



# Welcome to your CDP Water Security Questionnaire 2020

## W0. Introduction

### W0.1

#### **(W0.1) Give a general description of and introduction to your organization.**

First Solar, Inc. is a leading global provider of comprehensive photovoltaic (PV) solar energy solutions with over 25 gigawatts (GW) sold worldwide. We are the world's largest thin film PV solar module manufacturer and are the only American company among the world's ten largest PV manufacturers. We operate our business in two segments. Our modules segment involves the design, manufacture, and sale of our advanced thin film solar modules, which convert sunlight into electricity. Third-party customers of our modules segment include integrators and operators of PV solar power systems. Our second segment is our systems segment, through which we provide power plant solutions, which include (i) project development, (ii) engineering, procurement, and construction ("EPC") services, and (iii) O&M services. In addressing the overall global demand for electricity, our high-efficiency advanced thin film solar modules, which leverage our Series 6™ ("Series 6") module technology, and power plant solutions compete favorably on an economic basis with fossil fuel-based forms of electricity generation and provide low-cost electricity to end users. From raw material sourcing through end-of-life module recycling, First Solar's PV modules and systems protect and enhance the environment. 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](http://www.firstsolar.com)

First Solar was founded in 1999 and began commercial production in 2002. Since 2002 and through 2019, we have sold over 25 GW of PV solar modules. Assuming average worldwide irradiance and grid electricity emissions, our products are being used to displace over 17 million metric tons of CO<sub>2</sub>e per year during their 25+ year product life. This is equivalent to powering more than 12 million average homes, planting 290 million trees and saving 45 billion liters of water (or 18,000 Olympic swimming pools) per year based on worldwide averages.



## W0.2

**(W0.2) State the start and end date of the year for which you are reporting data.**

	Start date	End date
Reporting year	January 1, 2019	December 31, 2019

## W0.3

**(W0.3) Select the countries/areas for which you will be supplying data.**

- Germany
- Malaysia
- United States of America
- Viet Nam

## W0.4

**(W0.4) Select the currency used for all financial information disclosed throughout your response.**

- USD

## W0.5

**(W0.5) Select the option that best describes the reporting boundary for companies, entities, or groups for which water impacts on your business are being reported.**

- Other, please specify
- Global manufacturing, recycling and R&D

## W0.6

**(W0.6) Within this boundary, are there any geographies, facilities, water aspects, or other exclusions from your disclosure?**

- No

## W1. Current state

### W1.1

**(W1.1) Rate the importance (current and future) of water quality and water quantity to the success of your business.**



	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Vital	Important	Water quality is vital for our operations (direct use) as our thin film solar photovoltaic manufacturing process relies on ultra-pure water production. As we expand our manufacturing footprint, dependency on freshwater availability will increase. The indirect use of water is important as our supply chain relies on sufficient amounts of water to be available for use. However, by switching to less water-intensive electricity generation, this dependence could be reduced. First Solar conducted a lifecycle water assessment of our thin film PV technology which concluded that the life cycle water withdrawal of cadmium telluride (CdTe) PV ranges from approximately 382– 425 L/MWh. (Source: Sinha, Meader and de Wild-Scholten, Life Cycle Water Usage in CdTe Photovoltaics, IEEE, Journal of Photovoltaics, 2012) Direct onsite water use represents only ~12% of CdTe PV's lifecycle water withdrawal. The remainder is related to indirect water withdrawal from the use of grid electricity and raw materials throughout the product life cycle. Primary contributors to life cycle water withdrawal in our supply chain include the use of grid electricity, glass, steel and copper production, chemical use, and transport during take-back and recycling.
Sufficient amounts of recycled, brackish and/or produced water available for use	Not very important	Not important at all	Our direct and indirect operations do not depend on having sufficient amounts of brackish or produced water so the "not very important" rating was selected. We have however started recycling water from our routinely operated recycling facilities in order to reduce our water withdrawals. As a result, First Solar's routinely operated recycling facilities in Malaysia, Germany, Vietnam and the U.S. have zero wastewater discharge. This will enable us to operate mobile recycling plants in water scarce regions in the future and in areas where water utilities or wastewater treatment facilities are not available. Our direct and indirect dependency on brackish or produced water availability is unlikely to increase in the

			future, however recycling water will be increasingly important as our manufacturing footprint and water demand increases. Our supply chain does not rely on recycled, brackish or produced water which is why the "not important at all" rating was selected.
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## W1.2

**(W1.2) Across all your operations, what proportion of the following water aspects are regularly measured and monitored?**

	% of sites/facilities/operations	Please explain
Water withdrawals – total volumes	100%	We regularly measure and monitor 100% of our total withdrawals from our manufacturing, recycling, and research and development facilities based on water utility bills.
Water withdrawals – volumes by source	100%	We regularly monitor and measure 100% of the total water withdrawals of our manufacturing, recycling, and research and development facilities based on water utility bills. All withdrawals come from the local municipal supplier (third-party/ freshwater).
Water withdrawals quality	100%	We regularly monitor and measure 100% of our water discharge quality by standard effluent parameters as well as for heavy metals. First Solar factories are equipped with state-of-the-art analytical capabilities for in-house wastewater testing.
Water discharges – total volumes	100%	We regularly monitor and measure 100% of the water discharges of our manufacturing, recycling, and research and development facilities.
Water discharges – volumes by destination	100%	We regularly monitor and measure 100% of the water discharges by destination of our manufacturing, recycling, and research and development facilities. 56% of our wastewater in 2019 was discharged into freshwater (river), and 44% was sent to municipal wastewater treatment plants.
Water discharges – volumes by treatment method	100%	We regularly monitor and measure 100% of our total water discharge volumes by treatment method. No industrial wastewater leaves our



		site unless we have tested and approved it for discharge, even if it is being discharged to a municipal wastewater treatment plant.
Water discharge quality – by standard effluent parameters	100%	We regularly monitor and measure 100% of our water discharge quality by standard effluent parameters as well as for heavy metals from our manufacturing sites which represent 99.9% of our total wastewater discharge. First Solar factories are equipped with state-of-the-art analytical capabilities for in-house wastewater testing.
Water discharge quality – temperature	Not relevant	We do not have any high temperature inducing processes in wastewater. This is not anticipated to change or be relevant in the future.
Water consumption – total volume	100%	Approximately 51% of our total water withdrawals (~1,944 megaliters) was consumed during operation and used for irrigation, cooling towers, sanitary purposes, or recycled in 2019. We are able to estimate water consumption by subtracting total water discharges from total water withdrawals: 3,846 megaliters-1,902 megaliters= 1,944 megaliters consumed.
Water recycled/reused	100%	We measure the amount of water recycled at our manufacturing and recycling facilities in Malaysia, Ohio, Vietnam and Germany, which represented 99.9% of our water withdrawals in 2019. We recycled approximately 300 megaliters (or approximately 8% of our total water withdrawals) across our operations.
The provision of fully-functioning, safely managed WASH services to all workers	100%	100% of our facilities provide fully functioning, safely managed WASH services to all workers. Our total water withdrawal data includes sanitary water use at our manufacturing and recycling facilities.

## W1.2b

**(W1.2b) What are the total volumes of water withdrawn, discharged, and consumed across all your operations, and how do these volumes compare to the previous reporting year?**

	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
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Total withdrawals	3,846	Higher	Our total water withdrawals in 2019 (3,846 megaliters) were 13% higher than in 2018 (3,390 megaliters). While our production more than doubled in 2019, our absolute water withdrawals only increased by approximately 13%. Our threshold for "higher" is defined as any increase of less than 20%. Our water withdrawals increased due to the 111% increase in production. Total water withdrawals are expected to remain the same or decrease due to the increased throughput and efficiency of our Series 6 manufacturing process.
Total discharges	1,902	Much higher	In 2019, approximately 49% (or 1,900 megaliters) of First Solar's total water withdrawn from water utilities (3,846 megaliters) was discharged as wastewater from our industrial wastewater treatment systems. This represented a 27% increase compared to 2018 and was due to our production increasing by 111%. Our threshold for "much higher" is defined as any increase of 20% or more. Approximately 44% of our wastewater was sent to a third-party (municipal wastewater facility) and approximately 56% was discharged directly to fresh surface water (river). Total water discharges are expected to remain about the same in 2020. We expect to produce approximately 5.9 GW DC of solar modules during 2020, including 0.2 GW of S4 modules and 5.7 GW of Series 6 modules.
Total consumption	1,944	Higher	Our total water consumption in 2019 (1944 megaliters) was only 3% higher than in 2018 (1,895 megaliters) even though our production more than doubled. This was primarily due to increased throughput and efficiency of our Series 6 module manufacturing process as well as water recycling initiatives. Total water consumption is expected to remain about the same in 2020. We expect to produce approximately 5.9 GW DC of solar modules during 2020, including 0.2 GW of S4 modules and 5.7 GW of Series 6 modules.

