by 2050, relative to 2020.

C12.3b

(C12.3b) Provide details of the trade associations your organization is a member of, or 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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 (currency as selected in C0.4)

100,000

Describe the aim of your organization's funding

In 2022, First Solar donated $100,000 as a foundational funder of the Clean Energy Buyers Institute's (CEBI) Beyond the Megawatt Initiative, which aims to create a resilient, equitable, and environmentally sustainable energy system by leveraging energy customer demands for clean energy. The initiative is developing procurement guidance to help energy buyers embed environmental sustainability, social equity and resilience in energy buyers' clean energy procurement process. In June 2023, First Solar joined more than 18 other leading companies representing over $498 billion in

annual revenues to become a signatory of the Principles for Purpose Driven Energy Procurement.

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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 (currency as selected in C0.4)

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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 (currency as selected in C0.4)

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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 (currency as selected in C0.4)

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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 Ohio, was created to educate Ohioans, support pro-solar policy and ensure that Ohio communities benefit from the

billions of dollars of investment in the state. This is important to combat the misinformation and NIMBY opposition that blocks the development of renewable energy projects. USSEC advocates for policy reforms that support solar to protect Ohio as a viable solar market. This is consistent with our position as a PV manufacturer in Ohio with goals to be powered by 100% renewable energy in the U.S. by 2026.

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

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

SolarPower Europe

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

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

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 (currency as selected in C0.4)

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 policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

PVthin is an international, not-for-profit coalition representing global leaders in the thin-film solar industry. Its objective is to strengthen global energy security and support the transition to a low carbon economy by promoting the social, economic and environmental benefits of thin-film solar photovoltaic technologies. The activities of the coalition currently focus on:

• Advocating thin film PV as a solution for energy security, climate change and water scarcity

• Promoting policies that reward sustainable business practices such as resource efficiency and advanced closed-loop recycling schemes

• Sharing and promoting best practices in environment, health and safety management

• Advancing a recycling standard for PV modules under the EU WEEE Directive

• Participating in the development of the European Commission's Product Environmental Footprint Category Rules for PV electricity generation

• Supporting the development of 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 (currency as selected in C0.4)

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

Underway – previous year attached

Attach the document

FirstSolar_Sustainability-Report_2022.pdf

Page/Section reference

Pages 4-6; 10-13; 18-28; 54, 65-66

Content elements

Governance
Strategy
Emissions figures
Emission targets
Other metrics

Comment

Publication

In mainstream reports

Status

Complete

Attach the document

First-Solar-Inc-2022-Annual-Report-FINAL.pdf

Page/Section reference

Pages 2;4;6;9-10;17-19; 21-22; 37; 50; 58; 132-133

Content elements

Strategy
Risks & opportunities
Other metrics

Comment

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment
Row 1	Business Ambition for 1.5C RE100 Other, please specify Corporate Clean Energy Alliance	First Solar joined RE100 in 2020 and committed to powering our global operations with 100% renewable energy by 2028. RE100 is a global initiative dedicated to accelerating the shift to zero-carbon grids, led by The Climate Group in partnership with CDP. First Solar is a member of the Business Ambition for 1.5°C campaign and 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. Our near-term science-based emissions reduction target and net-zero target are in line with limiting the global temperature rise to 1.5 degrees Celsius above pre-industrial levels and have been approved by the Science Based Targets Initiative (SBTi). In 2021, we became a member of the Corporate Clean Energy Alliance, which aims to rapidly deploy transformation enabling technologies and expand access to clean energy resources across the Southeast Asia region.

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	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

	management-level responsibility	(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 impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment

No, but we plan to within the next two years

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment

No, but we plan to within the next two years

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity-sensitive areas in the reporting year?

No

C15.5

(C15.5) 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

C15.6

(C15.6) 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	

C15.7

(C15.7) 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
In voluntary sustainability report or other voluntary communications	Impacts on biodiversity Details on biodiversity indicators Risks and opportunities Biodiversity strategy	pg. 1-11 1

[1]Best Practices in Responsible Land Use for Improving Biodiversity at a Utility-Scale Solar Facility.pdf

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.

Not applicable

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 Product 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 2022, we have sold approximately 50 gigawatts (GW) of PV solar modules and have an additional backlog of ~70 GW. Assuming average worldwide irradiance and grid electricity emissions, our products will be used to displace 78 million metric tons of CO2e per year during their 30+ year product life. This is equivalent to powering more than 60 million average homes, planting 1.3 billion trees and saving over 225 billion liters of water (or 90,000 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	2,619,319,000

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, Inc.

Scope of emissions

Scope 1

Scope 2 accounting method

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

158

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

187

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 2022 relative to total goods produced in 2022. 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, Inc.

Scope of emissions

Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

11,612

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

187

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 2022 relative to total goods produced in 2022. 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, Inc.

Scope of emissions

Scope 3

Scope 2 accounting method

Scope 3 category(ies)

Category 1: Purchased goods and services
Category 2: Capital goods
Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)
Category 4: Upstream transportation and distribution
Category 5: Waste generated in operations
Category 6: Business travel
Category 7: Employee commuting
Category 8: Upstream leased assets
Category 9: Downstream transportation and distribution
Category 10: Processing of sold products
Category 11: Use of sold products
Category 12: End-of-life treatment of sold products
Category 13: Downstream leased assets
Category 14: Franchises
Category 15: Investments

Other (upstream)
Other (downstream)

Allocation level
Company wide

Allocation level detail

Emissions in metric tonnes of CO2e
55,205

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
187

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 2022 relative to total goods produced in 2022. 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

Scope 2 accounting method

Scope 3 category(ies)

Allocation level
Company wide

Allocation level detail

Emissions in metric tonnes of CO2e
0

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
0

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 2022 relative to total goods produced in 2022. 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. Because First Solar did not supply any goods to the customer in 2022, emissions are reported as zero.

Requesting member
Ørsted

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)

Allocation level
Company wide

Allocation level detail

Emissions in metric tonnes of CO2e
0

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
0

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 2022 relative to total goods produced in 2022. 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. Because First Solar did not supply any goods to the customer in 2022, emissions are reported as zero.

Requesting member
Ørsted

Scope of emissions
Scope 3

Scope 2 accounting method

Scope 3 category(ies)

Category 1: Purchased goods and services
Category 2: Capital goods
Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)
Category 4: Upstream transportation and distribution
Category 5: Waste generated in operations
Category 6: Business travel
Category 7: Employee commuting
Category 8: Upstream leased assets
Category 9: Downstream transportation and distribution
Category 10: Processing of sold products
Category 11: Use of sold products
Category 12: End-of-life treatment of sold products
Category 13: Downstream leased assets
Category 14: Franchises
Category 15: Investments
Other (upstream)
Other (downstream)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

0

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

0

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 2022 relative to total goods produced in 2022. 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. Because First Solar did not supply any goods to the customer in 2022, emissions are reported as zero.

SC1.2

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

Not applicable.

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, Inc.

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 peak (kWp)

Total emissions in kg CO2e per unit

267

±% change from previous figure supplied

0

Date of previous figure supplied

July 26, 2022

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). This is the first environmental product declaration published by First Solar, and is also representative of the Series 6 Plus PV modules produced in 2022.

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
PV module	Initiative 1	Alternative frame material (steel) in Series 7 compared to aluminum in Series 6 Plus.	Completed	40

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