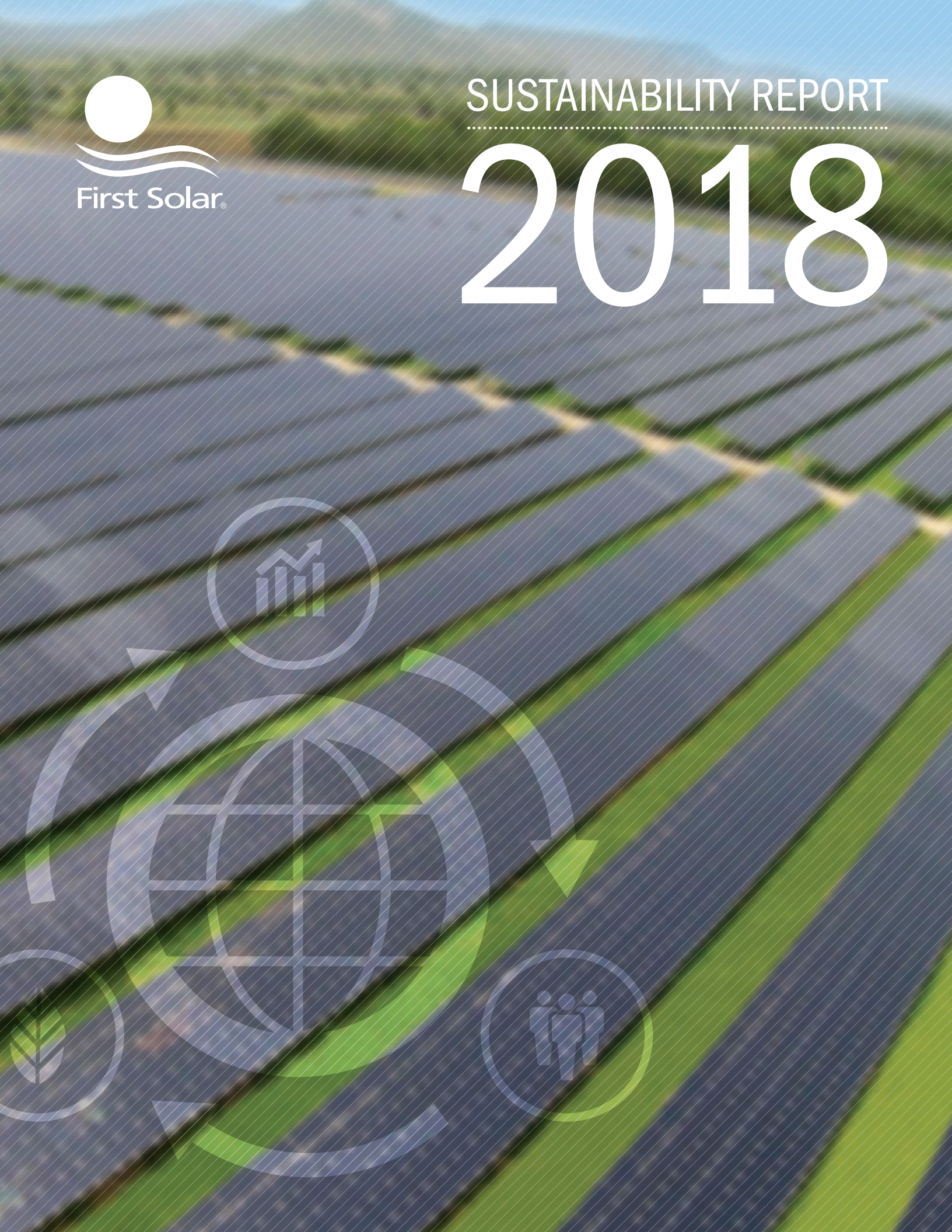
First Solar®

# SUSTAINABILITY REPORT

# 2018



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# Note Regarding Forward-Looking Statements

All financial numbers in this report are based on U.S. Generally Accepted Accounting Principles. This report contains forward-looking statements within the meaning of the United States federal securities laws. These forward-looking statements do not constitute guarantees of future performance. These forward-looking statements are based on current information and expectations, are subject to uncertainties and changes in circumstances, and involve a number of factors that could cause actual results to differ materially from those anticipated by these forward-looking statements, including risks described in the company's most recent annual report on Form 10-K, and other filings with the Securities and Exchange Commission. First Solar assumes no obligation to update any forward-looking information contained in this report or with respect to the information described herein.

# 1 Message from the CEO

Over the past two years, the global demand for solar photovoltaics (PV) continued to soar, with nearly 200 gigawatts (GW) installed worldwide. With cumulative global PV deployment now nearing half a terawatt, the transition to a low carbon economy is well on its way. By manufacturing the industry's most eco-efficient PV modules and developing some of the world's largest and most successful PV power plants, First Solar is reshaping the world's energy future and creating enduring value for generations to come.

At First Solar, our vision is to lead the world's sustainable energy future through operational excellence, industry leadership, and by driving innovation across the solar value chain.

Our differentiated thin film PV technology provides a sustainable solution to some of the world's most pressing challenges including climate change, energy security, water scarcity, and the unsustainable growing consumption of natural resources. As we continue to scale globally, we are contributing to a healthier planet while creating shared value for local communities.

In 2018, we began high-volume manufacturing of our Series 6 module technology and broke ground on our 1.2GW PV manufacturing facility in Perrysburg, Ohio- the largest and most high-tech solar manufacturing facility and excellence center in the U.S. The $400 million expansion is expected to create 500 new jobs in northwestern Ohio, while, in Vietnam, we invested approximately $830 million to retrofit a legacy factory and build an additional facility, creating over 1,000 jobs locally. We have also incorporated energy and water efficiency measures into new buildings and tool designs for Series 6 manufacturing.

Our commitment to sustainability is also extended to the utility-scale solar power plants that we engineer and construct. For instance, during construction of the 280 megawatt (MW) California Flats solar project, we significantly reduced trenching and ground disturbances by housing electrical cables above ground- an innovation to minimize potential impacts on cultural resources and the environment.

Beyond our products and projects, we remain committed to help manage the growing penetration of renewables. First Solar is driving industry thought leadership on grid integration and storage solutions that will make solar more dispatchable and enable greater carbon emissions reductions by minimizing curtailment.

Additionally, as part of our efforts to empower the next generation, First Solar partners with universities to promote Science, Technology, Engineering and Math (STEM) programs and inspire students from diverse backgrounds to pursue a career in solar. We had almost 600 interns at our global sites between 2017 and 2018.

First Solar is further improving the quality of life in communities where we operate and build projects, by aligning our Global Charitable Giving Program with the UN Sustainable Development Goals. In 2017, First Solar donated nearly $800,000 in cash and in-kind contributions to support charities and non-profits that promote green education and economic inclusion, ensure access to clean energy and water, and contribute to a circular economy.

In addition to our external sustainability initiatives, we are committed to reducing our operational impact. In 2018, we made significant strides in advancing our internal sustainability efforts by rolling out our Global Sustainability Ambassador program and implementing our sustainability mission to lead by example and empower the next generation.

In line with our commitment to environmental stewardship and corporate social responsibility, we have continued to minimize the environmental impacts and enhance the socioeconomic benefits of our products and projects across their lifecycle. With every PV module we manufacture and solar project we develop, we are transforming our energy future and making a difference in local communities around the world.

Thank you for your interest in this Sustainability Report, and in First Solar's vision to lead the world's sustainable energy future.

Mark Widmar

*Chief Executive Officer*

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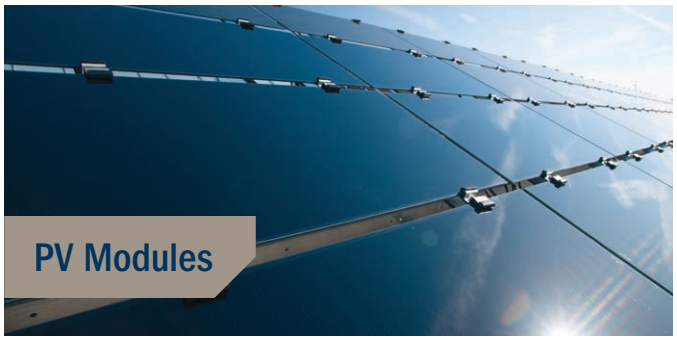
# ABOUT FIRST SOLAR

# 2 About First Solar

First Solar is a leading global provider of comprehensive PV solar energy solutions with over 17GW installed in more than 35 countries. We design, manufacture and sell PV solar modules with an advanced thin film semiconductor technology and we develop, design, construct, and sell PV power plants that primarily use the solar modules we manufacture. We provide operations and maintenance (O&M) services to plant owners that use solar modules manufactured by us or by other third-party manufacturers. Our power plant offerings diversify the global energy portfolio and reduce the impact of fuel-price volatility while delivering an economically attractive and environmentally friendly alternative or complement to fossil fuel electricity generation. From raw material sourcing through end-of-life module recycling, First Solar's solar PV modules and systems protect and enhance the environment.

First Solar 17GW INSTALLED WORLDWIDE

First Solar's 17GW of installed capacity produces enough electricity to power more than 8 million average homes and displace nearly 12 million metric tons of $CO_2$ per year, based on worldwide averages. This amounts to over $460 million in avoided costs associated with greenhouse gas emissions and over $323 million in avoided air pollutants per year, assuming a social cost of $0.02/kWh for carbon and $0.014 for other power sector emissions.[1]



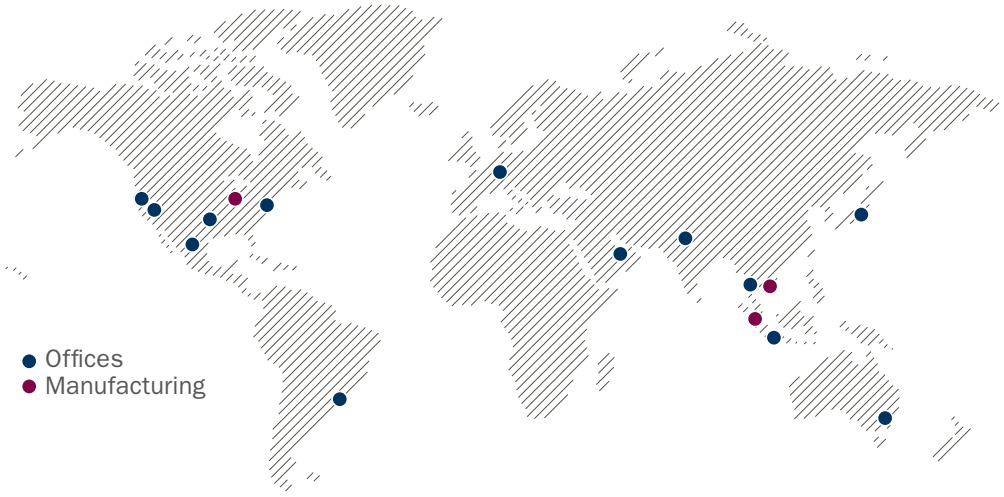
PV Modules

*Our mission is to provide cost-advantaged solar technology through innovation, customer engagement, industry leadership and operational excellence.*

PV Power Plant

[1] Wiser et al., The environmental and public health benefits of achieving high penetrations of solar energy in the United States, Energy 113 (2016) 472-486.

# Our Operations

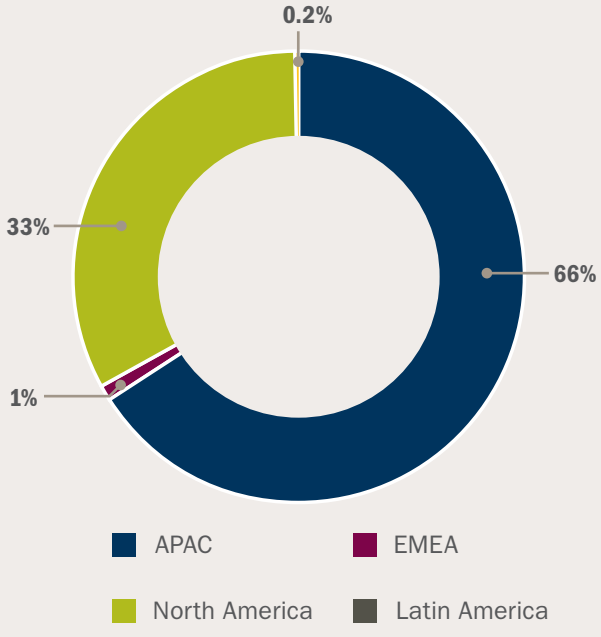



**~6,400**
**ASSOCIATES**

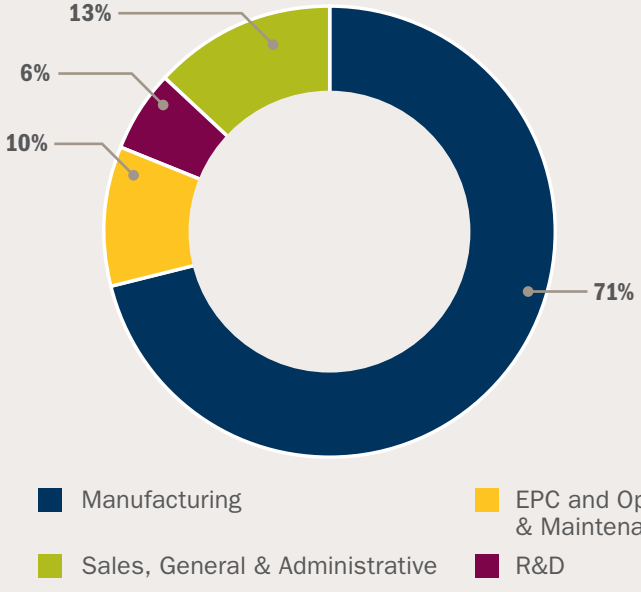
First Solar is headquartered in Tempe, Arizona with regional offices around the world and manufacturing facilities in Perrysburg, Ohio; Kulim, Malaysia; and Ho Chi Minh City, Vietnam. Our annual manufacturing capacity has grown from 25 megawatts (MW) in 2005 to more than 2,280 MW in 2017.

As of December 31, 2018, we had approximately 6,400 associates (our term for full and part-time employees) compared to approximately 4,100 in 2017. More than 70 percent of our associates work in manufacturing and approximately 10 percent work in our systems business. The remainder of our associates are in research and development, sales and marketing, and general and administrative positions.

## Associates by Region in 2017




## Associates by Function in 2017



# CSR Awards and Recognitions 2017-2018

2018 - **Forbes and JUST Capital's JUST 100 -** *America's Best Corporate Citizens- Ranked #71 out of 890 U.S. companies* - First Solar, Inc.

2018 - **Indeed's Best Places to Work in Phoenix -** *Ranked #1* - First Solar, Inc.

2018 - **Human Resources Minister Awards -** *Grand Winner for Large Manufacturing Sector* - First Solar Malaysia

2018 - **Malaysia International HR Awards -** *Grand Winner and Gold Award for Employer of Choice* - First Solar Malaysia

2018 - **HR Excellence Awards -** *Excellence in HR Change Management Bronze Award* - First Solar Malaysia

2018 - **Golden Globe Tiger Awards -** *Solar Energy Leadership Award and Best Change Management Program* - First Solar Malaysia

2018 - **International Federation of Training & Development Organizations Global HRD -** *Certificate of Merit in Best HRD Practice* - First Solar Malaysia

2018 - **International SOS Foundation Duty of Care Awards -** *Honorable Mention (third place) for Sustainability* - First Solar Malaysia

2017 - **Thomson Reuters 2017 Top 100 Global Energy Leaders -** *Top 25 renewable energy subsector honoree* - First Solar, Inc.

2017 - **Barron's 100 Most Sustainable Companies -** *Ranked #55 out of 1,000 of the largest U.S. companies* - First Solar, Inc.

2017 - **Forbes and JUST Capital's JUST 100 -** *America's Best Corporate Citizens- Ranked #91 out of 877 U.S. companies* - First Solar, Inc.

2017 - **Golden Globe Tiger Awards -** *Organization with Innovative HR Practices and Best Leadership Development Program for Workers* - First Solar Malaysia

2017 - **Malaysian Institute of Human Resource Management (MIHRM) International HR Awards -** *HR Best Practices Gold Award* - First Solar Malaysia

2017 - **HR Excellence Awards -** *Excellence in Workplace Wellbeing Bronze Award* - First Solar Malaysia

2017 - **ISS-Oekom Corporate "Prime" Rating -** *Demonstrating best-in-class environmental, social, governance performance* - First Solar, Inc.