## W1.2d

**(W1.2d) Indicate whether water is withdrawn from areas with water stress and provide the proportion.**

	Withdrawals are from areas with water stress	% withdrawn from areas with water stress	Comparison with previous reporting year	Identification tool	Please explain
Row 1	Yes	Less than 1%	Much lower	WWF Water Risk Filter	In 2019, 0.01% of our water withdrawals came from water stressed areas, compared to 0.1% in 2018. We used the WWF Risk Filter Tool and defined stressed areas as having baseline water stress that is equal to/greater than 'High': 40-80%. In 2019, Santa Clara was no longer classed as water stressed. We evaluate the percentage of sites operating in water stressed areas based on the baseline water stress of our site locations.

## W1.2h

**(W1.2h) Provide total water withdrawal data by source.**

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water, including rainwater, water from wetlands, rivers, and lakes	Not relevant			Not relevant. All withdrawals come from local municipal suppliers (third-party/freshwater). No change from last year. No changes are expected in the future.
Brackish surface water/Seawater	Not relevant			Not relevant. All withdrawals come from local municipal suppliers (third-party/freshwater). No change



				from last year.No changes are expected in the future.
Groundwater – renewable	Not relevant			Not relevant. All withdrawals come from local municipal suppliers (third-party/freshwater). No change from last year. No changes are expected in the future.
Groundwater – non-renewable	Not relevant			Not relevant. All withdrawals come from local municipal suppliers (third-party/freshwater). No change from last year. No changes are expected in the future.
Produced/Entrained water	Not relevant			Not relevant. All withdrawals come from local municipal suppliers (third-party/freshwater). No change from last year. No changes are expected in the future.
Third party sources	Relevant	3,846	Higher	All withdrawals for our manufacturing, recycling and research and development sites come from local municipal suppliers (third-party/freshwater). Our total water withdrawals were 13% higher in 2019 compared to 2018 (3,390 megaliters). This was due to the 111% increase in production capacity. Total water withdrawals from third party sources are expected to remain the same or decrease due to the increased throughput and efficiency of our Series 6 manufacturing process.

**W1.2i**

**(W1.2i) Provide total water discharge data by destination.**

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water	Relevant	1,069	Lower	Total water discharges to fresh surface water (river) amounted to 1,069 megaliters in 2019, which is approximately 12% lower than in 2018 (1,220 megaliters). This was due to the ramp down of Series 4 manufacturing lines. Total water discharges to fresh surface water are expected to be higher in 2020 due to the ramp up of Series 6 manufacturing lines.
Brackish surface water/seawater	Not relevant			On-site treated industrial wastewater is either indirectly discharged to sanitary sewer in the United States and Vietnam, or directly discharged to river in Malaysia. Our operations do not discharge wastewater to brackish surface water or seawater. No change from 2018 and no change is expected in the future.
Groundwater	Not relevant			On-site treated industrial wastewater is either indirectly discharged to sanitary sewer in the United States and Vietnam, or directly discharged to river in Malaysia. Our operations do not discharge wastewater to brackish surface water or seawater. No change from 2018 and no change is expected in the future.
Third-party destinations	Relevant	832	Much higher	Total water discharges to third-party destinations (municipal wastewater facility) amounted to 832 megaliters in 2019, which represented a 44% increase compared to 2018 (274 megaliters). The increase in 2019 was due to starting commercial production of Series 6 modules at



				our second manufacturing facility in Ho Chi Minh City, Vietnam and our manufacturing facility in Lake Township, Ohio.
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## W1.4

### (W1.4) Do you engage with your value chain on water-related issues?

Yes, our suppliers

Yes, our customers or other value chain partners

## W1.4a

### (W1.4a) What proportion of suppliers do you request to report on their water use, risks and/or management information and what proportion of your procurement spend does this represent?

#### Row 1

#### % of suppliers by number

1-25

#### % of total procurement spend

1-25

#### Rationale for this coverage

First Solar evaluates new suppliers using a balanced scorecard which focuses on the areas of Quality, Cost, Flexibility, Service, Technology and Sustainability. First Solar audits new and high-risk direct suppliers for their adherence to quality, environmental, health and safety, among other areas. The EHS section of our supplier audit tool uses the Responsible Business Alliance (RBA) Code of Conduct as a framework and includes questions on water use and water reduction targets. We prioritize engagement by focusing on our module component suppliers. We assessed approximately 4% of suppliers in 2019, representing approximately 2% of our spend. Before any materials are used in our manufacturing process, a supplier must undergo a rigorous qualification process.

#### Impact of the engagement and measures of success

Suppliers are scored in terms of low, medium and high risk to determine whether further engagement or corrective actions are needed. First Solar's Supplier Quality group trends and monitors on a monthly basis the number of non-conformances and drives the supplier to provide permanent corrective actions to prevent any reoccurrence of issues. After completing an onsite assessment, suppliers are more aware of First Solar's environmental, health and safety (EHS) requirements. Measures of success include overall low risk scores and supplier improvements such as creating or improving recycling programs, EHS objectives and targets. First Solar works with suppliers to drive

supplier improvement in Quality and EHS. In 2019, no suppliers were identified as having potential negative impacts based on their EHS audit score.

### Comment

## W1.4b

### (W1.4b) Provide details of any other water-related supplier engagement activity.

#### Type of engagement

Onboarding & compliance

#### Details of engagement

Inclusion of water stewardship and risk management in supplier selection mechanism

#### % of suppliers by number

1-25

#### % of total procurement spend

1-25

#### Rationale for the coverage of your engagement

First Solar evaluates new suppliers using a balanced scorecard which focuses on the areas of Quality, Cost, Flexibility, Service, Technology and Sustainability. First Solar audits new and high-risk direct suppliers for their adherence to quality, environmental, health and safety, among other areas. The EHS section of our supplier audit tool uses the Responsible Business Alliance (RBA) Code of Conduct as a framework and includes questions on water use and water reduction targets. We prioritize engagement by focusing on our module component suppliers. We assessed approximately 4% of suppliers in 2019, representing approximately 2% of our spend. Before any materials are used in our manufacturing process, a supplier must undergo a rigorous qualification process.

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### Comment

## W1.4c

### **(W1.4c) What is your organization's rationale and strategy for prioritizing engagements with customers or other partners in its value chain?**

First Solar engages customers through thought leadership, by generating awareness of the energy-water nexus. Unlike thermal electric power plants and concentrated solar power (CSP), solar PV does not require any water to generate electricity during operation and is therefore ideally suited to meet the growing energy and water needs of arid, water-limited regions. While energy security and climate change have been important drivers for renewable energy adoption, water security provides an additional driver. Desalination has become a common application of renewable energy in arid regions (e.g. Middle East, Australia). In addition, customers with their own sustainability goals are particularly interested in understanding how much carbon a First Solar PV plant displaces as well as how much water is saved by avoiding the use of grid electricity. Success is measured in terms of customer interest in the environmental attributes of our technology and megawatts (MW) sold.

We also raise awareness about the energy-water-carbon nexus through our social media platforms to highlight the important role solar PV can play in helping companies decouple their growth from environmental impacts associated with traditional sources of electricity generation. Over the past few years, we participated in a multi-stakeholder process led by the Green Electronics Council and NSF international to develop the industry's first sustainability leadership standard for PV modules and inverters (NSF 457) which includes criteria on energy and water efficiency, GHG emissions, and corporate sustainability reporting. PV modules and inverters conforming to NSF 457 will be added to the EPEAT registry for sustainable electronics. The EPEAT registry will enable public and private purchasers to identify environmentally preferable PV products.

## W2. Business impacts

### W2.1

#### **(W2.1) Has your organization experienced any detrimental water-related impacts?**

No

### W2.2

#### **(W2.2) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for water-related regulatory violations?**

No

## W3. Procedures

### W3.3

#### (W3.3) Does your organization undertake a water-related risk assessment?

Yes, water-related risks are assessed

### W3.3a

#### (W3.3a) Select the options that best describe your procedures for identifying and assessing water-related risks.

##### Direct operations

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##### Coverage

Full

##### Risk assessment procedure

Water risks are assessed as part of an enterprise risk management framework

##### Frequency of assessment

Annually

##### How far into the future are risks considered?

1 to 3 years

##### Type of tools and methods used

Tools on the market  
Enterprise Risk Management  
Other

##### Tools and methods used

WWF Water Risk Filter  
Internal company methods

##### Comment

First Solar conducts an annual survey to obtain the company leadership's view of enterprise risks and risk trends over a three-year horizon. The WWF Water Risk filter Tool is used to assess the baseline water stress levels of countries where our manufacturing, recycling and Research and Development facilities are located. Water-related project development risks are assessed based on internal company knowledge.

##### Supply chain

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##### Coverage

Partial

##### Risk assessment procedure

Other, please specify



Facility risk scorecards

**Frequency of assessment**

More than once a year

**How far into the future are risks considered?**

1 to 3 years

**Type of tools and methods used**

Tools on the market

Other

**Tools and methods used**

WWF Water Risk Filter

Internal company methods

**Comment**

Our facility risk scorecards assess water risks to our manufacturing facilities in the context of operational and/or business continuity on a semi-annual basis. Potential asset level water risks include natural disasters, production and utility supply disruption, and the inability to operate wastewater treatment plant or ultra pure water production. The level of coverage selected is prioritized according to a facility or supplier's ability to impact operations and business continuity.

**Other stages of the value chain**

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**Coverage**

Full

**Risk assessment procedure**

Water risks are assessed as part of other company-wide risk assessment system

**Frequency of assessment**

Not defined

**How far into the future are risks considered?**

Up to 1 year

**Type of tools and methods used**

International methodologies

**Tools and methods used**

Life Cycle Assessment

**Comment**

A life cycle assessment was conducted to determine the amount of water consumed across the life cycle of First Solar PV modules and systems. Approximately half the life cycle water withdrawal of First Solar's CdTe PV technology is associated with module manufacturing, one-third with the balance of system, and the remainder with end-of-life

recycling, with direct onsite water use representing only ~12% of CdTe PV's life cycle water withdrawal.

### W3.3b

**(W3.3b) Which of the following contextual issues are considered in your organization's water-related risk assessments?**

	Relevance & inclusion	Please explain
Water availability at a basin/catchment level	Relevant, always included	Sufficient water availability is taken into account when siting new manufacturing facilities as our manufacturing process relies on ultrapure water production. Our manufacturing risk scorecards assess potential risks to water availability at our current manufacturing sites. The WWF water risk filter tool is used to assess water stress levels of countries where our manufacturing, recycling and Research and Development facilities are located. The assessment determined that less than 1% of our manufacturing, research and development, and recycling sites are located in water stressed areas, defined as water stress of greater than 40% ("High": 40%-80%). In addition to evaluating manufacturing sites, securing sufficient water access for the construction of our utility-scale solar PV power plants is incorporated into our permitting and project development process.
Water quality at a basin/catchment level	Relevant, always included	Sufficient water quality is taken into account when siting new manufacturing facilities as our manufacturing process relies on ultrapure water production. Our manufacturing risk scorecards assess potential risks to water availability and ultrapure water production at our current manufacturing sites.
Stakeholder conflicts concerning water resources at a basin/catchment level	Relevant, always included	Securing sufficient water access for the construction of our utility-scale solar PV power plants is incorporated into our project development process. Each First Solar project begins with an extensive review of potential site locations, and considers the available solar resources, proximity to existing electrical transmission lines, current land uses, site characteristics and environmental sensitivities. Stakeholder engagement is an integral part of First Solar's project development and community outreach activities. First Solar consults with neighbors, community groups, educational institutions, environmental groups, tribal representatives and business organizations to address local concerns and ensure the environmentally responsible design of our solar projects. Water-related project development risks are then assessed based on internal company knowledge.

Implications of water on your key commodities/raw materials	Relevant, always included	First Solar conducted a life cycle assessment to understand the water impacts of our commodities and raw materials. The major contributors to our life cycle water withdrawal include grid electricity, glass, steel, copper, and inverters. Our manufacturing risk scorecards assess potential risks to water availability at our current manufacturing sites. Key raw materials not available for production are evaluated but are considered low risk.
Water-related regulatory frameworks	Relevant, always included	Water-related regulatory frameworks are included in our enterprise risk management process. We are subject to various national, state, local, and international laws and regulations relating to the protection of the environment, including those governing the discharge of pollutants into the air and water. Therefore, we could incur substantial costs, including cleanup costs, fines, and civil or criminal sanctions or liabilities under environmental and occupational health and safety laws and regulations or non-compliance with environmental permits required for our operations. We believe we are currently in substantial compliance with applicable environmental and occupational health and safety requirements and do not expect to incur material expenditures for environmental and occupational health and safety controls in the foreseeable future. Future developments such as the implementation of new, more stringent laws and regulations, more aggressive enforcement policies, or the discovery of unknown environmental conditions may require expenditures that could have a material adverse effect on our business, financial condition, or results of operations.
Status of ecosystems and habitats	Relevant, always included	The status of ecosystems and habitats are considered during the PV permitting and project development process. Each First Solar project begins with an extensive review of potential site locations, and considers the available solar resources, proximity to existing electrical transmission lines, current land uses, site characteristics and environmental sensitivities. Prior to being allowed admission to a project site, all workers and visitors are required to receive extensive site safety orientation training, which includes environmental and biological training. Although construction projects always involve some disturbance to existing land and wildlife habitats, responsibly developed PV power plants can create new habitats and help protect animal and plant species ( <a href="https://doi.org/10.1525/cse.2018.001123">https://doi.org/10.1525/cse.2018.001123</a> ). Rainy weather at our California Flats project along with proper habitat protection during construction promoted emergence of fairy shrimp, a rare and federally protected endangered species, in certain vernal pools. Water-related project

		development risks are assessed based on internal company knowledge.
Access to fully-functioning, safely managed WASH services for all employees	Relevant, always included	First Solar provides access to fully-functioning WASH services for all our associates. Hygienic conditions and a safe water supply is a requirement at all First Solar sites. All First Solar facilities monitor and track water use which is incorporated in First Solar's water inventory. Access to reliable utility water supply is included in First Solar's facility risk scorecards.
Other contextual issues, please specify	Not relevant, explanation provided	There are no other relevant contextual issues.

### W3.3c

**(W3.3c) Which of the following stakeholders are considered in your organization's water-related risk assessments?**

	Relevance & inclusion	Please explain
Customers	Relevant, always included	While energy security and climate change have been important drivers for renewable energy adoption, water security provides an additional driver. Desalination has become a common application of renewable energy in arid regions (e.g. Middle East, Australia). The energy-water nexus associated with traditional energy sources is a growing concern among our customers particularly in water-stressed regions. First Solar modules convert sunlight into electricity without the use of water which provides an additional advantage over conventional energy and concentrated solar power. On a life cycle basis, First Solar's thin film modules use up to 400 times less water per MWh than conventional energy and up to 24 times less water than other solar technologies such as mono-crystalline silicon PV. First Solar engages with customers by collaborating on the development of solar PV projects and by raising awareness of the energy-water-nexus in customer discussions.
Employees	Relevant, always included	First Solar provides access to fully-functioning WASH services for all our associates. Hygienic conditions and a safe water supply is a requirement at all First Solar sites. All First Solar facilities monitor and track water use which is incorporated in First Solar's water inventory.
Investors	Relevant, always included	Socially responsible investors are interested in understanding our water risks and management strategy. We engage with investors through various ESG surveys. We disclose water risks in our annual report and CDP Carbon and Water responses. We also provide insight into our water performance in our annual