# Sustainability At First Solar

At First Solar we define sustainability as our “capacity to endure and scale.” Our sustainability approach enables us to achieve long-term growth while following environmentally and socially responsible practices. First Solar’s sustainability program drives the company’s commitment to the triple bottom line of “people, planet and profit” through our approach to responsible life cycle management, environmental footprint analysis, greenhouse gas emissions intensity reduction, waste management, global charitable giving, operational cost reduction, and industry best practices such as responsible land use and our global PV module recycling services. We are committed to minimizing the environmental impacts and enhancing the social and economic benefits of our products across their life cycle, from raw material sourcing through product end-of-life. First Solar’s Corporate Sustainability Policy is available on our website: **http://www.firstsolar.com/en/Resources/Sustainability-Documents?ty=Policies&re=&ln**

## ENVIRONMENTAL

- Providing the leading eco-efficient PV technology
- Operating world-class manufacturing facilities
- Applying responsible PV construction practices
- Offering globally available recycling services

## ECONOMIC

- Enabling affordable access to clean electricity globally
- Producing more energy with a lower levelized cost of electricity
- Eliminating fuel price volatility and hedging costs
- Delivering the most bankable PV solutions in the industry

## SOCIAL

- Creating jobs in local communities
- Ensuring a safe and engaging workplace
- Promoting diversity, development and education programs
- Partnering with responsible suppliers for a sustainable supply chain

As part of our efforts to “think globally and act locally”, we rolled out a global internal Sustainability Ambassadors Program in 2018 which enables First Solar associates at various sites to identify and implement local sustainability initiatives.

As part of a company-wide “Reduce-Reuse-Recycle” campaign starting in 2019, First Solar’s sustainability ambassadors devised a strategy to eliminate Styrofoam, straws and single-use plastic utensils from our cafeteria in Ohio. In Malaysia, the local team developed a solution to turn food waste from our cafeteria into organic fertilizer.

## Economic Sustainability

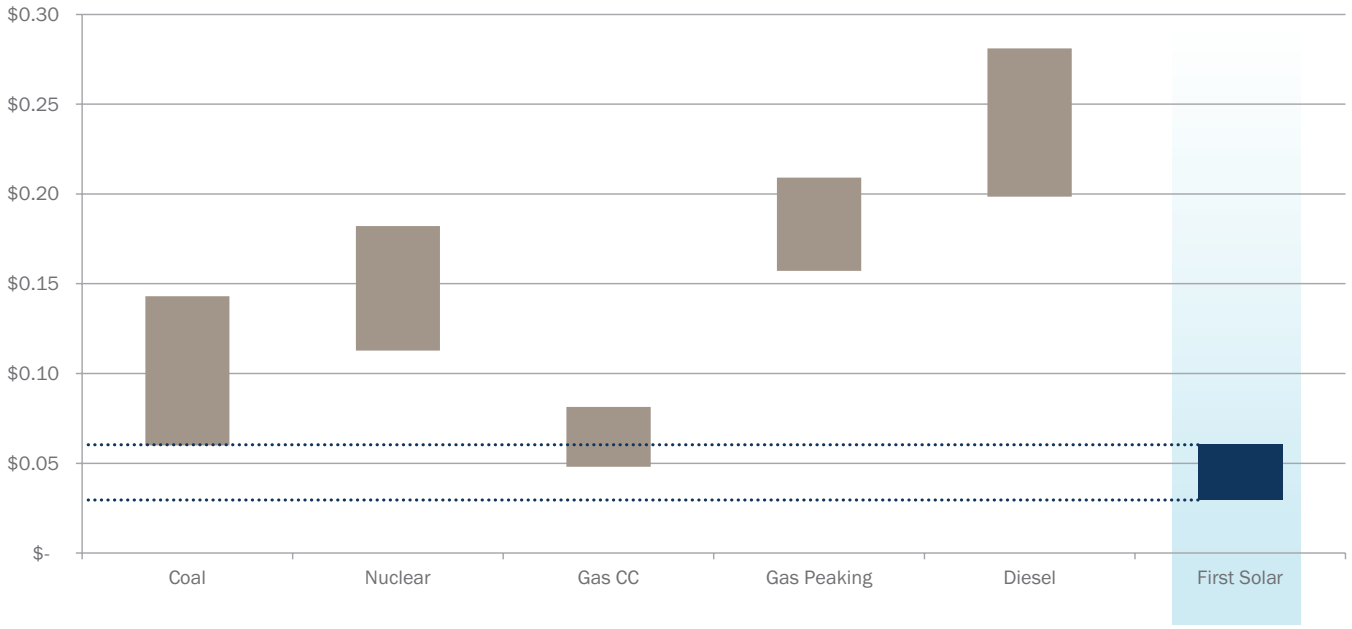
Economic sustainability for First Solar is about balancing our business model across growth, liquidity and profitability. We are creating enduring economic value by implementing a long-term roadmap to achieve our technology and cost leadership goals while operating as efficiently as we can in each environment where we do business. As part of our long-term strategic plans, we are focusing on opportunities in which our PV solar energy solutions can compete directly with fossil fuel offerings on an LCOE or similar basis, or complement such fossil fuel electricity offerings. Our corporate strategy focuses on providing utility-scale PV solar energy solutions using our modules to key geographic markets that we believe have a compelling need for mass-scale PV electricity, including markets throughout the Americas, the Asia-Pacific region, the Middle East, Europe, and Africa.

Competing in a dynamic industry requires us to be nimble and operate as efficiently as possible. We are prioritizing market opportunities worldwide relative to our core strengths and are allocating resources around the globe accordingly. First Solar has dedicated, and intends to continue to dedicate, significant capital and human resources to reduce the total installed cost of PV solar energy, to optimize the design and logistics around our PV solar energy solutions, and to ensure that our solutions integrate well into the overall electricity ecosystem of each specific market. We expect that, over time, an increasing portion of our consolidated net sales, operating income and cash flows may come from solar offerings in the key geographic markets described above as we execute on our Long Term Strategic Plan.

*We are providing PV solar energy solutions using our modules to key geographic markets that we believe have a compelling need for mass-scale PV electricity*

# Driving Down the Cost of Solar

Over the years, First Solar's utility-scale power plants have led the way in driving down the cost and ensuring the reliability of solar electricity, enabling the global transition to renewables. Solar has become a valued component of the global generation portfolio, able to hold its own with other energy sources in terms of cost competitiveness and energy yield. First Solar provides PV energy solutions that 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. On a LCOE basis, we currently provide electricity costs of between $0.03-$0.06/kWh depending on the region and other factors.




**Unsubsidized levelized cost of solar electricity compared to conventional energy sources.[2]**

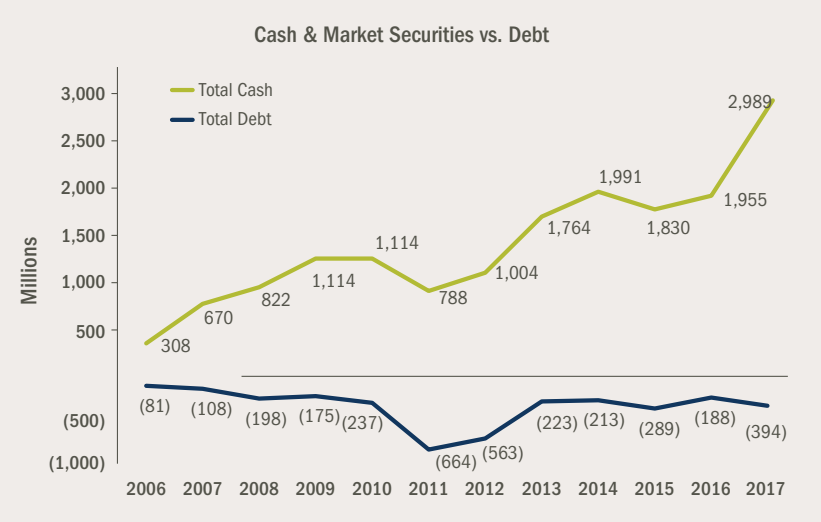
## 2017 Financial Highlights

In November 2016, we announced plans for the introduction of our Series 6 technology- a larger, more efficient and still recyclable PV module. To enable this transition, we started ramping down production of our Series 4 modules. As a result, we produced 2.3 GW of solar modules in 2017, which represented a 26 percent decrease from 2016. This temporary reduction in production capacity allowed us to use our existing manufacturing infrastructure to more quickly and cost effectively deploy our Series 6 module technology to best position us for long-term competitiveness and growth. During 2017, we ran our manufacturing facilities at approximately 99 percent capacity utilization, which represented a 2 percent increase from 2016.

[2] Lazard, Levelized Cost of Energy Analysis (Version 11), 2017. First Solar global LCOE range is based on internal data.

Our net sales totaled $2.9 billion in 2017, which was consistent with net sales in 2016. Despite uncertainty around global demand strength and pressure on module pricing in 2017, we generated record operating cash flows of $1.3 billion in 2017, which contributed to our ending cash and marketable security balance of $3 billion.

We provide a detailed account of our risks and opportunities related to climate change in our **2018 Carbon Disclosure Response**.




The following table sets forth our consolidated statements of operations as a percentage of net sales for the year ended 31 December 2017:

| Consolidated Financial Statement | | |
|---|---|---|
| | **31 December 2017** *(in thousands)* | **% of net sales** |
| Net Sales | $ 2,941,324 | 100% |
| Cost of Sales | 2,392,377 | 81.3% |
| Gross Profit | 548,947 | 18.7% |
| **Operating Expenses** | | |
| Research & Development | 88,573 | 3.0% |
| Selling, General and Administrative | 202,699 | 6.9% |
| Production Start-Up | 42,643 | 1.4% |
| Restructuring and asset impairments | 37,181 | 1.3% |
| **Operating Income** | | |
| Operating (loss) Income | 177,851 | 6% |
| Foreign Currency Loss, Net | (9,640) | (0.3)% |
| Interest Income | 35,704 | 1.2% |
| Interest Expense, Net | (25,765) | (0.9)% |
| Other Income, Net | 23,965 | 0.8% |
| Income Tax Expense | (371,996) | (12.6)% |
| Equity in Earnings, Net of Tax | 4,266 | 0.1% |
| Net Loss | (165,615) | (5.6)% |

# Corporate Governance

## Board of Directors

First Solar's business is conducted under the oversight of our board of directors. The primary responsibility of the board is to oversee and review senior management's performance of First Solar's business operations. For more information, please visit our website: **http://www.firstsolar.com/en/About-Us/Leadership**

## Executive Management

First Solar's CEO and executive management team are responsible for managing the Company's day-to-day business operations, including the preparation of financial statements and short- and long-term strategic planning. For more information, please visit our website: **http://www.firstsolar.com/en/About-Us/Leadership**

## Sustainability Governance

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

The SVP of Global Technical Services also leads the company's Sustainability Council which is composed of senior leaders from Supply Chain, Government Affairs, EHS, Sustainability, Business Development, Technology & Product Development, Legal, Human Resources, Finance, as well as the Chief Operating Officer, the Chief Technology Officer, Chief Accounting Officer and the Chief Information Officer. The Sustainability Council promotes the implementation of cross-functional sustainability strategies and drives the company's sustainability goals, initiatives and programs with a focus on resource efficiency, supply chain risk management, transparency, and utilizing sustainability as a lever for growth.

# Ethical Business Conduct

First Solar holds ethical business conduct as a core principle and is committed to operating at the highest ethical standards in every area of our business, at all times. **First Solar's Code of Business Conduct and Ethics Policy** demonstrates our commitment to this principle and guides the company's business conduct. Our Code of Business Conduct and Ethics applies to all directors and associates, including our Chairman, Chief Executive Officer, Chief Financial Officer, and other executive officers on a global basis. We have a long-standing commitment to conducting our business in compliance with applicable laws and regulations. This commitment, along with our culture of agility, collaboration and accountability, defines our accepted behaviors and enables us to advance our mission to provide cost-advantaged solar technology through rigorous safety practices, innovation, customer engagement, industry leadership and operational excellence.

## Our Culture

At First Solar, we believe that innovative and passionate people, working ethically and safely, form the foundation of our success. We generate results by fostering a culture based on agility, collaboration and accountability. Our formal internal Vision, Mission and Culture structure includes a collection of acceptable behaviors that support safety first, mutual respect for all associates, empowered collaboration between functions and individuals, and personal ownership of decisions, performance and results.

### Agility

We are creative and resilient.

### Collaboration

We help each other succeed.

### Accountability

We own the results of our actions.

## Collective Bargaining and Freedom of Association

First Solar recognizes that in the locations where we operate, employees have the right to freely associate or not associate with third-party labor organizations, along with the right to bargain or not bargain collectively in accordance with local laws. First Solar respects those rights and is committed to creating an environment of open communication where employees can speak with their managers about their ideas, concerns or problems, and work together to address workplace issues.

## Anti-Corruption

First Solar performs risk assessments that consider the possibility of fraud and related indicators. We currently operate in, and may expand into, many parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-bribery laws may conflict with local customs and practices. First Solar's Global Anti-Corruption Policy requires all associates to comply with the U.S. Foreign Corrupt Practices Act (FCPA) and all other applicable local anti-corruption laws. The Global Anti-Corruption Policy prohibits bribery, kickbacks, and the giving of other improper payments to obtain or retain business and covers any person engaged to perform work on behalf of First Solar including freelancers, independent contractors, temporary contractors, independent professionals, agents and consultants. We communicate our anti-corruption and anti-bribery policies in our technical service contracts. All First Solar associates are required to participate in periodic anti-corruption training. Advanced FCPA training is provided to associates in higher risk profile jobs and tailored according to the region. First Solar has implemented processes and procedures to help ensure compliance with all applicable anti-corruption laws. These processes and procedures are monitored and audited on an ongoing basis.

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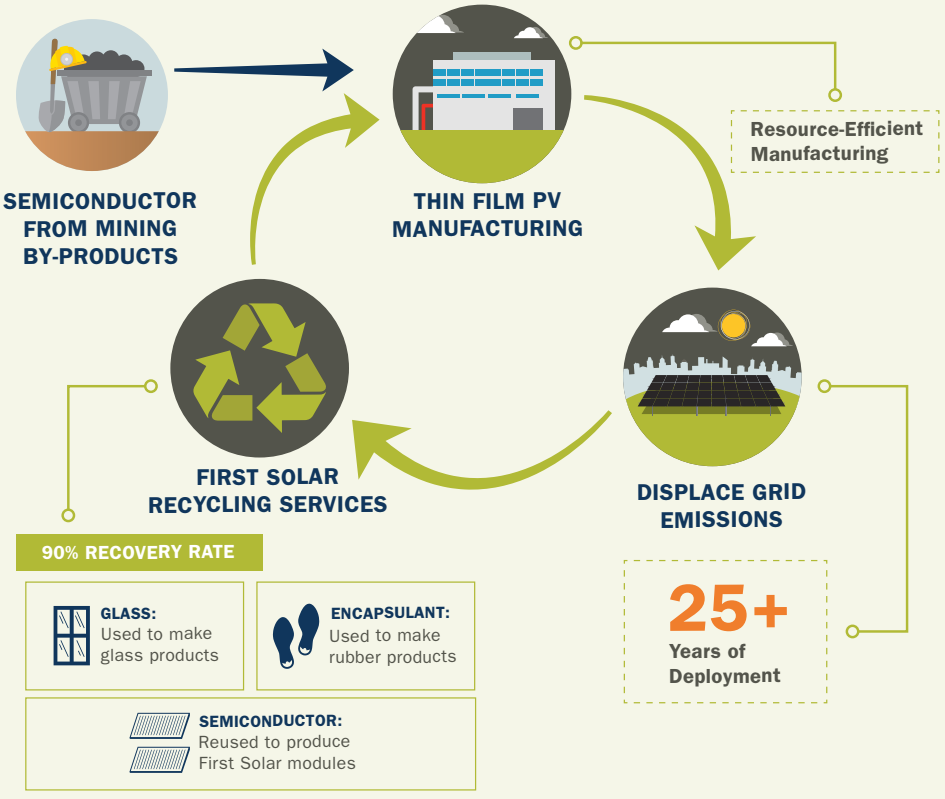
# RESPONSIBLE LIFE CYCLE MANAGEMENT

# 3 Responsible Life Cycle Management

First Solar is committed to minimizing the environmental impacts and enhancing the social and economic benefits of our products across their life cycle, from raw material sourcing through product end-of-life. Our semiconductor material is sustainably sourced from byproducts of the zinc and copper industries. Cadmium (Cd), a waste byproduct of zinc refining, and tellurium (Te), a byproduct of copper refining, are converted into a stable CdTe compound. Once encapsulated in First Solar modules, CdTe produces clean, affordable electricity throughout the modules' 25+ year lifetime. We are further reducing our life cycle impacts and increasing the eco-efficiency of our technology through our global recycling services.