		sustainability report: <a href="http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/FirstSolar_Sustainability-Report_2020.ashx">http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/FirstSolar_Sustainability-Report_2020.ashx</a>
Local communities	Relevant, always included	Securing sufficient water access for the construction of our utility-scale solar PV power plants is incorporated into our permitting and project development process. Each First Solar project begins with an extensive review of potential site locations, and considers the available solar resources, proximity to existing electrical transmission lines, current land uses, site characteristics and environmental sensitivities. Stakeholder engagement is an integral part of First Solar's project development and community outreach activities. First Solar consults with neighbors, community groups, educational institutions, environmental groups, tribal representatives and business organizations to address local concerns and ensure the environmentally responsible design of our solar projects. Throughout construction, First Solar provides regular updates to the local communities through project newsletters, websites and town hall meetings or informational sessions.
NGOs	Relevant, always included	Securing sufficient water access for the construction of our utility-scale solar PV power plants is incorporated into our permitting and project development process. Each First Solar project begins with an extensive review of potential site locations, and considers the available solar resources, proximity to existing electrical transmission lines, current land uses, site characteristics and environmental sensitivities. Stakeholder engagement is an integral part of First Solar's project development and community outreach activities. First Solar consults with environmental groups to address local concerns and ensure the environmentally responsible design of our solar projects. We work with experts in a range of disciplines with the aim of minimizing the biological, cultural and visual impacts of our projects.
Other water users at a basin/catchment level	Relevant, always included	Securing sufficient water access for the construction of our utility-scale solar PV power plants is incorporated into our permitting and project development process. Each First Solar project begins with an extensive review of potential site locations, and considers the available solar resources, proximity to existing electrical transmission lines, current land uses, site characteristics and environmental sensitivities. Stakeholder engagement is an integral part of First Solar's project development and community outreach activities. First Solar consults with neighbors, community groups, educational institutions, environmental groups, tribal representatives and business organizations to address local concerns and ensure the environmentally responsible design of our solar projects.

Regulators	Relevant, always included	Regulatory risks are included in our enterprise risk management process. First Solar engages with regulators as part of the project permitting process to ensure sufficient access to water during the construction of a PV power plant. As part of our public outreach activities, First Solar conducts site tours for community members, organizations, elected officials, schools and universities
River basin management authorities	Relevant, always included	First Solar engages with river basin authorities as part of the project permitting process to ensure sufficient access to water during the construction of a PV power plant.
Statutory special interest groups at a local level	Relevant, always included	First Solar engages with special interest groups at the local level as part of the project permitting process to ensure sufficient access to water during the construction of a PV power plant. As part of our public outreach activities, First Solar conducts site tours for community members, organizations, elected officials, schools and universities. Throughout construction, First Solar provides regular updates to the local communities through project newsletters, websites and town hall meetings or informational sessions.
Suppliers	Relevant, always included	First Solar evaluates new suppliers using a balanced scorecard which focuses on the areas of Quality, Cost, Flexibility, Service, Technology and Sustainability. First Solar audits new and high-risk direct suppliers for their adherence to quality, environmental, health and safety, among other areas. The EHS section of our supplier audit tool uses the Responsible Business Alliance (RBA) Code of Conduct as a framework and encompasses topics such as environmental management, health and safety, labor and human rights and ethics. We assess our suppliers' awareness of water risks through our supplier audit tool and include questions relating to their water reduction goals and monitoring practices. We prioritize our engagement by focusing on our module component suppliers.
Water utilities at a local level	Relevant, always included	Disruptions to water supply for our manufacturing facilities are considered in our facility risk assessment scorecards. We engage with local water utilities to support our mitigation activities in the event of water outages.
Other stakeholder, please specify	Not relevant, explanation provided	There are no other relevant stakeholders.

### W3.3d

**(W3.3d) Describe your organization's process for identifying, assessing, and responding to water-related risks within your direct operations and other stages of your value chain.**

First Solar conducts an annual survey to obtain the company leadership's view of enterprise risks and risk trends over a three-year horizon. Functional leaders (VP-level and above) and risk owners are requested on an annual basis to complete the survey. Risk owners may provide their own updates more frequently if needed. Risks are assessed on their likelihood, impact and velocity, based on residual risk, i.e. remaining risk after action and control activities to reduce the impact and likelihood of an adverse event have been undertaken. 24 risk statements were captured in the 2019 survey, including areas such as regulatory risks, operational risks, reputational risks, market/customer changes, technology risks, supply chain, organizational adaptability, and corporate sustainability. These include climate change related risks and opportunities such as regulatory and other market drivers, uncertainty in market signals, commodity price risks, and corporate sustainability. These may include water risks e.g. water scarcity, EHS obligation and liabilities, biodiversity impacts, and disruptions to water quality and supply. The survey input is converted into a heatmap chart depicting each risk's likelihood and impact. In 2020, we began also highlighting top risks with the highest velocity factor. 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. ERM updates are provided to the Board's Audit Committee at least twice annually. Impacts, risks, mitigation efforts, and opportunities related to climate change and water risks may be included in these updates if they have a significant impact on the company's business and operations.

Our facility risk scorecards assess water risks to our manufacturing facilities in the context of operational and/or business continuity on a semi-annual basis. Potential asset-level water risks include natural disasters, utility supply and supply chain disruption, as well as the inability to operate wastewater treatment plant or ultra pure water production. The level of coverage selected is prioritized according to a facility or supplier's ability to impact operations and business continuity. The WWF Water Risk Filter Tool is used to assess the baseline water stress levels of countries where our manufacturing, recycling and Research and Development facilities are located.

The development and construction of solar energy generation facilities and other energy infrastructure projects involve numerous risks which are outlined in our annual report. These include water risks which vary project by project. During construction, water is typically needed for site preparation and dust suppression. Ensuring access to water during the construction period is incorporated into our project development and permitting process. Water-related project development risks are assessed based on internal company knowledge.

## W4. Risks and opportunities

### W4.1

**(W4.1) Have you identified any inherent water-related risks with the potential to have a substantive financial or strategic impact on your business?**

Yes, both in direct operations and the rest of our value chain



## W4.1a

### (W4.1a) How does your organization define substantive financial or strategic impact on your business?

First Solar has an enterprise risk management process that includes identifying entity-level risks and opportunities via a forward-looking view (a three-year horizon). Risks are assessed on their likelihood, impact and velocity, based on residual risk, i.e. remaining risk after action and control activities to reduce the impact and likelihood of an adverse event have been undertaken. 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). Substantive strategic impacts on our business include a major impact on our strategy, major financial overrun, and/or failure to meet our key strategic goals. Our definition of substantive risk applies to both direct operations and our supply chain.

Natural disasters such as floods and disruptions to our utility water supply that affect a plant's ability to produce and perform process development activities are water risks 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 2019 exit rate nameplate capacity was 1.9 gigawatts (GW)DC in Ohio, 1.2 GW DC in Malaysia, and 2.4 GW DC in Vietnam.

In addition to manufacturing thin film solar photovoltaic (PV) modules, First Solar also develops, finances, engineers, constructs, and operates some of the world's largest PV power plants. The successful development and construction of solar energy generation facilities is contingent upon, securing necessary water rights for project construction and operation, among other things. Water shortages in regions where we develop and construct PV projects could adversely affect, delay and/or render the successful completion of a particular project infeasible.

## W4.1b

### (W4.1b) What is the total number of facilities exposed to water risks with the potential to have a substantive financial or strategic impact on your business, and what proportion of your company-wide facilities does this represent?

	Total number of facilities exposed to water risk	% company-wide facilities this represents	Comment
Row 1	3	26-50	First Solar's PV modules are currently produced at our facilities in Ohio, Malaysia, and Vietnam. These three locations are exposed to water risks with the potential to have a substantive financial impact on our business. First Solar has an additional recycling facility in Germany and two



			<p>research and development facilities in the U.S. However, water risks at these facilities would not pose a substantive financial impact. If our module manufacturing facilities were impacted by a water risk, it would impact approximately 48% of our net sales since module sales made up 48% of our net sales in 2019. Our 2019 exit rate nameplate capacity was 1.9 gigawatts (GW)DC in Ohio, 1.2 GW DC in Malaysia, and 2.4 GW DC in Vietnam.</p>
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### W4.1c

**(W4.1c) By river basin, what is the number and proportion of facilities exposed to water risks that could have a substantive financial or strategic impact on your business, and what is the potential business impact associated with those facilities?**

**Country/Area & River basin**

United States of America  
St. Lawrence

**Number of facilities exposed to water risk**

1

**% company-wide facilities this represents**

1-25

**% company's total global revenue that could be affected**

31-40

**Comment**

Our facilities in Ohio represent approximately 34% of our total 2019 exit rate nameplate capacity. Although we have two manufacturing facilities in Ohio (Perrysburg and Lake Township), they have been aggregated and are referred to as one facility in this response since they share the same river basin.

**Country/Area & River basin**

Malaysia  
Other, please specify  
Muda River

**Number of facilities exposed to water risk**

1

**% company-wide facilities this represents**

1-25

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**% company's total global revenue that could be affected**

21-30

**Comment**

Our manufacturing operations in Malaysia represent approximately 22% of our total 2019 exit rate nameplate capacity.

**Country/Area & River basin**

Viet Nam  
Saigon

**Number of facilities exposed to water risk**

1

**% company-wide facilities this represents**

1-25

**% company's total global revenue that could be affected**

11-20

**Comment**

Our manufacturing operations in Vietnam represent approximately 44% of our total 2019 exit rate nameplate capacity.

## W4.2

**(W4.2) Provide details of identified risks in your direct operations with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.**

**Country/Area & River basin**

United States of America  
St. Lawrence

**Type of risk & Primary risk driver**

Physical  
Flooding

**Primary potential impact**

Reduction or disruption in production capacity

**Company-specific description**

Our manufacturing risk scorecard for Ohio identified natural disasters, such as earthquake, tornado, hurricane, building collapse, and flood, that affects our manufacturing facility's ability to produce as a potential high risk. Any damage to or



disruption of our facilities would result in an inability to maintain maximum production levels.

**Timeframe**

Current up to one year

**Magnitude of potential impact**

High

**Likelihood**

Unlikely

**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)**

600,000,000

**Explanation of financial impact**

Assuming an average selling price of \$0.324/W, as implied by our June 30, 2020 contracted module backlog of 10.8 GW for an aggregate transaction price of \$3.5 billion, and 2019 exit rate nameplate capacity in Ohio of 1.9 gigawatts (GW)DC, the maximum potential revenue impact if our production in Ohio was down for an entire year would be approximately \$600 million. This worst-case scenario however is unlikely. We would likely lose some production for a while in the event of a natural disaster until we are able to bring the affected buildings back into production.

**Primary response to risk**

Increase geographic diversity of facilities

**Description of response**

To mitigate the impacts of a natural disaster on our operations in Ohio, we separate our manufacturing capability across several buildings and purchase insurance to cover such losses. We have implemented our management method to reduce and minimize this risk.

**Cost of response**

1,000,000

**Explanation of cost of response**

The cost of the response is based on our approximate annual insurance costs for Ohio

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**Country/Area & River basin**



Viet Nam  
Saigon

**Type of risk & Primary risk driver**

Physical  
Rationing of municipal water supply

**Primary potential impact**

Reduction or disruption in production capacity

**Company-specific description**

A water outage at our utility supplier would disrupt the supply of water to our manufacturing plant in Vietnam, as identified by our manufacturing facility risk scorecards. Disruption to our utility water supply would result in an inability to maintain maximum production levels. Our manufacturing operations in Vietnam represent approximately 44% of our total 2019 exit rate nameplate capacity.

**Timeframe**

Current up to one year

**Magnitude of potential impact**

High

**Likelihood**

Unlikely

**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)**

65,000,000

**Explanation of financial impact**

Assuming an average selling price of \$0.324/W, as implied by our June 30, 2020 contracted module backlog of 10.8 GW for an aggregate transaction price of \$3.5 billion, and 2019 exit rate nameplate capacity in Vietnam of 2.4 GW DC, the maximum potential revenue impact would be approximately \$65 million assuming the water outage lasted for one month. While we would likely experience some supply disruption in the event of a water outage, it is unlikely to last for more than a month.

**Primary response to risk**

Secure alternative water supply

**Description of response**

Our facility in Vietnam has a water storage tank that can supply 8 hours of production. We also identified a second source which can supply water in the event of a water outage.

**Cost of response**

0

**Explanation of cost of response**

Cost of response are part of our normal plant operational expenditures and would be a one-off cost.

## W4.2a

**(W4.2a) Provide details of risks identified within your value chain (beyond direct operations) with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.**

**Country/Area & River basin**

Viet Nam  
Saigon

**Stage of value chain**

Supply chain

**Type of risk & Primary risk driver**

Physical  
Severe weather events

**Primary potential impact**

Supply chain disruption

**Company-specific description**

Our manufacturing risk scorecard for Vietnam identified natural disasters at our supplier sites as a potential high risk that could disrupt our supply or shipment channels. Any disruption to our supply would result in an inability to maintain maximum production levels. Our manufacturing operations in Vietnam represent approximately 44% of our total 2019 exit rate nameplate capacity.

**Timeframe**

Current up to one year

**Magnitude of potential impact**

High

**Likelihood**

More likely than not

**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)**

65,000,000

**Explanation of financial impact**

Assuming an average selling price of \$0.324/W, as implied by our June 30, 2020 contracted module backlog of 10.8 GW for an aggregate transaction price of \$3.5 billion, and 2019 exit rate nameplate capacity in Vietnam of 2.4 GW DC, the maximum potential revenue impact would be approximately \$65 million assuming the supply disruption lasted for one month. While we would likely experience some disruption to our production capacity in the event of a supply disruption, it is unlikely to last for more than a month.

**Primary response to risk**

Upstream  
Increase supplier diversification

**Description of response**

We have worked on increasing the geographic diversity of our key component suppliers to reduce and minimize this risk.

**Cost of response**

0

**Explanation of cost of response**

Cost of response are part of our normal plant operational expenditures and would be a one-off cost.

**Country/Area & River basin**

Malaysia  
Other, please specify  
Muda River

**Stage of value chain**

Supply chain

**Type of risk & Primary risk driver**

Physical  
Severe weather events

**Primary potential impact**



Supply chain disruption

**Company-specific description**

Our manufacturing risk scorecard for Malaysia identified natural disasters that could disrupt our supply or shipment channels (primarily at supplier sites) as a potential high risk. Any disruption to our supply would result in an inability to maintain maximum production levels. Our manufacturing operations in Malaysia represent approximately 22% of our total 2019 exit rate nameplate capacity.

**Timeframe**

Current up to one year

**Magnitude of potential impact**

High

**Likelihood**

More likely than not

**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)**

32,000,000

**Explanation of financial impact**

Assuming an average selling price of \$0.324/W, as implied by our June 30, 2020 contracted module backlog of 10.8 GW for an aggregate transaction price of \$3.5 billion, and 2019 exit rate nameplate capacity in Malaysia of 1.2 GW DC, the maximum potential revenue impact would be approximately \$32 million assuming the supply disruption lasted for one month. While we would likely experience some supply disruption in the event of a natural disaster, it is unlikely to last for more than a month.

**Primary response to risk**

Upstream  
Increase supplier diversification

**Description of response**

We have worked on increasing the geographic diversity of our key component suppliers to reduce and minimize this risk.

**Cost of response**

0

**Explanation of cost of response**



Cost of response are part of our normal plant operational expenditures and would be a one-off cost.

### W4.3

**(W4.3) Have you identified any water-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes, we have identified opportunities, and some/all are being realized

### W4.3a

**(W4.3a) Provide details of opportunities currently being realized that could have a substantive financial or strategic impact on your business.**

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**Type of opportunity**

Efficiency

**Primary water-related opportunity**

Cost savings

**Company-specific description & strategy to realize opportunity**

First Solar is reducing water consumption during manufacturing and recycling through the implementation of water conservation and recycling projects. In 2019, we saved approximately 300 million liters of water by recycling rejected water from our purification system back into our raw water tank in Malaysia and retrofitting our recycling facilities to recycle and reuse wastewater.

**Estimated timeframe for realization**

Current - up to 1 year

**Magnitude of potential financial impact**

Low

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

583,000

**Potential financial impact figure – minimum (currency)**

**Potential financial impact figure – maximum (currency)**

**Explanation of financial impact**



By recycling and reusing 300 megaliters of water in 2019, we saved approximately \$583,000, up from \$81,000 in 2018. As the price of water increases, we expect the financial benefits of water recycling and reduction efforts to increase.