## THE VALUE LOOP




### TYPICAL RECYCLING RATES

AUTOMOTIVE
**~75%**

INFORMATION TECHNOLOGY
**~45%**

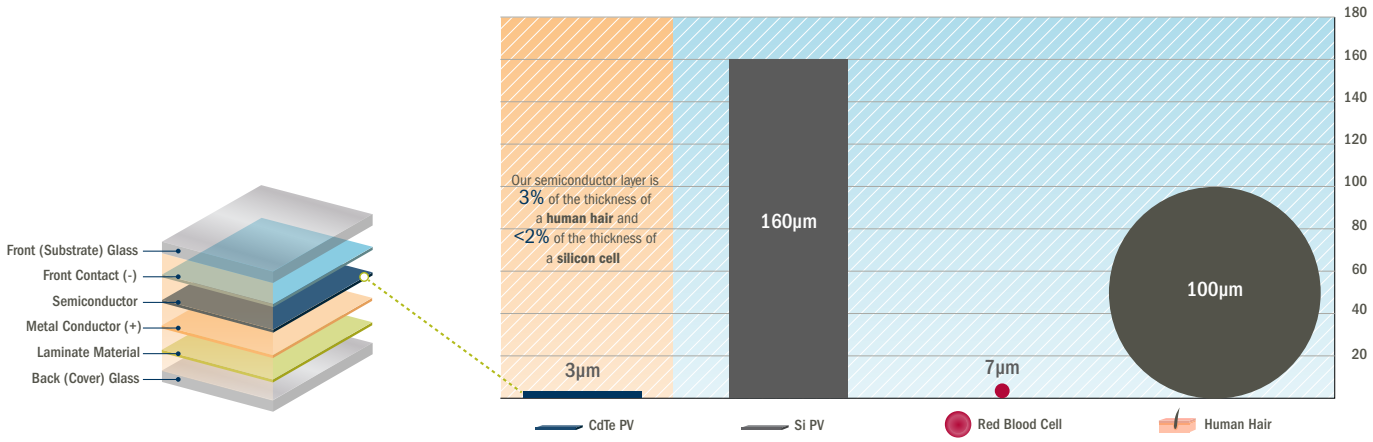
FIRST SOLAR MODULES
**~90%**

# Leading Eco-Efficient PV Technology

First Solar's advanced thin film PV solutions are the industry's leading eco-efficient technology due to their superior energy yield, competitive cost and smallest life cycle environmental impacts.[3] We provide the highest efficiency thin film modules suited to utility scale applications with a proven real-world energy yield advantage and a Tier one bankability profile.[4] With our Series 6 technology, we aim to deliver even higher value, higher efficiency and lower costs.

First Solar PV modules consist of a thin layer of semiconductor - approximately a fraction the thickness of a human hair strand - encapsulated between two sheets of glass and sealed with an industrial laminate material. Since CdTe is more efficient at absorbing light than indirect bandgap semiconductors such as silicon, First Solar modules use 98-99 percent less semiconductor material than conventional crystalline silicon modules. First Solar has identified multiple device improvements that could further reduce semiconductor intensity and increase these advantages compared to crystalline silicon modules.

Our glass-glass design is more robust and durable than glass-backsheet designs, resulting in a strongly bonded monolithic structure. As a result, First Solar thin film PV modules produce no emissions to soil, air or water under normal operating conditions.

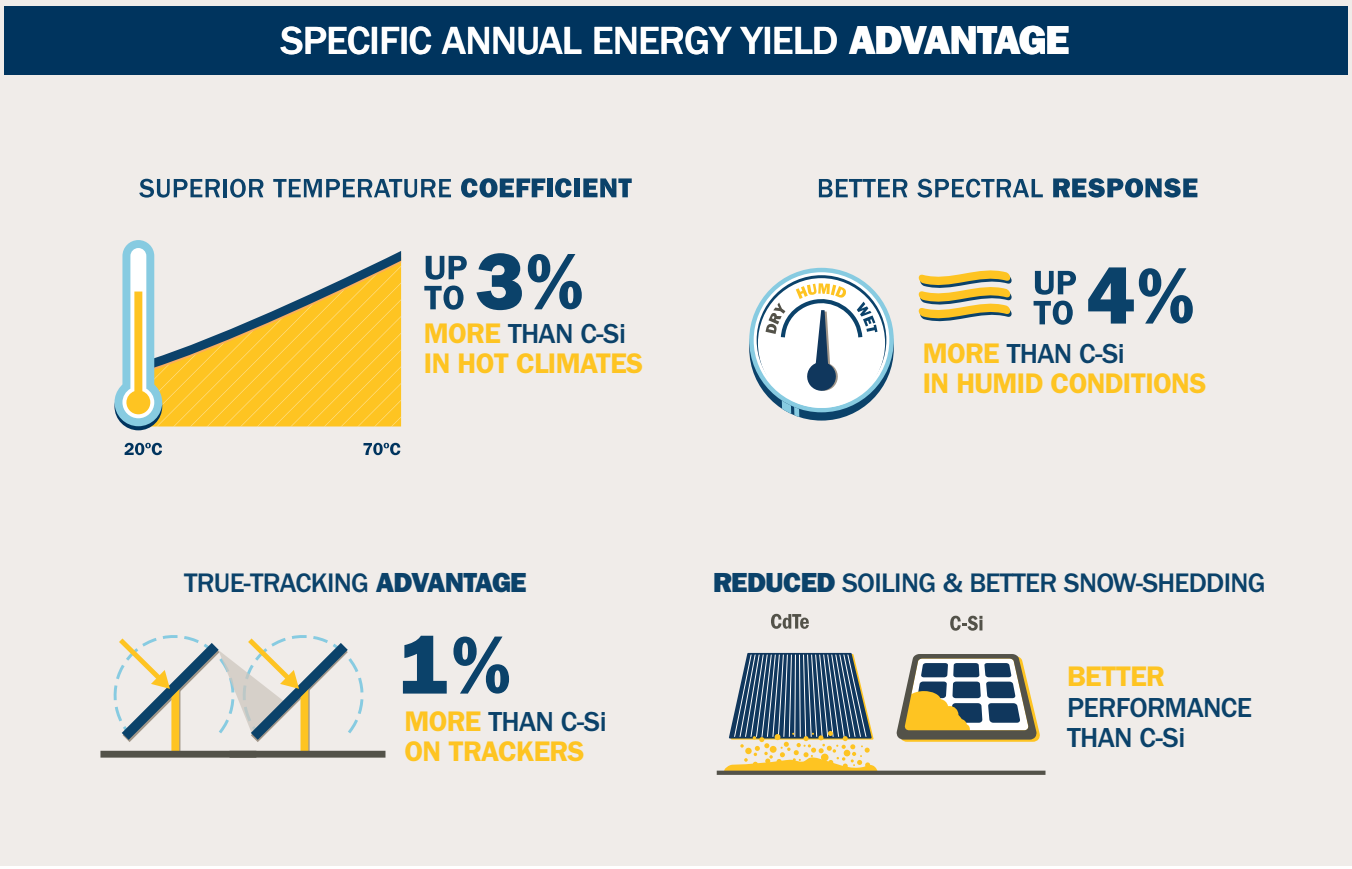



[3] M. Seitz, M. Kroban, T. Pitschke, S. Kriebe, 2013, Eco-Efficiency Analysis of Photovoltaic Modules, Bavarian State Ministry of Environment and Health.

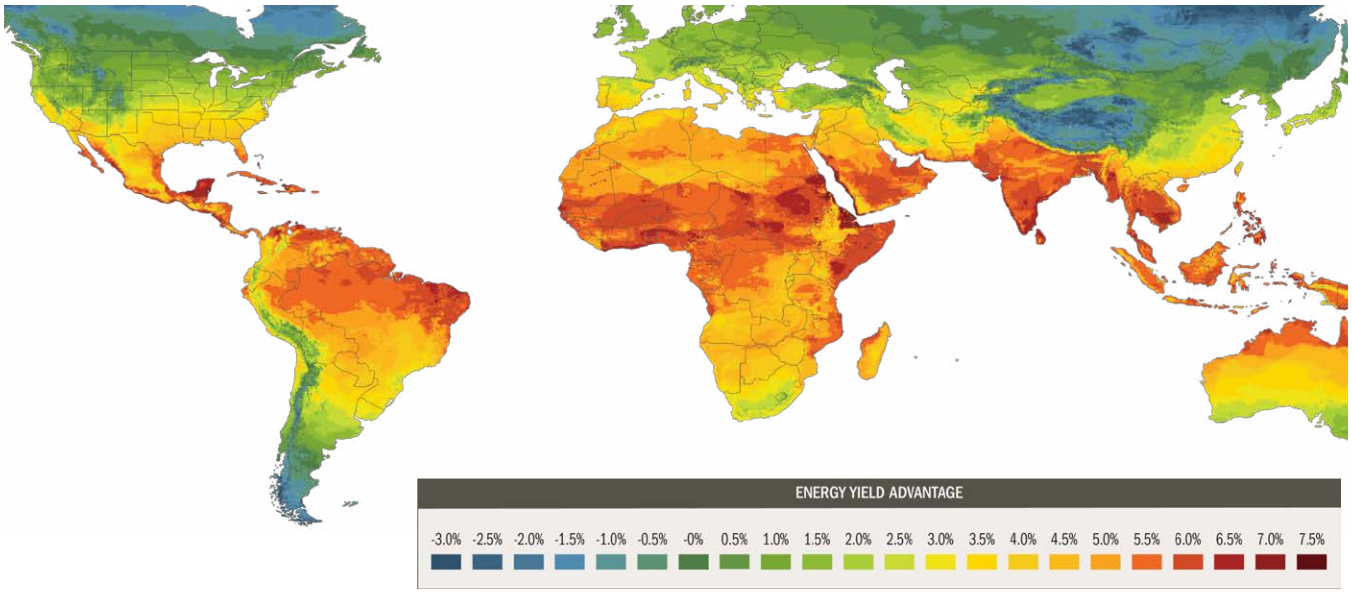
[4] Green, M. A., Emery, K., Hishikawa, Y., Warta, W., Dunlop, E. D., Levi, D. H., and Ho-Baillie, A. W. Y. (2017) Solar cell efficiency tables (version 49). Prog. Photovolt: Res. Appl., 25: 3–13. doi: 10.1002/pip.2855.

The CdTe semiconductor layer in First Solar modules is optimal for absorbing and converting sunlight into useful electricity and has a proven performance advantage over conventional crystalline silicon modules in harsh operating environments. While module efficiency identifies the power produced by a module in standard test conditions (STC), the Specific Annual Energy Yield metric provides a more useful picture of the energy produced by the modules in a power plant in a year under real world conditions. In addition to having a low temperature coefficient which reduces power losses at higher temperatures, our semiconductor material's narrower spectral response is less susceptible to dips in power that occur due to light absorption of water vapor in the atmosphere. While partial shading can dramatically impact a conventional crystalline silicon module, the unique cell design of First Solar modules minimizes power loss from shading, contributing a 1 percent energy yield advantage. Due to their low temperature coefficient and superior spectral and shading response, First Solar thin film modules with tracker mounting systems provide up to 7.5 percent greater specific annual energy yield in high temperature and high humidity climates compared to conventional crystalline silicon modules.

## First Solar's Module Advantage | Specific Annual Energy Yield vs. mc-Si Panels



## First Solar Specific Annual Energy Yield Advantage in Different Regions of the World




Powered by:

PLANTPREDICT

When evaluating a solar power plant's return on investment (ROI), energy yield has one of the biggest impacts on the overall Levelized Cost of Electricity (LCOE). One of the biggest factors influencing the specific energy yield is spectral response; however standard PV simulation tools often do not adequately take it into account. In most cases, standard reference conditions (ASTM G173 spectrum, air mass of 1.5) do not match real world conditions. By applying a spectral correction, First Solar's **PlantPredict** software provides more accurate and sophisticated energy estimates for utility scale PV applications.

Third-party test sites operated by Fraunhofer ISE have validated our energy model by quantifying the climatic effect on the specific energy yield. First Solar's high efficiency thin film modules are proven to deliver more usable energy per nameplate watt than conventional silicon-based modules.[5] This means that for an equivalently designed and installed power plant priced at the same $/Watt, a First Solar plant will produce more energy, resulting in a lower LCOE ($/MWh).

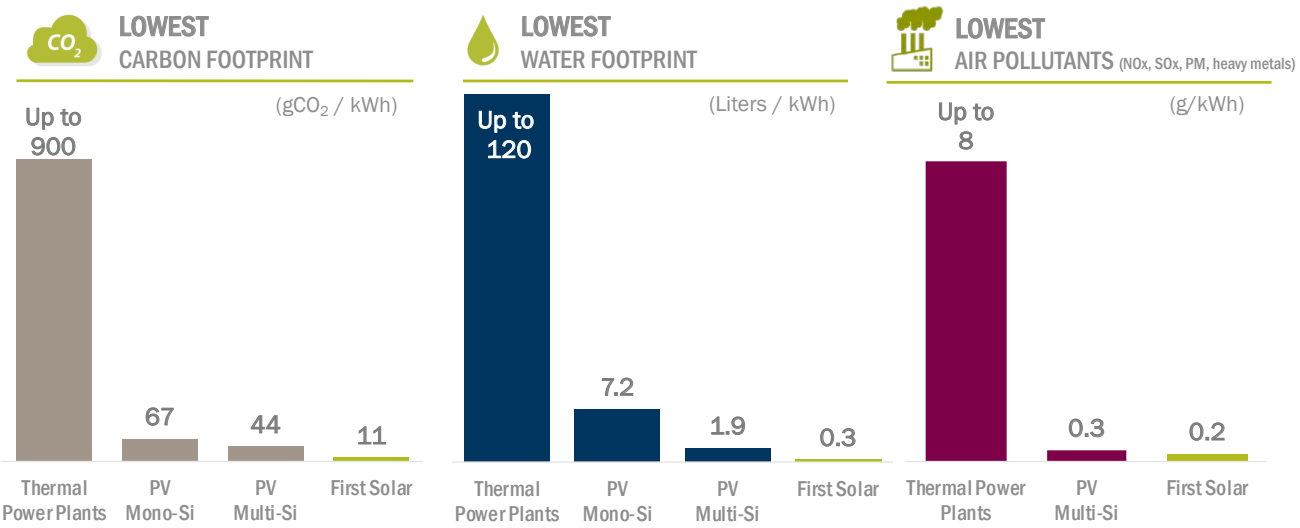
[5] D. Dirnberger et al., "On the impact of solar spectral irradiance on the yield of different PV technologies," in Solar Energy Materials & Solar Cells, vol. 132 pp. 431–442, 2015.

## Smallest Environmental Footprint

In addition to delivering competitive and reliable solar electricity globally, First Solar energy solutions provide an ecologically leading solution to climate change, energy security and water scarcity. Our advanced thin film PV modules are manufactured using less energy, water and semiconductor material, resulting in the best environmental profile in the industry. As a result, the carbon footprint of First Solar PV modules is up to six times lower than conventional crystalline silicon modules and a fraction of the carbon footprint of conventional energy sources.

While climate change has been an important driver 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 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. On a life cycle basis, First Solar's Series 6 modules use up to 400 times less water per kWh than conventional energy and up to 24 times less water than other PV technologies.

### Decoupling Business Growth from Negative Impacts



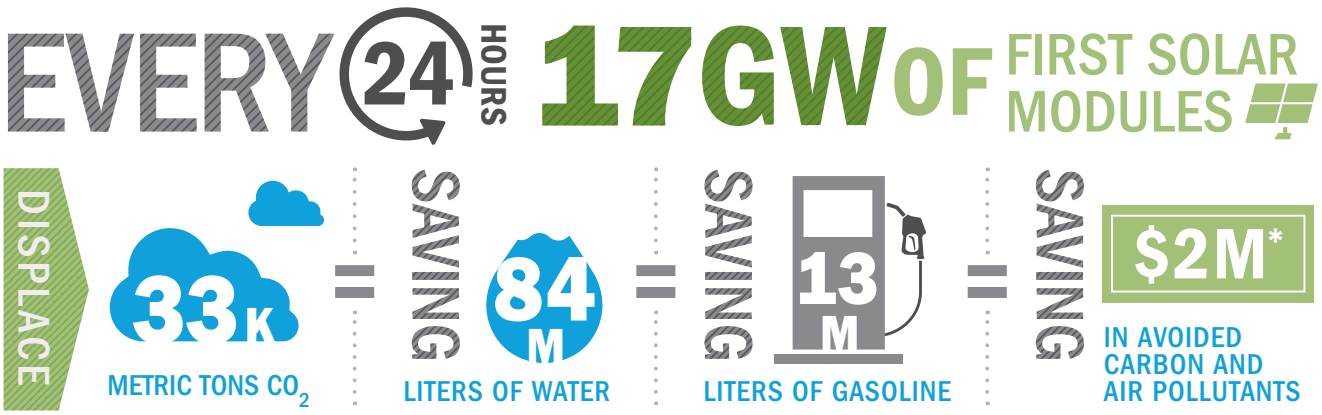

**First Solar PV enables customers to decouple their business growth from emissions, water use and waste generation.**

The concept of "decoupling" is about breaking the link between economic growth and resource consumption along with its environmental impacts. Energy accounts for approximately two-thirds of anthropogenic greenhouse gas emissions, 10 percent of global water withdrawals and is the leading cause of air pollution, which the World Health Organization (WHO) considers the world's single largest environmental health risk. By generating clean electricity with no emissions, water use, or waste generation, First Solar PV solutions enable customers to decouple their own business growth from environmental impacts associated with conventional electricity generation and consumption.

[6] M. de Wild-Scholten, Energy Payback Time and Carbon Footprint of Commercial Photovoltaic Systems, Solar Energy Materials & Solar Cells 119, 296-305, 2013. Assumes rooftop installation in Southern Europe (1700 kWh/m2/yr irradiation). Literature values were updated based on relative PV efficiency gains. Thermal power plants data: Fthenakis and Kim, V. Fthenakis, H.C. Kim, Energy Use and Greenhouse Gas Emissions in the Life Cycle of CdTe Photovoltaics, 2006

[7] Fthenakis and Kim. Life cycle uses of water in U.S. electricity generation. Renewable and Sustainable Energy Reviews vol. 14, pp. 2039–2048, 2010. Sinha, Meader and de Wild-Scholten, Life Cycle Water Usage in CdTe Photovoltaics, IEEE, Journal of Photovoltaics, 2012. Updated to reflect S6 water footprint based on Sinha and Wade, Addressing Hot Spots in the Product Environmental Footprint of CdTe Photovoltaics, IEEE PVSC, 2017

[8] P. Sinha, M. de Wild-Scholten, A. Wade, C. Breyer, Total Cost Electricity Pricing of Photovoltaics, SmartGreenScans, First Solar, and Renoir Lemoine Institute, 2013.



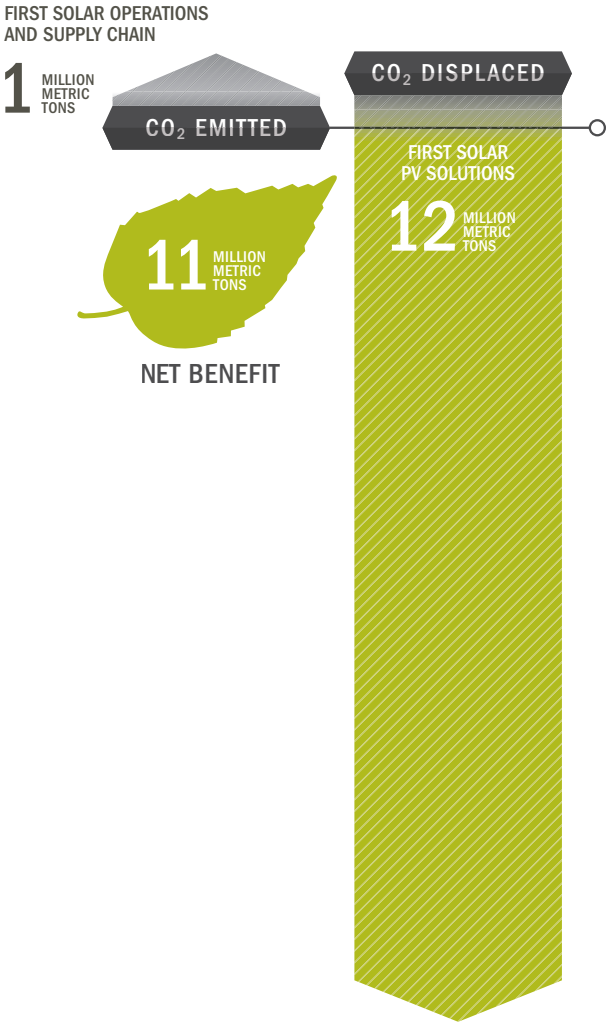

## Net Beneficial Carbon Impact

First Solar's eco-efficient PV modules and power plants are displacing twelve times the amount of greenhouse gas emissions we emit through our global operations and supply chain. In 2017, First Solar's total scope 1, scope 2 and scope 3 greenhouse gas emissions amounted to approximately 1 million metric tons of $CO_2$ equivalent.[9] With over 17GW of modules installed worldwide, First Solar PV solutions are displacing more than 12 million metric tons of $CO_2$ equivalent per year resulting in a net beneficial carbon impact of approximately 11 million metrics tons $CO_2e$ per year, assuming average worldwide irradiance and grid electricity emissions. Further information on the worldwide average solar carbon displacement methodology is provided in our **technical report**.

First Solar's scope 1 and scope 2 greenhouse gas emissions are externally verified on a triennial basis in accordance with the International Standard ISO 14064 Part 3 (ISO 14064-3) as well as the WRI/WBCSD GHG Protocol. Scope 3 emissions represent more than two-thirds of the company's total greenhouse gas emissions and are estimated in accordance with the WRI/WBCSD GHG Protocol.

## First Solar Annual Carbon Impact

### (MT of $CO_2$ Emitted vs. Displaced in 2017)

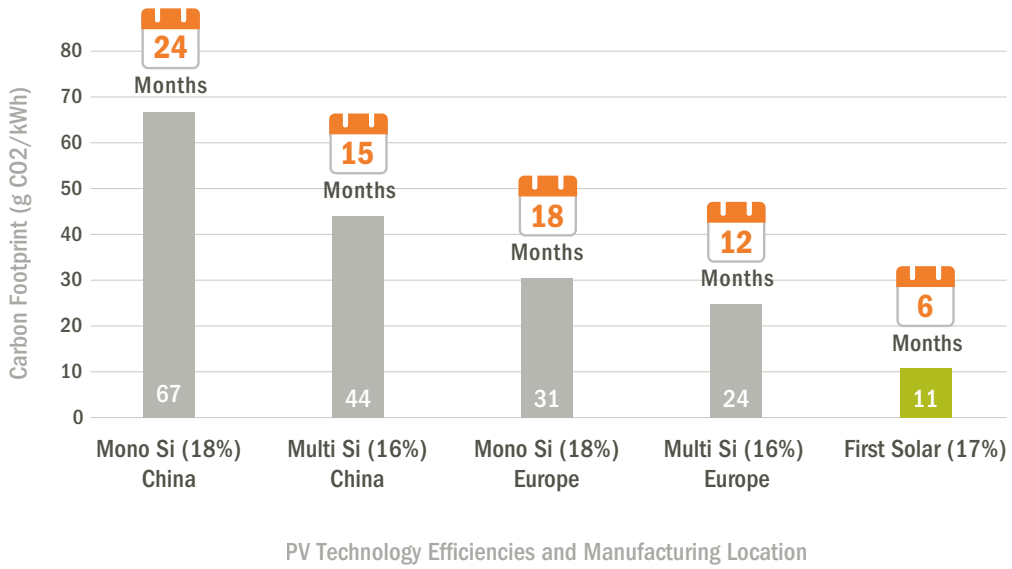



[9] Scope 1 includes direct GHG emissions from sources that are owned by the company e.g. emissions from fossil fuels burned on-site or emissions from company-owned vehicles. Scope 2 includes indirect GHG emissions resulting from the generation of electricity, heating and cooling, or steam generated offsite but purchased by the company e.g. purchased grid electricity. Scope 3 includes all other indirect emissions that occur in the company's value chain, i.e. from sources not owned by the company.

## All PV Technologies Are Not Created Equal

Where and how a PV module and its components are manufactured significantly impacts its environmental profile. Manufacturing PV modules using a fully integrated and resource-efficient process in countries with a less carbon intensive grid, not only results in the smallest environmental footprint but also the fastest energy payback time[10] of any PV technology on a life cycle basis. In less than six months under high irradiation conditions, First Solar PV power plants produce more energy than was required to create them. This corresponds to a 50-fold energy return on investment (EROI) over a 25-year project lifetime, providing an abundant net energy gain to the electricity grid.

### Industry-Leading Carbon Footprint and Energy Payback Time[11]




**A fast energy payback time enables the rapid expansion of PV while achieving faster carbon reductions.**

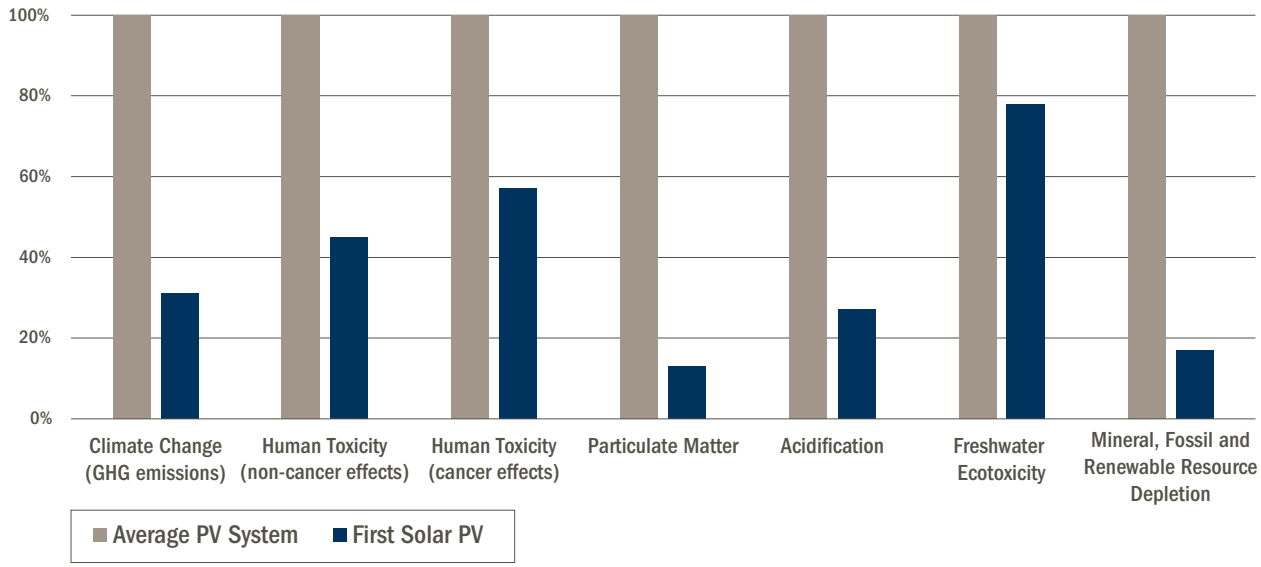
A recent study evaluated the environmental footprint of five different PV technologies (CdTe, CIS, micro-morphous silicon, multi-crystalline silicon, mono-crystalline silicon) in accordance with the European Commission's Product Environmental Footprint Guidance. On average, characterized impacts of a First Solar PV system are about two-thirds lower than the average PV system.[12]

[10] Energy payback time is the amount of time a system must operate to recover the energy required to produce it.

[11] M. de Wild-Scholten, Energy Payback Time and Carbon Footprint of Commercial Photovoltaic Systems, Solar Energy Materials & Solar Cells 119, (2013), 296-305. Assumes rooftop installation in Southern Europe (1700 kWh/m2/yr irradiation). Literature values were updated based on relative PV efficiency gains.

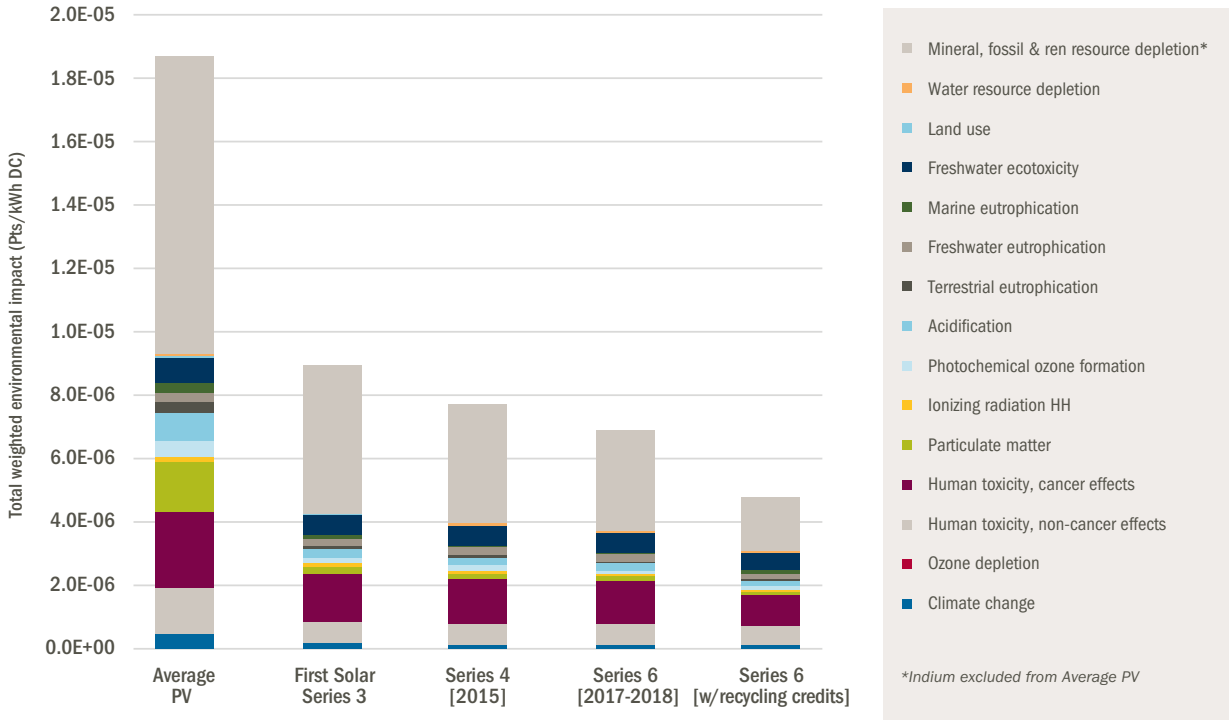
[12] First Solar, "First Solar Series 4 PV System Product Environmental Footprint," 2016. The environmental performance of the electricity produced with an average PV system is based on the market mix of PV panels in 2012 (45.2% multi c-Si, 40.5% mono c-Si, 6.3% CdTe, 3.5% CIS, 4.5% micromorph Si). Source: P. Stolz, R. Frischknecht, F. Wyss, and M. de Wild-Scholten, "PEF screening report of electricity from photovoltaic panels in the context of the EU Product Environmental Footprint Category Rules (PEFCR) Pilots, v. 2.0," treeze Ltd. and SmartGreenScans, 2016.

## Environmental Impacts of First Solar PV Compared to Average PV System[10]




Our sustainability advantage is set to increase with our Series 6 technology due to its larger form factor, higher anticipated efficiency of 17.5 percent and lower glass usage per $m^2$. By transitioning to our larger, more efficient and still recyclable Series 6 modules, the environmental footprint of our thin film PV technology is expected to be four times lower than the average PV module.[13] Over the past few years, we have been participating in the development of the PV industry's first sustainability leadership standard (NSF 457) which provides a standardized set of performance objectives and focuses on addressing hotspots across the PV value chain.[14]

## Total Weighted Environmental Impact Results of 1 kWh of DC Electricity Produced with a 3 kWp Mounted Installation[12]

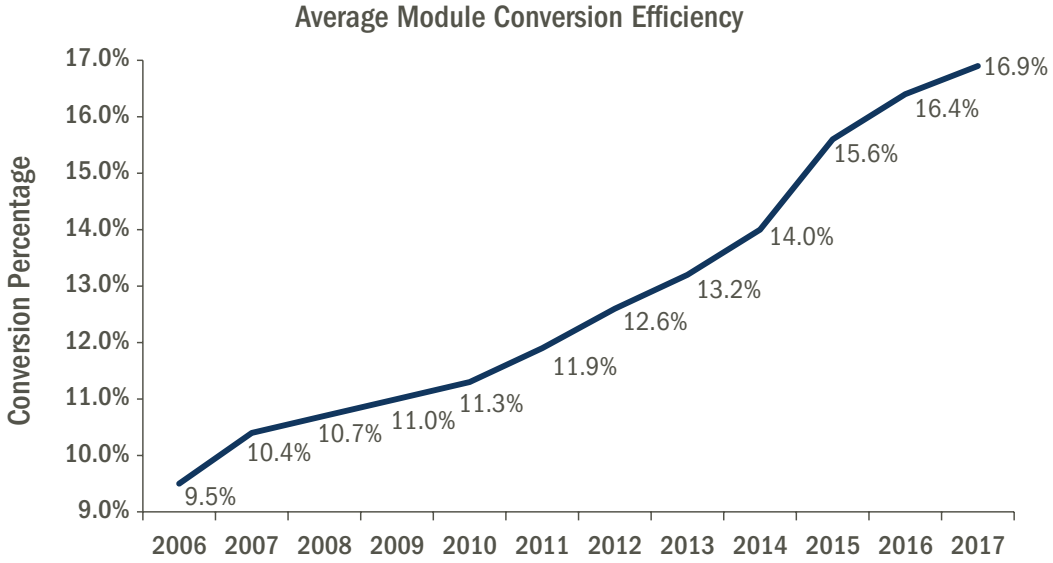



[13] P. Sinha and A. Wade, Addressing Hot Spots in the Product Environmental Footprint of CdTe Photovoltaics, IEEE JPV. DOI: 10.1109/JPHOTOV.2018.2802786, 2018.