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### **Type of opportunity**

Products and services

### **Primary water-related opportunity**

Increased sales of existing products/services

### **Company-specific description & strategy to realize opportunity**

While energy security and climate change have been important drivers for renewable energy adoption, water security provides an additional driver. The energy-water nexus associated with traditional energy sources is a growing concern particularly in water-stressed regions. Unlike thermal electric power plants and CSP, solar PV does not require any water to generate electricity during operation and is therefore ideally suited to meet the growing energy and water needs of arid, water-limited regions. In addition, First Solar's fully integrated thin film solar module manufacturing process requires less energy, water and semiconductor material than conventional crystalline silicon PV's batch manufacturing process. On a life cycle basis, First Solar's thin film modules use up to 400 times less water per MWh than conventional energy and up to 24 times less water than other solar technologies such as mono-crystalline silicon PV. Customers with their own sustainability goals are particularly interested in understanding how much carbon a First Solar PV plant displaces as well as how much water is saved by avoiding the use of grid electricity. 2019 was a strong year with net bookings of 6.1GW, as well as record shipments of 5.4GW. The bookings momentum has continued in 2020, with 2.6GW of additional net bookings to date. We believe the strong bookings in 2019 are evidence of the demand for renewable energy in general and our Series 6 PV modules in particular as well as our track record of meeting pricing and delivery commitments for long-dated agreements. The wholesale commercial and industrial market also represents a promising opportunity given our utility-scale PV solar power system expertise. The demand for corporate renewables continues to accelerate, with corporations worldwide committing to the RE100 campaign, a collaborative, global initiative of influential businesses committed to 100% renewable electricity. We believe we also have a competitive advantage in the commercial and industrial market due to many customers' sensitivity to the experience, bankability, and financial viability of their suppliers and geographically diverse operating locations. With our strong development expertise, financial strength, and global footprint, we are well positioned to meet these needs.

### **Estimated timeframe for realization**

Current - up to 1 year

### **Magnitude of potential financial impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

3,100,000,000

**Potential financial impact figure – minimum (currency)****Potential financial impact figure – maximum (currency)****Explanation of financial impact**

Net sales for 2019 increased by 36% to \$3.1 billion compared to \$2.2 billion in 2018.

The increase in net sales was primarily attributable to an increase in third-party module sales and the sale of solar projects. With over 1GW of corporate power purchase agreements (PPAs) signed, First Solar is an industry leader in corporate solar. Its track record includes projects to support the decarbonization efforts of RE100 members such as Apple, Facebook, Kellogg's, and Microsoft. For example, our 150 MWAC Sun Streams 2 project is expected to provide energy for certain Microsoft Corporation data centers, and our recently sold 227 MWAC Muscle Shoals, 122 MWAC Cove Mountain Solar 2, and 58 MWAC Cove Mountain Solar 1 projects are expected to provide energy for certain Facebook, Inc. data centers through PPAs with Tennessee Valley Authority and PacifiCorp. Customers like Microsoft value the sustainability benefits of First Solar's PV modules, including the water savings they provide by displacing conventional grid electricity. The Sun Streams 2 solar project is expected to save as much as 356 million liters of water per year compared to traditional power generation:

<https://blogs.microsoft.com/on-the-issues/2019/07/30/building-world-class-sustainable-datacenters-and-investing-in-solar-power-in-arizona/>

**Type of opportunity**

Products and services

**Primary water-related opportunity**

Increased sales of existing products/services

**Company-specific description & strategy to realize opportunity**

Floatovoltaics or floating solar PV installations are gaining increasing popularity as a solution for installing solar in areas with limited land availability. First Solar modules have been used in floating solar installations for aquaculture and irrigation canals. Customers in Thailand have installed First Solar modules on shrimp farms using their own floating solar designs, and have also installed First Solar modules panels over canals surrounding rice paddies in Thailand and Indochina. Rice has high water requirements so the solar installation serves two purposes: powering the farming operation and reducing evaporative losses.

**Estimated timeframe for realization**

More than 6 years

**Magnitude of potential financial impact**

Low-medium

**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)**

2,700,000,000

**Explanation of financial impact**

Thailand plans to construct 2.7 GW of floating PV with estimated completion in 2037. With two-thirds of the Earth's surface covered with water, floatovoltaics have the potential to become more widespread. In addition, the cost of leasing water for solar installations is lower than that of land. However, since these installations are still in their early and experimental stages, the potential financial impact is estimated to be low-medium. The global floating solar panel market is expected to reach \$2.7 billion by 2025, according to a report by Grand View Research.

## W5. Facility-level water accounting

### W5.1

**(W5.1) For each facility referenced in W4.1c, provide coordinates, water accounting data, and a comparison with the previous reporting year.**

**Facility reference number**

Facility 1

**Facility name (optional)**

Perrysburg

**Country/Area & River basin**

United States of America

St. Lawrence

**Latitude**

41.557058

**Longitude**

-83.552515

**Located in area with water stress**

No

**Total water withdrawals at this facility (megaliters/year)**

316

**Comparison of total withdrawals with previous reporting year**

Much higher

**Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes**

0

**Withdrawals from brackish surface water/seawater**

0

**Withdrawals from groundwater - renewable**

0

**Withdrawals from groundwater - non-renewable**

0

**Withdrawals from produced/entrained water**

0

**Withdrawals from third party sources**

316

**Total water discharges at this facility (megaliters/year)**

123

**Comparison of total discharges with previous reporting year**

Higher

**Discharges to fresh surface water**

0

**Discharges to brackish surface water/seawater**

0

**Discharges to groundwater**

0

**Discharges to third party destinations**

123

**Total water consumption at this facility (megaliters/year)**

193

**Comparison of total consumption with previous reporting year**



Much higher

**Please explain**

With the addition of a second facility in Ohio, our water withdrawals , discharges and consumption increased in 2019 compared to 2018.

**Facility reference number**

Facility 2

**Facility name (optional)**

Kulim

**Country/Area & River basin**

Malaysia

Other, please specify

Muda River

**Latitude**

5.428624

**Longitude**

100.572598

**Located in area with water stress**

No

**Total water withdrawals at this facility (megaliters/year)**

2,401

**Comparison of total withdrawals with previous reporting year**

Lower

**Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes**

0

**Withdrawals from brackish surface water/seawater**

0

**Withdrawals from groundwater - renewable**

0

**Withdrawals from groundwater - non-renewable**

0

**Withdrawals from produced/entrained water**

0

**Withdrawals from third party sources**

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2,400

**Total water discharges at this facility (megaliters/year)**

1,069

**Comparison of total discharges with previous reporting year**

Lower

**Discharges to fresh surface water**

1,069

**Discharges to brackish surface water/seawater**

0

**Discharges to groundwater**

0

**Discharges to third party destinations**

0

**Total water consumption at this facility (megaliters/year)**

1,331

**Comparison of total consumption with previous reporting year**

Lower

**Please explain**

Our water withdrawals , discharges and consumption in Malaysia decreased in 2019 compared to 2018 due to the ramp down of Series 4 manufacturing lines.

**Facility reference number**

Facility 3

**Facility name (optional)**

Dong Nam

**Country/Area & River basin**

Viet Nam

Saigon

**Latitude**

10.77653

**Longitude**

106.70098

**Located in area with water stress**

No

**Total water withdrawals at this facility (megaliters/year)**



1,126

**Comparison of total withdrawals with previous reporting year**

Much higher

**Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes**

0

**Withdrawals from brackish surface water/seawater**

0

**Withdrawals from groundwater - renewable**

0

**Withdrawals from groundwater - non-renewable**

0

**Withdrawals from produced/entrained water**

0

**Withdrawals from third party sources**

1,126

**Total water discharges at this facility (megaliters/year)**

708

**Comparison of total discharges with previous reporting year**

Much higher

**Discharges to fresh surface water**

0

**Discharges to brackish surface water/seawater**

0

**Discharges to groundwater**

0

**Discharges to third party destinations**

708

**Total water consumption at this facility (megaliters/year)**

418

**Comparison of total consumption with previous reporting year**

Higher

**Please explain**



With the ramp up of manufacturing capacity and the addition of a facility in Vietnam, our water withdrawals, discharges and consumption were much higher in 2019 compared to 2018.

## W5.1a

**(W5.1a) For the facilities referenced in W5.1, what proportion of water accounting data has been externally verified?**

### Water withdrawals – total volumes

---

**% verified**

Not verified

### Water withdrawals – volume by source

---

**% verified**

Not verified

### Water withdrawals – quality

---

**% verified**

Not verified

### Water discharges – total volumes

---

**% verified**

Not verified

### Water discharges – volume by destination

---

**% verified**

Not verified

### Water discharges – volume by treatment method

---

**% verified**

Not verified

### Water discharge quality – quality by standard effluent parameters

---

**% verified**

Not verified

### Water discharge quality – temperature

---

**% verified**

Not verified

### Water consumption – total volume

---



**% verified**

Not verified

**Water recycled/reused**

**% verified**

Not verified

## W6. Governance

### W6.1

**(W6.1) Does your organization have a water policy?**

Yes, we have a documented water policy that is publicly available

### W6.1a

**(W6.1a) Select the options that best describe the scope and content of your water policy.**

	Scope	Content	Please explain
Row 1	Company-wide	Description of business dependency on water Description of business impact on water Description of water-related performance standards for direct operations Reference to international standards and widely-recognized water initiatives Commitment to align with public policy initiatives, such as the SDGs Commitments beyond regulatory compliance Commitment to water-related innovation Commitment to stakeholder awareness and education	First Solar's water policy includes a commitment to improving the water efficiency of our operations by conserving, recycling and reusing water. The policy is publicly available on our website and describes the importance of water in our thin film manufacturing operations and how our advanced thin film PV modules help address the energy-water nexus by decoupling electricity generation from water consumption. First Solar recognizes that access to clean water is a fundamental human right, in line with Goal 6 of the United Nations' 2030 Agenda for Sustainable Development, and is committed to transparency on water usage, partnering on innovative solutions to water challenges and supporting community projects which deliver access to clean energy and water.   1



	Commitment to water stewardship and/or collective action Acknowledgement of the human right to water and sanitation Recognition of environmental linkages, for example, due to climate change	
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1First Solar Water Policy\_vf.pdf

## W6.2

**(W6.2) Is there board level oversight of water-related issues within your organization?**

Yes

### W6.2a

**(W6.2a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for water-related issues.**

Position of individual	Please explain
Other, please specify Board of Directors Audit Committee	The Audit Committee of the Board of Directors has the highest level of oversight over risk management for the company. The annual enterprise risk assessment process includes identifying risks that would impact the company's achievement of strategic objectives. Thus, the assessment would consider water risks among other environmental aspects as part of the enterprise risk management process.

### W6.2b

**(W6.2b) Provide further details on the board's oversight of water-related issues.**

	Frequency that water-related issues are a scheduled agenda item	Governance mechanisms into which water-related issues are integrated	Please explain
Row 1	Sporadic - as important matters arise	Monitoring implementation and performance Reviewing and guiding risk management policies	Water risks and other environmental aspects are integrated into the company's enterprise risk management process. Water scarcity and water resource availability are taken into account in the decision making process and help guide our strategy as we expand our manufacturing footprint to new countries. Our solar module manufacturing

		Reviewing and guiding strategy	process relies on ultra pure water production so access to water is key to our operations. 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. ERM updates are provided to the Board's Audit Committee at least annually or more frequently. Water risks may be included as important matters arise. Although our enterprise risk management process currently considers risks (including water risks) with a time horizon of up to 3 years, we are considering conducting longer term risk assessments.
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## W6.3

**(W6.3) Provide the highest management-level position(s) or committee(s) with responsibility for water-related issues (do not include the names of individuals).**

### **Name of the position(s) and/or committee(s)**

Chief Executive Officer (CEO)

### **Responsibility**

Both assessing and managing water-related risks and opportunities

### **Frequency of reporting to the board on water-related issues**

As important matters arise

### **Please explain**

As the top owner of enterprise risk, Our Chief Executive Officer (CEO) has the highest level of direct responsibility for water risks and other environmental aspects within the company. Leveraging sustainability as a business enabler was one of the CEO's executive goals in 2019 which was cascaded to the Chief Operations Officer, Chief Sustainability Officer and global sustainability team. First Solar's Chief Sustainability Officer reports into the Chief Operational Officer and is in charge of overseeing the company's global Environmental Health and Safety (EHS), Sustainability and Recycling programs. The Chief Sustainability Officer provides regular sustainability updates to the executive leadership team and the Board. These updates can include water-related issues as important matters arise.

## W6.4

**(W6.4) Do you provide incentives to C-suite employees or board members for the management of water-related issues?**

	Provide incentives for management of water-related issues	Comment
Row 1	Yes	Leveraging sustainability as a business enabler is one of the CEO's executive goals which includes managing risks and identifying opportunities for growth e.g. operation cost reduction through reduced resource consumption and emissions. Executives are rewarded for achieving their operational goals and objectives.

## W6.4a

**(W6.4a) What incentives are provided to C-suite employees or board members for the management of water-related issues (do not include the names of individuals)?**

	Role(s) entitled to incentive	Performance indicator	Please explain
Monetary reward	Chief Executive Officer (CEO)	Improvements in efficiency - direct operations Other, please specify reducing operational costs and leveraging sustainability as a business enabler	Leveraging sustainability as a business enabler is one of the CEO's executive goals which includes managing risks and identifying opportunities for growth e.g. operation cost reduction through reduced resource consumption and emissions. Executives are rewarded for achieving their operational goals and objectives.
Non-monetary reward	Chief Executive Officer (CEO)	Improvements in efficiency - direct operations Other, please specify reducing operational costs and leveraging sustainability as a business enabler	Leveraging sustainability as a business enabler is one of the CEO's executive goals which includes managing risks and identifying opportunities for growth e.g. operational cost reduction through reduced resource consumption and emissions. Executives are rewarded for achieving their operational goals and objectives.

## W6.5

**(W6.5) Do you engage in activities that could either directly or indirectly influence public policy on water through any of the following?**

Yes, direct engagement with policy makers

Yes, trade associations

Yes, other

## W6.5a

### (W6.5a) What processes do you have in place to ensure that all of your direct and indirect activities seeking to influence policy are consistent with your water policy/water commitments?

Our vision "to lead the world's sustainable energy future" drives every aspect of our business strategy from developing sustainable solar markets, reducing our operational impacts, increasing the efficiency of our products, reducing the levelized cost of solar electricity, and improving the environmental life cycle benefits of our technology. This includes manufacturing thin film PV modules with the lowest water footprint in the industry and contributing to thought leadership on the energy-water nexus and educating policy makers and trade associations on the EHS impacts of PV. Our corporate policies (including the corporate sustainability and EHS policy) provide guidance on our commitment to reducing operational impacts to ensure alignment, from the manufacturing, construction, operation and end-of-life management of our PV products and projects. We foster a culture where EHS is an integral part of our associates' work and require our contractors and suppliers to adhere to our standards and commitments. Any inconsistency is addressed with a corrective action.

First Solar's Government Affairs team is responsible for guiding public policy and works closely with Origination, Project Development, the Sustainability/EHS team, and the Executive Leadership Team to support the development of PV projects in various markets. First Solar engages with regulators as part of the project permitting process to ensure sufficient access to water during the construction of a PV power plant.

## W6.6

### (W6.6) Did your organization include information about its response to water-related risks in its most recent mainstream financial report?

Yes (you may attach the report - this is optional)

 First-Solar-2019-Annual-Report-vPost.pdf

## W7. Business strategy

### W7.1

#### (W7.1) Are water-related issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, water-related issues are integrated	5-10	Water-related issues such as water availability and costs are integrated into our long-term business objectives of maintaining low manufacturing costs as well as the lowest environmental footprint in the

			industry. Access to sufficient water availability and quality is taken into account when siting new manufacturing facilities as our manufacturing process relies on ultra-pure water production and is key to scaling our manufacturing capacity over the next few years. Sufficient access to water is also taken into account in the development of PV projects. Since we often develop solar projects in arid regions, their success is contingent upon securing necessary water rights for project construction and operation, among other things.
Strategy for achieving long-term objectives	Yes, water-related issues are integrated	5-10	Resource conservation and water recycling projects are part of our strategy to manage manufacturing costs and maintain the lowest environmental footprint in the industry. First Solar identified best practices to minimize water usage during the construction operation of PV projects through responsible construction practices and dry module cleaning techniques. Minimizing water use during the construction and operation of PV power plants contributes to the success of a project which directly impacts our balance sheet.
Financial planning	Yes, water-related issues are integrated	5-10	Water-related issues are integrated into our long-term 5-year financial planning process since water indirectly impacts our manufacturing and recycling costs. Our facility and recycling teams include resource efficiency projects, as well as wastewater treatment plant and recycling upgrades into their budget plans.