[14] A. Wade, P. Sinha, K. Drozdiak, D. Mulvaney, J. Slomka, Ecodesign, Ecolabeling and Green Procurement Policies – enabling more Sustainable Photovoltaics? 7th World Conference on Photovoltaic Energy Conversion - 45th IEEE Photovoltaic Specialists Conference, 2018.

# Continuous Improvement


Over the past ten years, First Solar has invested more in research and development (R&D) than any of our competitors.[15] Our R&D efforts are focused on achieving the goals established in our cost and efficiency roadmaps to make solar a valued component of the global energy generation portfolio and increase our customer's financial savings. As a result, our module efficiency has improved on average more than half a percent every year since 2006. In 2017, we decreased our R&D spend to approximately $88.5 million compared to $124 million in 2016, in order to focus on our transition to Series 6. Despite the decrease in our R&D spend, we successfully increased the fleet average efficiency of our Series 4 module to 17 percent and lowered the module cost per watt by 14 percent as compared to the prior year. We currently hold two world records for CdTe PV efficiency, achieving an independently certified research cell efficiency of 22.1 percent and an aperture area efficiency of 18.6%, which corresponds to a full area module efficiency of 18.2 percent. Our research cell efficiency is a leading indicator of where our technology can ultimately go. By executing our watts per module roadmap, First Solar is simultaneously driving down emissions and the cost of solar electricity.




## Change Management System

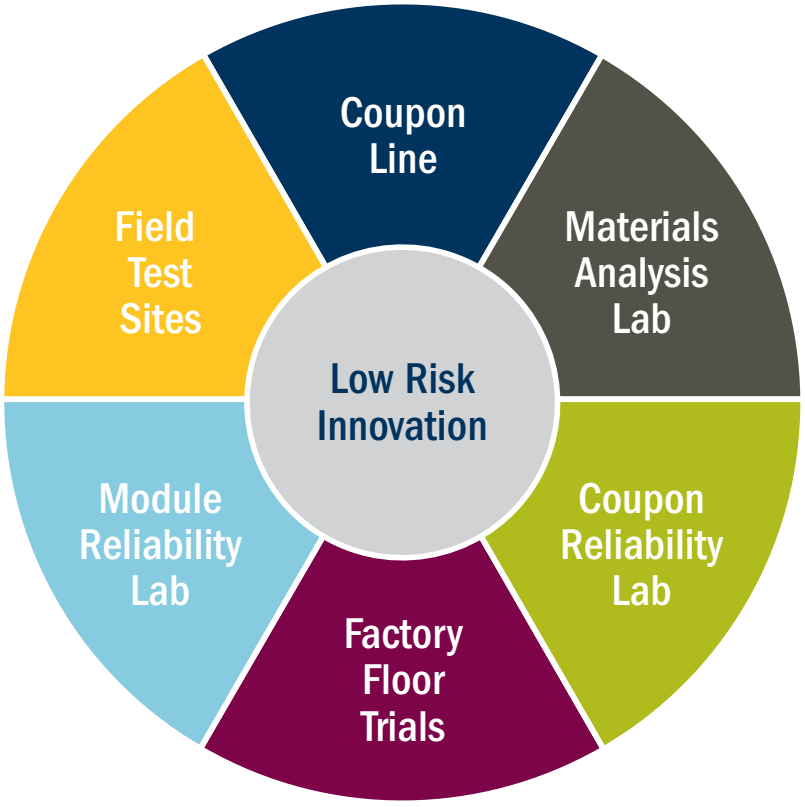
First Solar implements a robust Change Management System (CMS) to ensure product changes do not negatively impact product safety, reliability, environmental footprint or recyclability. Process changes and module design improvements undergo several test and validation runs before receiving final approval and being implemented across manufacturing facilities. Life cycle analysis is performed for significant product and manufacturing process modifications to assess environmental, health and safety impacts before any changes are implemented.

[15] PV Tech, 10 years of R&D spending analysis of 12 key PV module manufacturers, 2017. https://www.pv-tech.org/editors-blog/10-years-of-rd-spending-analysis-of-12-key-pv-module-manufacturers

# Industry-Leading Quality, Reliability And Safety

First Solar is committed to providing PV modules with world-class quality and reliability that deliver a predictable energy yield throughout the lifetime of a PV plant. Failure Mode and Effects Analysis (FMEA) is core to our innovation and enables First Solar to select the most robust and reliable materials and components. First Solar goes beyond industry testing standards and implements a continuous Product Reliability Monitoring ("PRM") program to ensure product reliability is maintained globally during high-volume manufacturing, giving customers project-specific reliability assurance without increasing the cost of supply. Our PRM process involves random sampling of manufacturing volume and testing for durability and power performance. The program is designed to complement existing third-party tests and demonstrate reliability assurance continuously on every manufacturing line every week.

## First Solar's unique and extensive infrastructure to ensure product quality and reliability

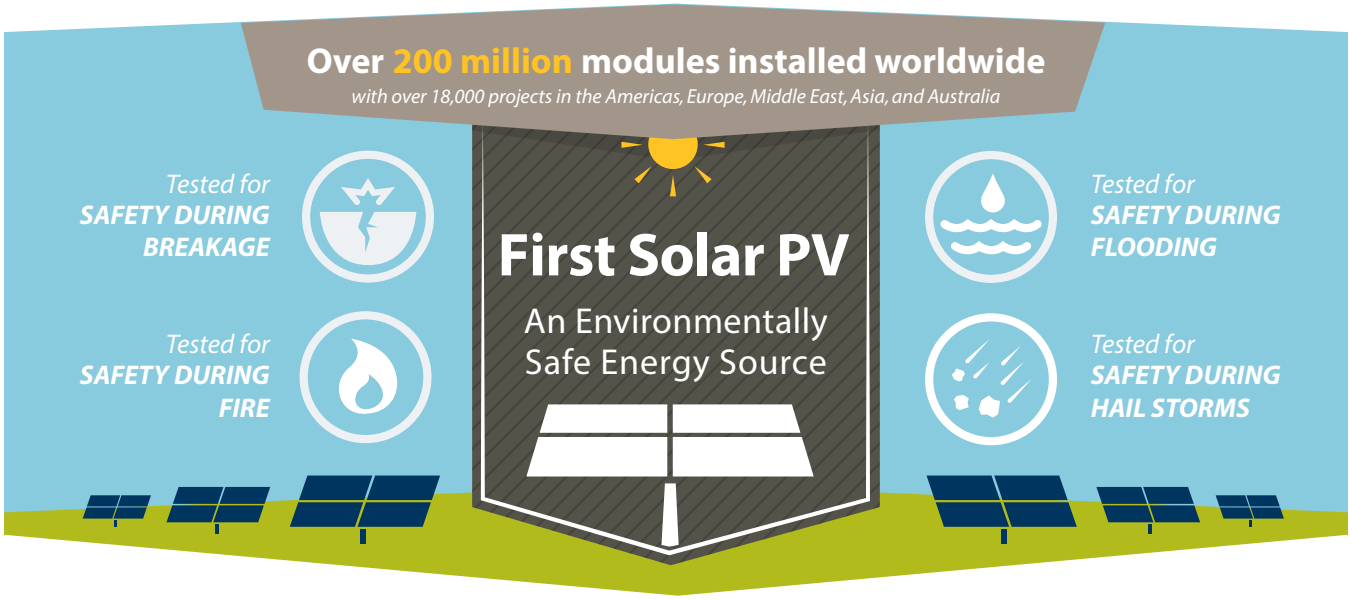


First Solar modules and PV power plants are certified to globally recognized standards for safety, quality, reliability and environmental sustainability to provide the most bankable PV solutions in the industry. Our modules are additionally certified to regional standards including UL for North America, Golden Sun for China, InMetro for Brazil, MCS for the U.K. and JET for Japan. First Solar PV modules meet rigorous performance testing standards, demonstrating their durability and reliability in real-world environments. The performance of our modules and PV power plants are monitored through world-class outdoor test sites to provide high-level field validation.

In 2018, First Solar's Series 6 thin film PV module technology completed **CSA/ANSI C450 PV Module Testing Protocol for Quality Assurance**, administered by CSA Group's PV test lab CFV Solar Test Laboratory in Albuquerque, New Mexico. The test results provide confidence in the long term performance and durability of Series 6 modules in harsh climates. CSA/ANSI C450 replicates actual field failure experiences through a series of extended environmental tests including temperature cycling, damp heat exposure, mechanical load testing, UV exposure and PID (Potential Induced Degradation) testing. As the first publicly available standard to address extended stress testing of PV modules beyond that required for safety certification and qualification, CSA/ANSI C450 provides project developers, independent engineers and investors with a more transparent, consistent and comparable method for evaluating PV module reliability.

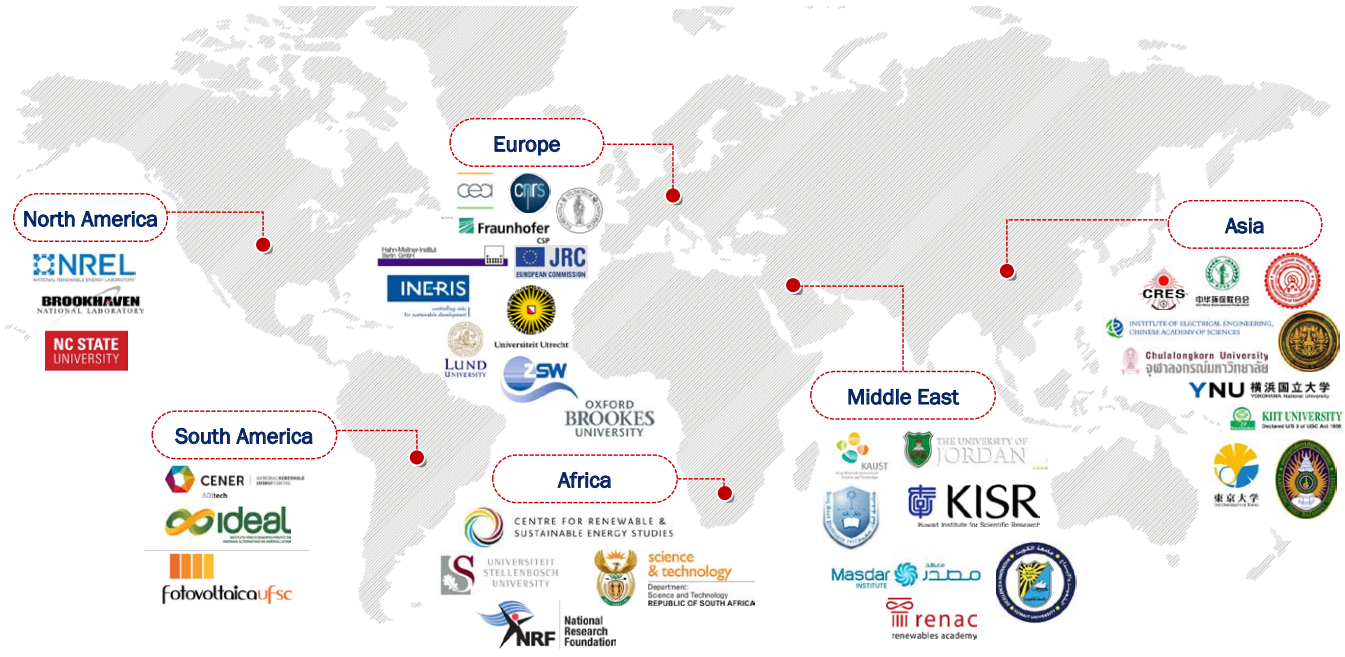
- **1st PV company** to receive globally recognized IECRE certification for quality in PV product design, manufacturing processes, and the selection and control of materials (IEC TS 62941)

| Test | Description | Results |
|---|---|---|
| **IEC 61215/IEC 61730 Certification** | Basic industry market entry certifications | **PASS** *1500V certification level* |
| **Thresher Test** | Multiplies basic IEC 61730/61215 test cycles and durations 2X to 4X | **PASS** *<5% Power Output drop* |
| **Long-Term Sequential Test** | 6-month accelerated protocol to evaluate long-term harsh climate durability where same modules experience critical serial stresses | **PASS** *1st thin film module to pass* |
| **IEC 62804 PID-Resistant Certification** | Demonstrates high resistance to potential induced degradation at extreme ± 1500V voltages at most extreme 85C/85% RH test levels, enabling confident floating and grounded applications | **PASS** *1500V* |
| **IEC 60068 Desert Sand Resistance Certification** | Demonstrates minimal power loss and package integrity resistant to wind-blown particulates | **PASS** |
| **IEC 61701 Salt Mist Corrosion Certification** | Demonstrates resistance against salt mist corrosion | **PASS** |
| **IEC TS 62941 (IECRE)** | Sets the global industry benchmark for PV module product design, development, product certification, process control, raw material control and procurement, as well as product testing and monitoring. | **PASS** *1st certificate issued under IECRE conformity assessment system* |




More than 40 researchers from leading international institutions have confirmed the benefits and safety of First Solar PV technology over its entire life cycle; during normal operation as well as foreseeable accidents such as fire or module breakage and through end-of-life recycling and disposal. First Solar modules are tested for safety during breakage, fire, flooding and hail storms to ensure their durability in the field. First Solar has extensive reliability testing capabilities with the ability to test more than 80,000 modules per year for light-induced degradation, resilience to wind, snow and ice loads, fire resistance under reverse current fault conditions, material adhesiveness, breakage resistance to hail impact and performance in the event of soiling or shading. With more than 17,000MW installed worldwide, First Solar modules have a proven record of safe and reliable performance.

## 40+ Researchers Have Confirmed the Safety and Benefits of CdTe PV



# First Solar Recycling Program

First Solar has a long-standing leadership position in PV recycling. We established the industry's first voluntary global prefunded module recycling program in 2005 and have over a decade of experience in operating high-value PV recycling facilities on a global and industrial scale. Our unrivalled in-house recycling expertise and infrastructure has enabled us to consistently drive down recycling costs for our customers. First Solar's industry-leading recycling services enable PV power plant and module owners to meet their module end-of-life obligations simply, cost-effectively and responsibly. Our state-of-the-art recycling facilities are operational in the U.S., Germany, Malaysia and Vietnam, and have a scalable capacity to accommodate high volume recycling as more modules reach the end of their 25+ year life.

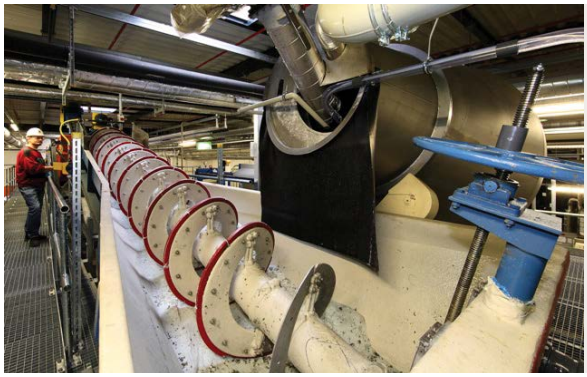
## First Solar PV Module Recycling Process


Our high-value recycling process recovers approximately 90 percent of the glass for reuse in new glass products and over 90 percent of the semiconductor material for reuse in new modules. During the recycling process, First Solar modules are crushed and shredded to break the lamination bond. The crushed modules are chemically treated to recover semiconductor material from the glass. The unrefined semiconductor material is then sent externally for further processing. Once rinsed and cleaned, the glass is packaged so it can be reused in new glass products. In Malaysia, our laminate material is now being recycled for reuse in rubber mats, bicycle handles and shoe soles, thereby further closing the loop on our products' life cycle. The remainder of the recycled module scrap (approximately 5 to 10 percent) which cannot be used in secondary raw materials is handled using other responsible waste treatment and disposal techniques. Due to the shredding, crushing and heating typically involved in recycling processes, material losses are inevitable, and the recovery ratio is always less than 100 percent.[16]

[16] McKinney, Schoch, and Yonavjak, Mineral Resources, Environmental Science Systems and Solutions, Jones & Bartlett Learning, 2013.

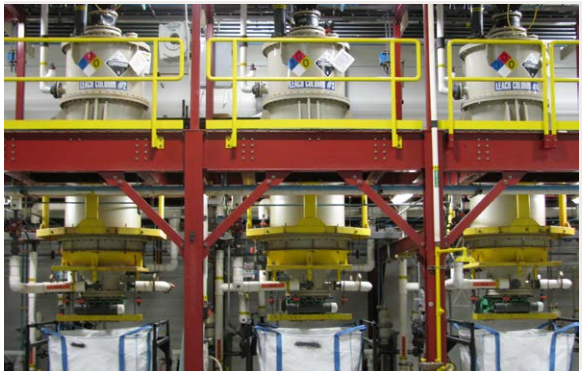
## Continuously Improving Our PV Recycling Technology

First Solar is proactively investing in recycling technology improvements and is implementing a cost reduction roadmap to drive down recycling prices. In 2015, we launched our third-generation recycling technology which achieves superior glass and semiconductor purity and requires 30 percent less capital, chemicals, waste and labor. The continuous flow process improves our recycling efficiency and throughput, increasing our daily recycling capacity from 30 tons to 150 tons. We aim to develop modular recycling facilities for smaller markets to enable in-country recycling and reduce transportation costs.



### VERSION 1 (2005)

- Based on the mining industry
- Batch process
- Moving glass and liquid from process to process
- Volume output – 10 MT/day
- Capital investment - $5M



### VERSION 2 (2011)

- Based on the chemical industry
- Batch process
- Keeping the glass fixed and moving the liquids through the material
- Volume output – 30 MT/day
- Capital investment - $7M

### VERSION 3 (2015)

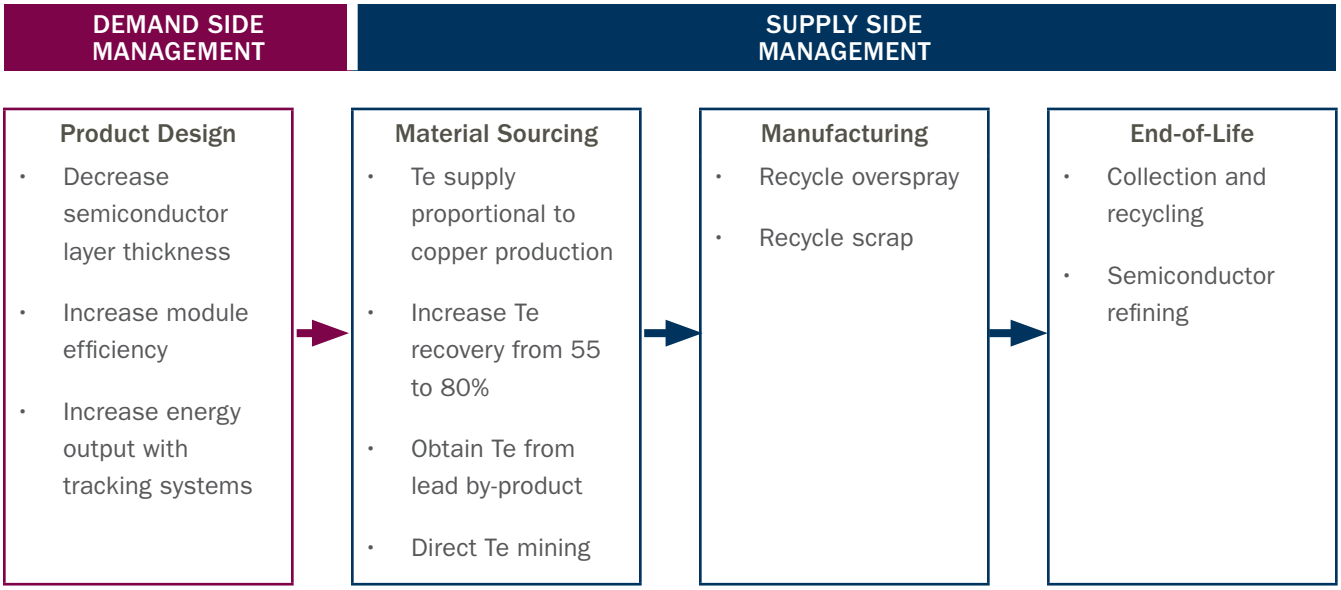
- Continuous process
- Efficient 7/24 operations
- Compact plant
- Volume output -150 MT/day
- 30% less capital, chemicals, waste and labor
- Superior glass and semiconductor purity

# Raw Material Availability

First Solar's semiconductor material is manufactured from byproducts of zinc and copper refining. Cadmium is generated in substantial quantities regardless of its use in PV, primarily as an unavoidable by-product of zinc production which is needed to produce steel products. A future oversupply of Cd is projected as current demand for Cd decreases and zinc production increases. Thin film PV systems provide a sustainable use for Cd which would otherwise be stored or disposed of.[17] Te is largely supplied from the byproducts of copper production, which have been growing at a rate of approximately 1-3 percent per year.[18,19] Tellurium (Te) is managed through both demand and supply side strategies, see figure below.[20] On the supply side, production could be expanded by improving Te recovery from copper anode slimes and beginning to recover Te from non-traditional byproduct streams. On the demand side, progress in PV module conversion efficiency and manufacturing will continue to reduce the demand for Te per Watt produced. First Solar is actively pursuing multiple technical programs, such as bandgap engineering, to achieve step change improvements in tellurium requirements. First Solar maintains a strategic reserve of tellurium products to decrease exposure to tellurium supply or price volatility.

In the longer term, end-of-life recycling is expected to be an important additional source of Te supply. In 2016, approximately 8 percent of our semiconductor material came from recycled input materials. As more First Solar modules reach the end of their useful life, this percentage is likely to increase. Researchers from independent institutions have concluded that a combination of improvements in PV module Te intensity, Te recovery from copper ores and recycling could lead to annual production of CdTe PV on the order of 100GW per year by mid-century at reasonable cost, which would enable terawatt-scale deployment on the order of a decade.[21,22,23]

## Demand and Supply-Side Tellurium Management Strategies




[17] Y. Matsuno, T. Hur, and V. Fthenakis, Dynamic modeling of cadmium substance flow with zinc and steel demand in Japan. Resources, Conservation and Recycling, 61: 83– 90, 2012.

[18] K. Zweibel, The Impact of Tellurium Supply on Cadmium Telluride Photovoltaics, Science, 328: 699-701, 2010.

[19] M. Redlinger, M. Lokanc, R. G. Eggert, M. Woodhouse, A.C. Goodrich, The Present, Mid-Term, and Long-Term Supply Curves for Tellurium: and updates in the results from NREL's CdTe PV module manufacturing cost model, 2013.

[20] P. Sinha, Life Cycle Materials and Water Management for CdTe Photovoltaics. Solar Energy Materials and Solar Cells, 119, 271-275, 2013.

[21] Redlinger et al., 2013.

[22] Y. Houari, J. Speirs, C. Candelise, and R. Gross. A system dynamics model of tellurium availability for CdTe PV, 2013.

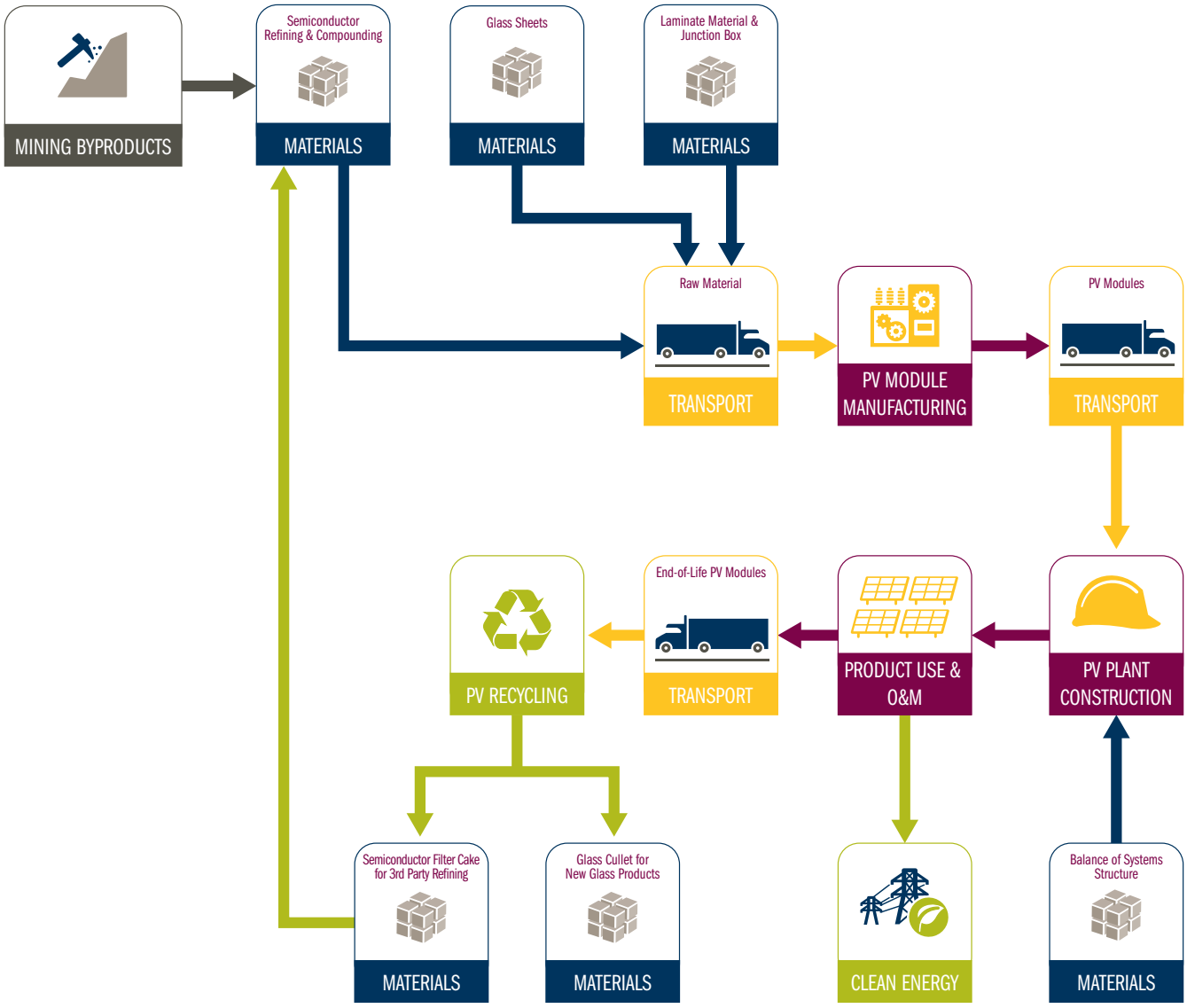
[23] V. Fthenakis, Sustainability metrics for extending thin-film photovoltaics to terawatt levels. MRS Bulletin. Vol. 37: 425-430, 2012.

4

# SUPPLY CHAIN SUSTAINABILITY

# 4 First Solar Supply Chain Overview

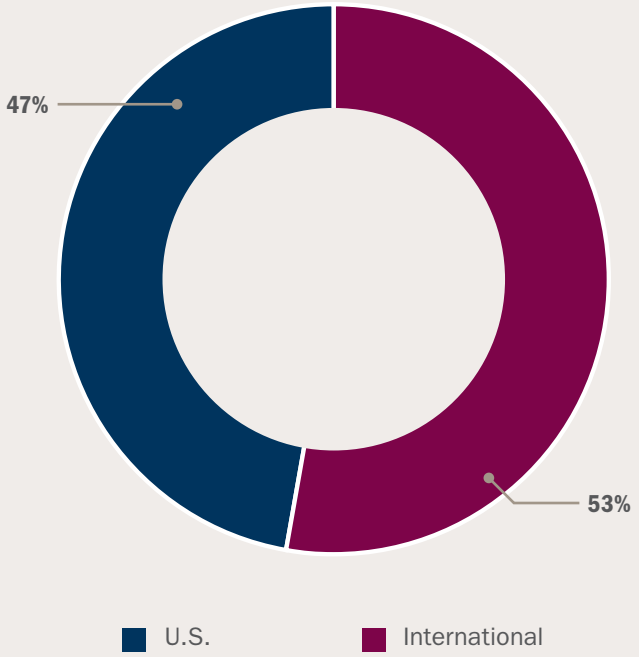
Our thin film module manufacturing process uses approximately 30 types of raw materials and components to construct a complete solar module. Critical raw materials and components in our manufacturing process include cadmium telluride, front glass coated with transparent conductive oxide, photo resist, laminate material, tempered back glass, junction boxes, cables and solar connectors. First Solar has one product, one process and one Bill of Materials resulting in a tightly controlled and consistently manufactured quality product in contrast to many traditional tier one crystalline silicone manufacturers who have multiple products, processes and Bill of Materials with a sprawling supply chain resulting in increased variability and quality and reliability risks.



In 2017, First Solar spent approximately $1.95 billion on its global supply chain. Our data includes our manufacturing bill of materials, project spend, capital spend and indirect expenses. The data includes all credit memos. Approximately $917 million or 47 percent was spent on local suppliers in the U.S. to support our module manufacturing operations and solar project development. In total, we estimate we are creating over 30,000 direct, indirect and induced jobs across the supply chain worldwide.[24]

At First Solar, we recognize that diversity and inclusion is a driving force in the success of our company. Our commitment to diversity is about building projects that support the growth and success of the small and disadvantaged contracting community. In 2017, approximately $17 million was awarded to women-, minority-, and disabled veteran-business enterprises (WMDVBE). We are actively pursuing ways to increase our spending with diverse business enterprises (DBEs). We are in the process of building lasting business relationships through the continuous development and engagement of DBEs as partners.

## Global Supply Chain Spend by Region*




*** Data is based on where a purchase order is placed, not necessarily where work is performed.**


[24] The estimated job creation includes actual First Solar associate jobs and estimated supply chain jobs based on calculations provided by the University of Massachusetts Department of Economics and Political Economy Research Institute (PERI) in The Economic Benefits of Investing in Clean Energy. Direct jobs= 5.4 jobs/$1M spend; Indirect Jobs= 4.4 jobs/$1M spend; Induced jobs= .4 jobs (Direct + Indirect). Total First Solar annual spend was more than $1.95 billion in 2017.

# Supplier Qualification and Assessment

First Solar utilizes a supplier selection scorecard process to identify the right supplier partners who can meet our technical, quality and commercial needs. Before any materials are used in our manufacturing process, a supplier must undergo a rigorous qualification process. First Solar's Supplier Qualification process is linked to our Change Management System and is used to qualify any new suppliers and materials. First Solar inspects over 1,000 material qualities per day and issues over 6,000 certificates of analysis per year. When possible we attempt to use suppliers that can provide a raw material supply source that is near our manufacturing locations, thereby reducing the transportation cost and impact as well as the lead times for such materials.

First Solar performs periodic cross-functional team reviews of our critical suppliers' performance using a balanced scorecard which focuses on the areas of Quality, Cost, Flexibility, Service, Technology and Sustainability. During these business reviews we communicate First Solar's state of the business and work in partnership with our supply base to develop the best course of action for them to support our dynamic needs.

First Solar continues to validate supplier quality through periodic audits and weekly meetings with key suppliers. We prioritize our engagement by focusing on our module and system component suppliers. In 2017, we focused on assessing suppliers with a potential of being high risk based on California's Transparency in Supply Chains Act (SB 657). In total, we assessed ~14% of our suppliers in 2017, representing 22% of our supply chain spend. Our supplier scorecards provide a rating system which is used to evaluate the supplier performance and track any year over year change. 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.

# Human Rights Standards and Practices

First Solar is committed to protecting human rights, enforcing fair labor practices and addressing the potential risks of forced labor, child labor, human trafficking and slavery across our operations and supply chain. First Solar recognizes the principles set forth in the International Labour Organization (ILO) 1998 Declaration on Fundamental Principles and Rights at Work and is committed to complying with the laws established to protect human rights in each country in which we operate. To this end, First Solar requires direct suppliers to comply with all fair labor standard laws. Under the terms of First Solar's supplier agreements, suppliers must certify in writing that neither they nor any of their subcontractors will utilize child, slave, prisoner or any other form of forced or involuntary labor, or engage in abusive employment in the supply of goods or provisions of services.

First Solar's **Code of Conduct** and **Corporate Policies** establish minimum requirements for our associates and suppliers in the areas of environmental, health and safety (EH&S), labor standards, human rights, and business ethics. First Solar endeavors to ensure that its suppliers acknowledge these policies to ensure a safe working environment that respects and values each employee. In addition, First Solar supports the Solar Energy Industries Association (SEIA) **Solar Industry Commitment to Environmental & Social Responsibility** ("Solar Commitment") as well as the **EICC Code of Conduct** as part of our commitment to continuous progress of environmental and social responsibility in the solar industry.[25]

[25] The EICC Code of Conduct and SEIA Commitment are informed by many international instruments including the 1948 Universal Declaration of Human Rights of the United Nations, the Ten Principles of the Global Compact of the United Nations, and certain ILO Conventions.

In compliance with the **California Transparency in Supply Chains Act (SB 657)**, First Solar is committed to addressing the potential risks of human trafficking, forced labor and slavery in our supply chain by:

1. Verifying our suppliers' adherence to quality, sustainability and social responsibility through supplier contractual agreements, scheduled visits and audits of their facilities. Violation of any Labor Standards may result in the termination of First Solar's business relationship with the supplier.

2. Requiring direct suppliers to certify that materials supplied to First Solar and incorporated into First Solar's products (i) comply with all applicable laws, and (ii) are manufactured in full compliance with applicable laws, which includes laws enforcing fair labor standards and prohibiting slavery and human trafficking.

3. Ensuring internal accountability standards by requiring all First Solar directors, officers and employees to act ethically and in compliance with First Solar's Associate Handbook and **Code of Business Conduct and Ethics** which is available on our website.