## W7.2

**(W7.2) What is the trend in your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) for the reporting year, and the anticipated trend for the next reporting year?**

### Row 1

**Water-related CAPEX (+/- % change)**

7,023

**Anticipated forward trend for CAPEX (+/- % change)**

-57

**Water-related OPEX (+/- % change)**

181

**Anticipated forward trend for OPEX (+/- % change)**

-11

**Please explain**

Water CAPEX increased significantly in 2019 compared to 2018 due to the installation of a wastewater treatment system at our new manufacturing facility in Ohio. Water CAPEX is anticipated to decrease in 2020 since we do not expect to have any major installations. Water OPEX increased in 2019 due to the 111% increase in production and the ramp up of new facilities in Ohio and Vietnam. Water OPEX is anticipated to decrease in 2020 due to the ramp down of manufacturing lines in Malaysia and the increased resource efficiency of our Series 6 manufacturing lines. To manage our operational impacts and costs, we have been recycling and reusing water in our manufacturing and recycling operations and incorporating water efficiency measures into new buildings, tools and process designs.

**W7.3****(W7.3) Does your organization use climate-related scenario analysis to inform its business strategy?**

	<b>Use of climate-related scenario analysis</b>	<b>Comment</b>
Row 1	No, but we anticipate doing so within the next two years	We used forward-looking scenario analyses such as the 2°C scenario, when considering the company's new greenhouse gas emissions target. In assessing the feasibility of science-based targets, we used the CSO Carbon Metric with RCP2.6 - a 2°C GHG mitigation scenario developed under IPCC. The scenario was considered over a medium term time horizon of 5 years, consistent with our business planning horizon. We anticipate using climate-related scenario analysis in the future to bolster our water strategy. We currently use the WWF water risk filter tool to assess water stress levels of countries where our manufacturing, recycling and research and development facilities are located. We have also used the WRI Aqueduct tool to project future water basin stress levels for 2020, 2030 and 2040. Although our enterprise risk management process currently considers risks (including water risks) with a time horizon of up to 3 years, we are considering conducting longer term risk assessments.

**W7.4****(W7.4) Does your company use an internal price on water?**

Row 1

**Does your company use an internal price on water?**

No, and we do not anticipate doing so within the next two years

**Please explain**

We do not anticipate setting an internal price on water within the next two years.

## W8. Targets

### W8.1

**(W8.1) Describe your approach to setting and monitoring water-related targets and/or goals.**

	Levels for targets and/or goals	Monitoring at corporate level	Approach to setting and monitoring targets and/or goals
Row 1	Company-wide targets and goals Business level specific targets and/or goals Site/facility specific targets and/or goals Other, please specify Company-wide goals	Targets are monitored at the corporate level Goals are monitored at the corporate level	As part of our company-wide EHS policy, First Solar strives to conserve natural resources, minimize waste, protect biodiversity and native habitats, and prevent pollution from the manufacturing, construction, operation and end-of-life management of our PV products and installations. Water reduction goals are also sometimes set at the site level and business level (e.g. recycling) to encourage resource efficiency and cost savings.

### W8.1a

**(W8.1a) Provide details of your water targets that are monitored at the corporate level, and the progress made.**

#### Target reference number

Target 1

#### Category of target

Water use efficiency

#### Level

Business activity

#### Primary motivation

Corporate social responsibility

#### Description of target

In conformance with sustainability leadership standard NSF 457 for PV modules and inverters, First Solar is committed to achieving an average 1% reduction in total water

withdrawal per unit of production (MW produced) per year from inventory baseline (2009) at each of its global manufacturing facilities in Ohio, Malaysia and Vietnam.

**Quantitative metric**

% reduction in total water withdrawals

**Baseline year**

2009

**Start year**

2017

**Target year**

2020

**% of target achieved**

100

**Please explain**

Since 2009, First Solar's manufacturing water intensity (water consumption per watt produced) decreased by 64% due to significant improvements in module efficiency, manufacturing throughput, and the implementation of water conservation and recycling projects in our manufacturing and recycling operations. First Solar manufacturing facilities achieved a 5%-82% year over year reduction since 2017 through a combination of resource conservation, efficiency improvements, and water recycling and reuse initiatives. Our threshold for success is achieving an average 1% reduction in total water withdrawal per unit of production (MW produced) per year, in conformance with sustainability leadership standard NSF 457 for PV modules and inverters.

## W8.1b

**(W8.1b) Provide details of your water goal(s) that are monitored at the corporate level and the progress made.**

**Goal**

Other, please specify  
Increased resource efficiency

**Level**

Company-wide

**Motivation**

Cost savings

**Description of goal**

As part of our company-wide EHS policy, First Solar strives to conserve natural resources, minimize waste, protect biodiversity and native habitats, and prevent



pollution from the manufacturing, construction, operation and end-of-life management of our PV products and installations.

**Baseline year**

2009

**Start year**

2018

**End year**

2019

**Progress**

Since 2009, First Solar's manufacturing water intensity (water consumption per watt produced) decreased by 64% due to significant improvements in module efficiency, manufacturing throughput, and the implementation of water conservation and recycling projects in our manufacturing and recycling operations. Our threshold for success is reducing our water withdrawals per unit of production (MW produced) from our 2009 baseline of 1.9 liters of water per watt produced. In 2019, First Solar's manufacturing water intensity decreased by approximately 46% (to 0.68 liters of water per watt produced) due to the increased throughput and efficiency of our Series 6 manufacturing process as well as water recycling initiatives. In 2019, we saved approximately 274 megaliters of water by recycling rejected water from our purification system back into our raw water tank in Malaysia, which is equivalent to approximately 7% of our absolute water withdrawals in 2019, up from 3.5% in 2018.

**Goal**

Other, please specify  
Zero wastewater discharge recycling

**Level**

Business activity

**Motivation**

Reduced environmental impact

**Description of goal**

First Solar's recycling team are committed to finding new ways to make our recycling process more efficient and sustainable. In 2017, the team set a goal for First Solar's routinely-operated recycling facilities to have zero wastewater discharge by retrofitting our wastewater treatment plants and installing evaporators. The evaporators not only reduce wastewater treatment costs but also minimize our recycling process' dependence on freshwater. This will enable the roll-out of mobile PV recycling solutions in areas where water utilities or wastewater treatment facilities are not available. The wastewater is recycled and converted into freshwater, which can then be reused in the recycling process.

**Baseline year**

2017

**Start year**

2018

**End year**

2019

**Progress**

Since 2018, all routinely operated First Solar recycling facilities in the U.S., Germany, Malaysia and Vietnam generate zero wastewater discharge under normal operations. Instead, the wastewater is recycled and converted into freshwater, which can then be reused in the recycling process. Since the retrofit in 2018, we recycled more than 34 megaliters of water at our global recycling facilities. Our threshold for success is maintaining zero water discharge among our routinely operated recycling facilities.

## W9. Verification

### W9.1

**(W9.1) Do you verify any other water information reported in your CDP disclosure (not already covered by W5.1a)?**

No, we do not currently verify any other water information reported in our CDP disclosure

## W10. Sign off

### W-FI

**(W-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.**

### W10.1

**(W10.1) Provide details for the person that has signed off (approved) your CDP water response.**

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

### W10.2

**(W10.2) Please indicate whether your organization agrees for CDP to transfer your publicly disclosed data on your impact and risk response strategies to the CEO Water**

First Solar Inc CDP Water Security Questionnaire 2020 Wednesday, August 26, 2020



**Mandate’s Water Action Hub [applies only to W2.1a (response to impacts), W4.2 and W4.2a (response to risks)].**

Yes

## Submit your response

**In which language are you submitting your response?**

English

**Please confirm how your response should be handled by CDP**

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

**Please confirm below**