First Solar's Global Compliance Organization manages the company's ethics and compliance program. The goal of this organization is to implement policies, processes, training, monitoring and general awareness programs to promote ethics and compliance with applicable legal and regulatory standards. Subject to the requirements of local law, and after due diligence and full and fair investigation, any employee found to have directly engaged in or knowingly engaged suppliers engaged in slave labor or human trafficking will be subject to immediate termination of employment. Providing training on SB 657 and other Federal and International anti-human trafficking regulations to all First Solar employees that engage in procurement activities with third parties, including suppliers. First Solar's Avoiding Trafficked Labor training includes the following objectives: Recognizing and communicating awareness of human trafficking risks relevant to First Solar's business; assuring compliance with trafficking-related statutes and regulations; and formulating plans to identify and avoid trafficked labor in each specific business unit at First Solar.

# Conflict Minerals

First Solar is committed to responsible sourcing and operating a supply chain free of conflict minerals.[26] We support the goals established under Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act") on conflict minerals and condemn human rights abuses associated with the extraction, transport or trade of minerals and any direct or indirect support to non-state armed groups or security forces that illegally control or tax mine sites, transport routes, trade points or any upstream actors in the supply chain. First Solar's **Conflict Mineral Policy** is published on our website, communicated to our suppliers, and incorporated into supplier contracts. We require all our direct suppliers to agree to and follow these principles. We have an operating cross-functional internal governance team with representatives from our supply chain, legal, sustainability, and finance departments to ensure policy statements and control processes are followed. First Solar has an existing records retention process and grievance mechanism for reporting policy violations via our Ethics Hotline.

[26] Conflict Minerals include cassiterite, columbite-tantalite (colton), gold and wolframite and their derivatives, tin, tantalum, and tungsten (or any other mineral or its derivative determined by the Secretary of State) which are sourced from the eastern Democratic Republic of the Congo ("DRC") or an adjoining country (together, the "Conflict Region") whose extraction and trade are financing conflict in the Conflict Region.

First Solar is committed to complying with the reporting obligations required under Section 1502 of the Dodd-Frank Act and the U.S. Securities and Exchange Commission's rules on conflict minerals, including the requirement to conduct inquiries and, if necessary, due diligence into the source and chain of custody of any conflict minerals included in our products. In accordance with SEC rules, we conducted a materials content analysis to identify whether any products we have manufactured and contracted to manufacture contain certain conflict minerals and implemented a Reasonable Country of Origin Inquiries (RCOI) process to determine whether any of the conflict minerals originated, or may have originated, in the covered countries and whether such conflict minerals originated from recycled or scrap sources. Our direct suppliers performed similar RCOI procedures to identify the chain of custody from their suppliers back to the smelter and origin.

As we do not source directly from smelter or refiner processing facilities, we rely on the Responsible Minerals Initiative's Responsible Minerals Assurance Program (RMAP), previously known as Conflict-Free Smelter Program, to oversee and coordinate third-party audits of these facilities. The RMAP audit protocols and procedures require the smelters or refiners to engage specially trained third-party auditors to independently verify that these smelters and refiners can be considered conflict free. Our conflict minerals risk mitigation plan defines supplier-risk management strategies, including (i) continued procurement, (ii) assistance in identifying alternate sources of supply, and (iii) disengagement, the severity of which is at the discretion of our conflict minerals steering committee and executive management. We aim to advance the effectiveness of our due diligence efforts and further enhance our compliance processes by, among other things, encouraging non-RMAP validated processing facilities to become validated either through the RMAP or a RMAP-recognized third-party audit program. First Solar's **Specialized Disclosure and Conflict Minerals reports** are available on our public website.

# 5

# OPERATIONAL EXCELLENCE

# 5 World-Class Manufacturing

First Solar is minimizing the company's operational impact and driving continuous improvement through increased module and manufacturing throughput efficiency, conservation projects and on-site PV installations. All First Solar manufacturing sites are certified to globally recognized standards: **ISO 14001 for Environmental Management, ISO 9001 for Quality, and OHSAS 18001 (or ISO 45001) for Occupational Health and Safety**. We foster a culture where environmental, health and safety (EHS) is an integral part of our associates' work and require our contractors and suppliers to adhere to our standards and commitments. First Solar's Environmental, Health and Safety Policy is available on our website: **http://www.firstsolar.com/Resources/Sustainability-Documents**

First Solar modules are manufactured in a high-throughput, automated environment that integrates all manufacturing steps into a continuous flow line. During the manufacturing process, a thin semiconductor layer is continuously applied onto glass substrates using a high temperature Vapor Transport Deposition process. Laser scribes are then used to define individual cells and monolithic integration for cell interconnection. First Solar's fully integrated manufacturing process requires less energy, water and semiconductor material than conventional crystalline silicon, enabling First Solar thin film modules to have the smallest carbon footprint, lowest life cycle water use and fastest energy payback time of all solar technologies. In less than 3.5 hours, a sheet of glass is transformed into a complete PV module — flash tested, boxed and ready for shipment.


In addition to manufacturing PV modules with the smallest environmental footprint in the industry, First Solar is committed to reducing the company's own operational impact. Since 2009, we've successfully reduced our energy, water, waste, and carbon intensity per watt produced through improvements in module efficiency, manufacturing throughput and capacity utilization, as well as by implementing resource conservation projects at our facilities.

We have received global recognition for our state-of-the art environmental controls and performance, world-class health and safety practices, industry-leading quality and reliability and manufacturing excellence. In 2015, our manufacturing site in Malaysia was awarded the prestigious Prime Minister's Hibiscus Award. In 2016, our Perrysburg campus received the Ohio EPA's Encouraging Environmental Excellence Gold Level Award and First Solar's Santa Clara office received the Bay Area Green Business Program certification for efforts to ensure that our business operates in an environmentally friendly manner.


**The Ohio EPA recognized First Solar Perrysburg with the Encouraging Environmental Excellence (E3) Gold Level Award.**

The Ohio EPA E3 Gold Level Award is designed to recognize businesses that exceed regulatory compliance obligations and commit to long-term strategies to reduce waste, lower emissions and improve environmental performance. Applicants must pass a comprehensive compliance check, maintain an environmental management system and commit to continuous environmental improvement. First Solar is the 18th business in Ohio to receive the gold-level award.

*"First Solar is an outstanding Ohio business. This really is an exclusive club. You've got one of the best programs we've ever seen."*

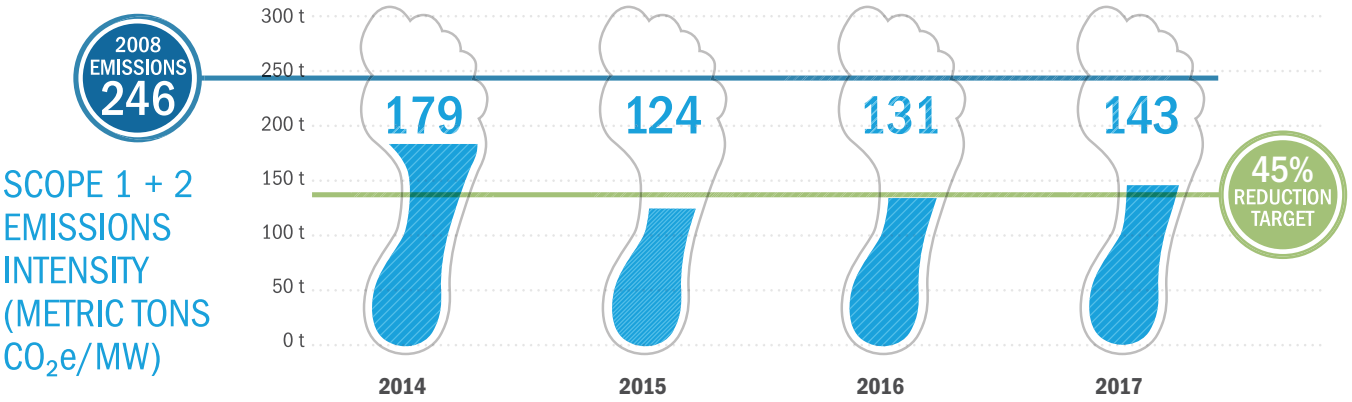
***—Craig W. Butler, Ohio EPA Director.***

## First Solar Malaysia was awarded the 2014/2015 Prime Minister's Hibiscus Award for environmental excellence.

The Prime Minister Hibiscus Award was first launched in 1996 to recognize companies for their commitment and contributions to environmental protection. Winners of the award are widely recognized as corporate role models for their environmental performance and excellence. First Solar Malaysia received the Exceptional Achievement Award, the State Award for the best awardee in Kedah state, along with a Gold Award for the Special Project Award that showcased an environmental project on renewable resources.


# Greenhouse Gas Emissions Goal (2014-2017)

After surpassing our greenhouse gas (GHG) emissions reduction goal in 2016, we set a new five-year goal for 2021 to reduce our GHG emissions intensity per watt produced by 45 percent compared to our 2008 baseline. The temporary ramp down in production decreased our absolute GHG emissions and increased our GHG emissions intensity in 2017. To manage our operational impacts as we continue to ramp up production, we have been incorporating energy and water efficiency measures into new buildings and tool designs. We continually strive to minimize our operational impact and drive continuous improvement to enable First Solar's capacity to endure and to scale.




The chart depicts direct (scope 1) and indirect (scope 2) emissions of all manufacturing and recycling plants, R&D and testing facilities, EPC-owned construction equipment, company-owned operational solar projects, and company-owned vehicle fleet on a carbon intensity basis measured per MW produced. Since 2008, our company-wide carbon intensity decreased by approximately 40 percent through increased module efficiency, manufacturing throughput, and capacity utilization, decreased emissions intensity of purchased grid electricity, and energy conservation and low carbon initiatives. Our GHG emissions intensity increased in 2017 due to the temporary ramp down in production.

# Energy Conservation Initiatives

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.

**2.75MW AC Rooftop and Ground-Mount PV Installation at First Solar's Perrysburg, Ohio Manufacturing Facility.**

The Perrysburg PV installation generates enough energy to power 290 average local homes, displacing 1,920 metric tons of $CO_2$ equivalent emissions per year, based on the regional average grid. Our Perrysburg, Ohio facility uses solar electric power to offset peak demand. On the hottest days of the year in Ohio, we limit our energy usage by implementing an Energy Load Shedding Reduction Initiative to reduce the burden on the regional grid during peak hours.

**2.9 MW Rooftop PV Installation at First Solar's Recycling Facility in Frankfurt Oder, Germany.**

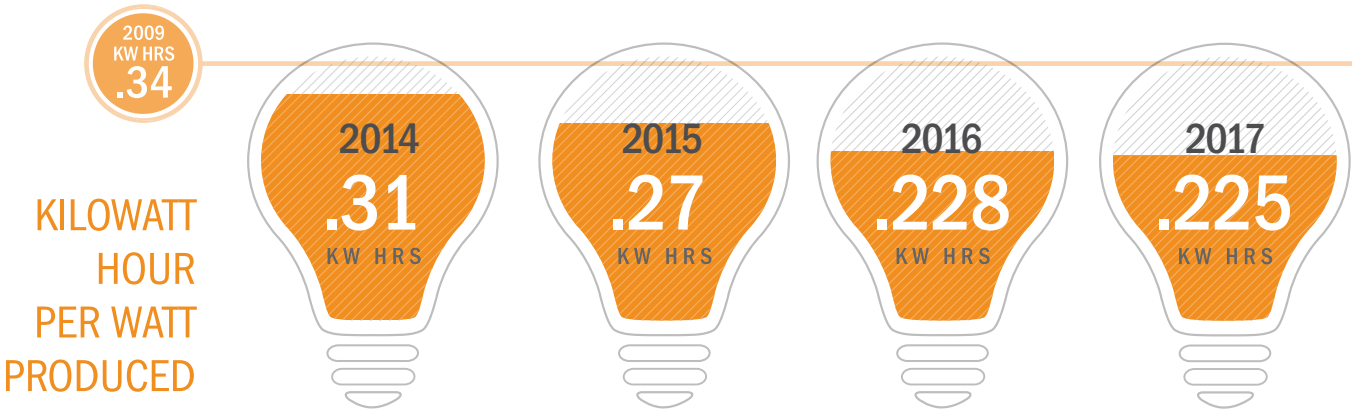
First Solar Malaysia has one of the largest installations of a grid-connected carpark solar PV system in Malaysia. In 2015, First Solar installed 7,820 modules to supply power to our manufacturing facility in Kulim, Malaysia. The 750kW installation generates enough energy to power 350 average Malaysian homes and displace 750 metric tons of $CO_2$-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.

**750 kW AC PV Installation at First Solar's Manufacturing Facility in Kulim, Malaysia.**

## 2016-2017 Energy Efficiency Initiatives

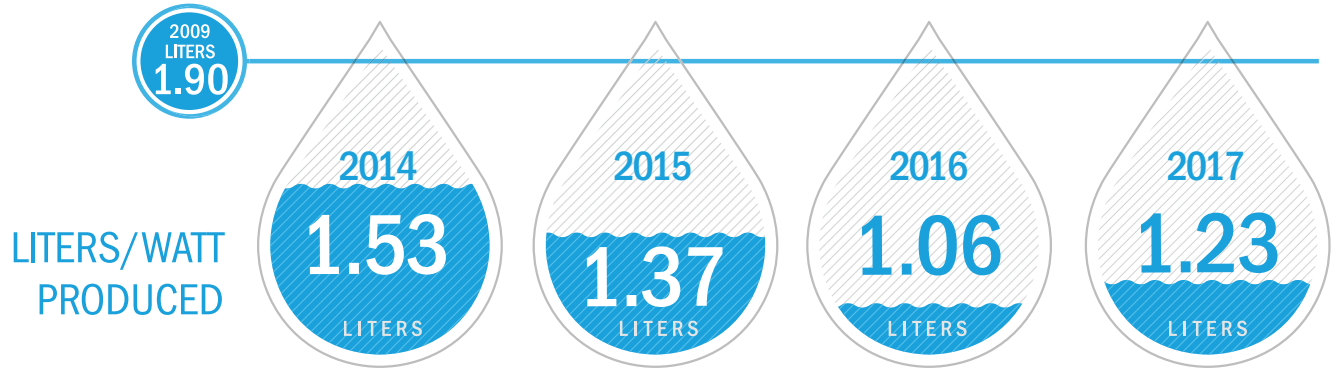
| Activity Type | Energy and Carbon Saving Initiatives | Investment Required (USD) | Annual $CO_2e$ savings (metric tonnes) | Annual Monetary Savings (USD) |
|---|---|---|---|---|
| **Energy efficiency Processes** | In 2016, we utilized building management system controls to optimize our cooling tower water and reduce surging at our manufacturing facility in Ohio. | 0 | 1,340 | 16,500 |
| **Lighting reduction in non-critical areas** | In 2016, we removed lights in non-critical areas and installed LEDs to reduce energy consumption at our manufacturing facility in Ohio. | 1,000 | 68 | 8,400 |
| **Energy efficiency: Building services** | In 2017, we replaced and reduced lighting in the office area at our manufacturing facility in Malaysia. | 25,860 | 59 | 10,500 |

# Manufacturing Energy Intensity (2014-2017)




First Solar's manufacturing energy intensity (energy consumption per watt produced) includes all processes, from the beginning of our manufacturing process to finished panel. Since 2009, our manufacturing energy intensity has decreased by more than 30 percent due to increased manufacturing throughput and module efficiency as well as the implementation of energy conservation programs. In 2017, our manufacturing energy intensity decreased by approximately 1 percent compared to 2016 primarily due to the reduction in our absolute manufacturing energy consumption, continued improvements in module efficiency, and energy efficiency measures. Our absolute manufacturing energy consumption fell by approximately 27 percent as our production volume decreased by 26 percent to 2.3GW in 2017 during our transition to Series 6 module technology and manufacturing equipment. We ran our manufacturing facilities at approximately 99 percent capacity utilization during 2017, which represented a 2 percentage point increase from 2016.

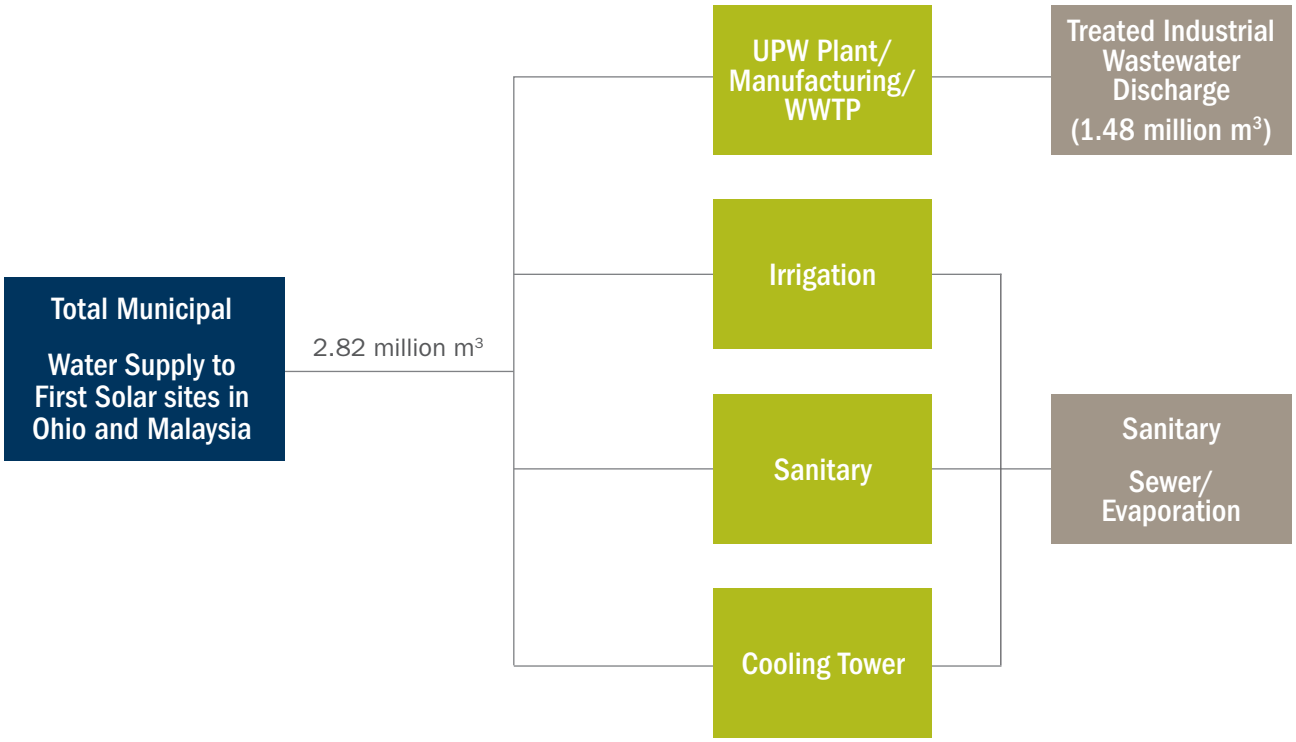
# Manufacturing Water Intensity (2014-2017)




Since 2009, First Solar's manufacturing water intensity (water consumption per watt produced) has decreased by 35 percent due to significant improvements in module efficiency, manufacturing throughput, and the implementation of water conservation and recycling projects. In 2017, First Solar's manufacturing water intensity increased by 16 percent. Although we ramped down production, we were still using water for our bathroom facilities, cooling towers and process water generation. Overall, First Solar's total manufacturing water consumption decreased by approximately 14 percent in 2017 primarily due to the reduction in our production volume, related to our transition to Series 6 module technology and manufacturing equipment. By recycling rejected water from our purification system back into our raw water tank in Malaysia, we saved over 75 million liters of water in 2017.

# Effluents and Waste

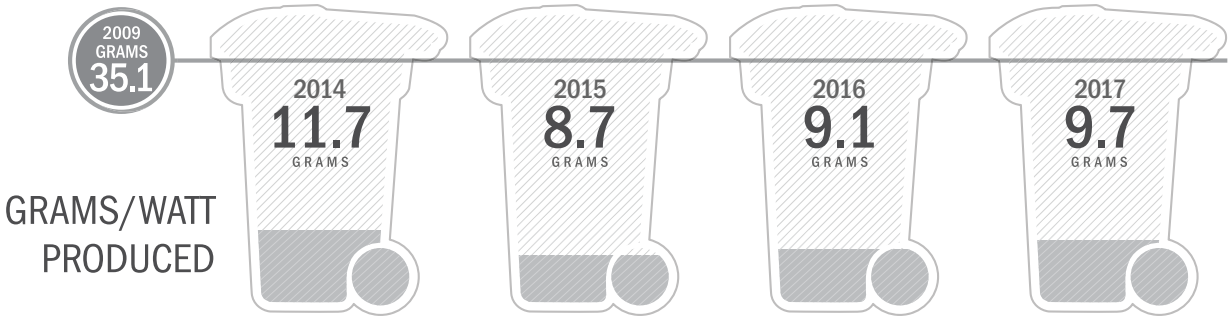
In 2017, approximately 52 percent of First Solar's total water withdrawn from water utilities (2.82 billion liters) was discharged as wastewater from our industrial wastewater treatment systems in Ohio and Malaysia. The remaining 48 percent was used for irrigation, cooling towers, recycling and sanitary purposes. The water withdrawal and wastewater discharge data includes all First Solar manufacturing facilities worldwide.




On-site treated industrial wastewater is indirectly discharged to sanitary sewer in the United States, and directly discharged to river in Malaysia. First Solar is committed to complying with wastewater regulations in all countries where we operate. First Solar treats wastewater at our manufacturing and recycling facilities using a batch discharge system. Once treated, the water is collected in holding tanks, which are sampled and tested to confirm compliance with regulatory limits before being discharged. 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. If the water contaminant levels are above the permitted discharge limit, it is sent for re-treatment internally. First Solar factories are equipped with state-of-the-art analytical capabilities for in-house water testing of heavy metals such as cadmium. Treated wastewater discharged from First Solar's industrial wastewater treatment facilities in Ohio and Malaysia are significantly below the permitted discharge limits for cadmium.

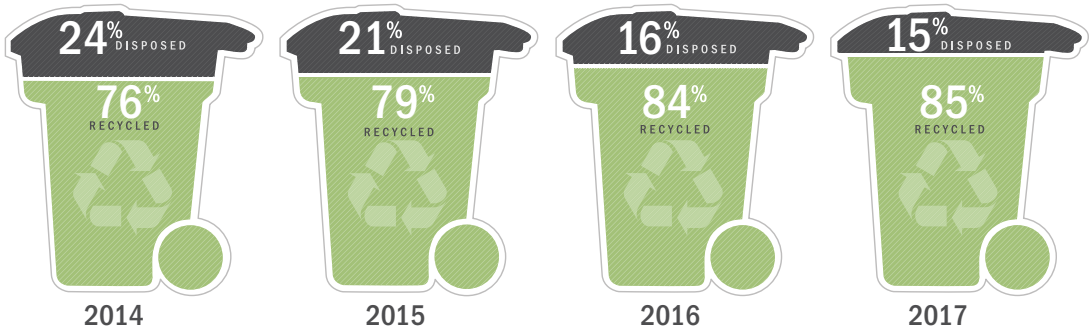
In addition to recycling water, we are also working on reducing the amount of wastewater discharged by retrofitting our recycling facilities. As of January 2018, all routinely-operated First Solar recycling facilities in the U.S., Germany, and Malaysia, generate zero wastewater discharge under normal operations. Instead, the wastewater is recycled and converted into freshwater, which can then be reused in the recycling process. As part of the retrofit, we recycled 3.7 million liters of water in 2017 at our recycling facility in Malaysia alone.

## Manufacturing Waste Intensity (2014-2017)



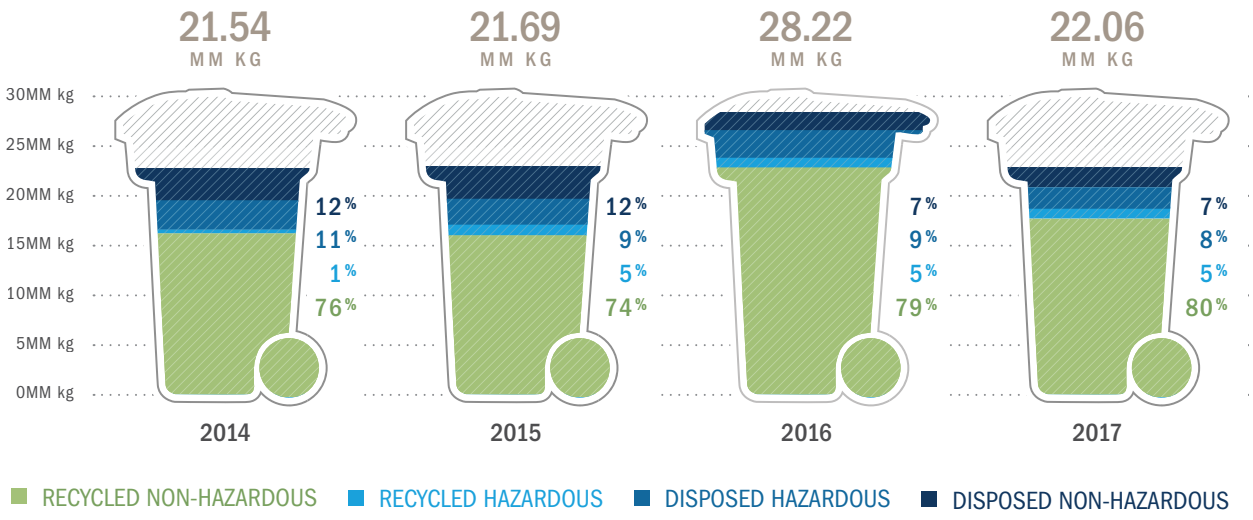

First Solar's manufacturing waste generation intensity (grams per watt produced) has decreased by more than 70 percent since 2009 as a result of increased module and manufacturing efficiency combined with recycling and waste minimization projects. In 2017, our manufacturing waste intensity increased by approximately 7 percent primarily due to the decommissioning of our Series 4 manufacturing equipment.

## Waste Recycled vs. Disposed (2014-2017)




This graph depicts waste recycled and disposed by First Solar's manufacturing and recycling facilities in Perrysburg, Ohio and Kulim, Malaysia. The data includes modules that we recycle onsite; both manufacturing line scrap and modules returned from the field but does not include modules that are being recycled at our recycling facility in Germany. First Solar's state-of-the-art recycling process recovers more than 90 percent of the semiconductor material and 90 percent of the glass. The glass cullet is reused in new glass products and the unrefined semiconductor material is sent for further processing to be reused in new First Solar modules. Our laminate material which would normally be sent for disposal, is now being recycled in Malaysia for reuse in products such as rubber mats, bicycle handles, and shoe soles, thereby further closing the loop on our product's life cycle. Many other manufacturing byproducts are recycled. In Perrysburg, we successfully recycled over 90 percent of our decommissioned manufacturing equipment. Overall, of the total material First Solar sends off-site, 85 percent is sent for beneficial reuse and not to landfill.

## Waste by Type and Destination (2014-2017)

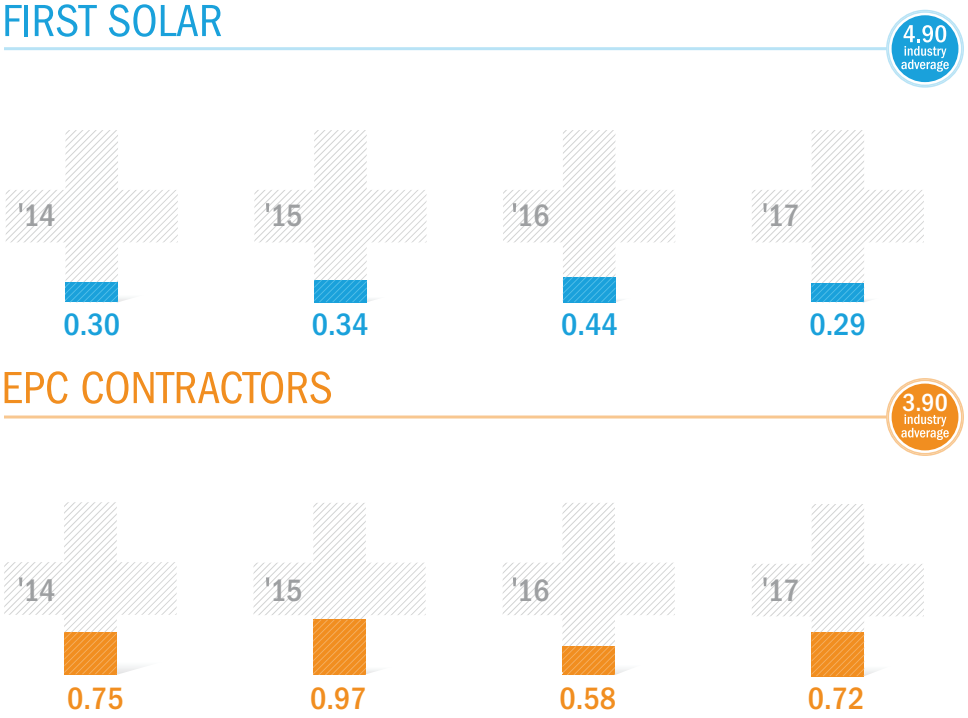



This graph depicts First Solar's absolute manufacturing waste produced in kilograms (kg) with a percentage breakdown by type and destination. In 2016, our overall waste generation increased by 30 percent due to the expansion in production and new technology upgrades. In 2017, our absolute manufacturing waste generation decreased by approximately 20 percent primarily due to the reduction in our production volume for the transition to Series 6 module technology and manufacturing equipment. First Solar is committed to reducing and recycling hazardous waste in line with our environmental management system objectives of minimizing waste and preventing pollution.

In 2017, First Solar recycled 17.73 million kilograms or 91 percent of its non-hazardous waste and sent the remaining 9 percent to landfill. First Solar recycled 40 percent (1.07 out of 2.68 million kg) of its hazardous waste and sent 60 percent to landfill. Since 2014, First Solar has decreased the amount of hazardous waste disposed by nearly 40 percent (from 2.65 to 1.61 million kg) through increased recycling. Hazardous waste is classified according to the definition used by the countries in which we operate, e.g. under the Environmental Quality (Scheduled Wastes) Regulations in Malaysia and the Resource Conservation and Recovery Act in the U.S.

# Safety First: Occupational Health and Safety

## Recordable Injury Rate (Per 200,000 Hours Of Exposure)




"Safety First" is a core value at First Solar and our goal is to achieve an injury-free workplace. Since 2008, First Solar has reduced its recordable injury rate by nearly 90 percent (from 2.6) by establishing a strong safety culture throughout the company, ensuring an understanding of First Solar's Safety Policies and Procedures, and standardizing processes at our project sites. First Solar's recordable injury rate (RIR) includes all First Solar associates including manufacturing, R&D, construction, maintenance and operation, and office personnel. The engineering, procurement and construction (EPC) RIR includes PV array construction workers that were contracted by First Solar. An injury is considered recordable if it requires medical attention beyond first aid. First Solar requires all contractors to work under our safety policies, programs and procedures.

In 2017, we increasingly began developing projects in new regions of the U.S. which did not benefit from the contractor experience base developed over several years in other regions. The majority of these contractor injuries consisted of bug bites and bee stings. First Solar's overall RIR decreased in 2017 primarily due to the ramp down of several manufacturing lines for Series 6 retooling. First Solar's company-wide RIR is about 16 times lower than the manufacturing industry average rate of 4.9 per 200,000 hours of exposure and our EPC RIR of less than 1 is well below the average construction industry rate.

First Solar requires all contractors to work under our safety policies, programs and procedures. We have strict prequalification requirements which assess subcontractors based on quality, experience, supplier diversity and safety performance. Subcontractors are required to meet First Solar's total recordable injury rate target (TRIR) standard of 1 or less. First Solar has a comprehensive safety training program for our EPC contractors which includes daily environmental, health and safety review talks and field observations. First Solar EPC conforms to OHSAS 18001 and uses a world-class workflow management tool to track incidents and assign corrective actions. Weekly and monthly audits are performed by First Solar safety staff to ensure compliance of sub-contractors. A Site Safety Committee is established for each site, consisting of both management and field representation from First Solar and our subcontractors. Site Safety Committee meetings are typically held on a monthly basis.

100 percent of First Solar's workforce and management team are represented by formal joint management-worker health and safety committees. In Ohio, First Solar has seven safety committees representing various parts of the workforce including production, R&D labs, recycling, and offices. The cross-functional safety teams' membership rotates every six months to enable all interested associates in each department to participate. The safety teams meet on a bi-weekly basis and report to the EHS Steering Committee every quarter. The EHS Steering committee is made up of Directors and Managers who represent the rest of the staff at First Solar. We recently added two other committees that report into the EHS Steering Committee; the Ergonomics team meet on a quarterly basis and the Incident Review team meet on a weekly basis to go over incidents and implement corrective actions.

In Malaysia, our site EHS committee meets every two months and is composed of Directors, Managers and shop floor associates from production, site services and quality and reliability. The site EHS committee focuses on setting and reviewing site goals, site indicators and allowing shop floor associates to discuss safety matters with site leaders. First Solar Malaysia also has three plant EHS forums which meet on a bi-weekly basis. In addition to reviewing injuries and incidents, the Plant EHS forums implement corrective actions and tactical actions to improve safety culture.

| Key Performance Indicators | 2016 | 2017 | GRI Standards |
|---|---|---|---|
| Net Sales ($ Billion) | 2.904 | 2.941 | 102-7 |
| Total Modules Produced (Millions) | 27.1 | 19.4 | 102-7 |
| Total Gigawatts Produced (GW) | 3.10 | 2.28 | 102-7 |
| Total Scope 1 & 2 GHG Emissions (Metric Tons $CO_2$) | 406,108 | 325,518 | 305-1 & 2 |
| *Scope 1 GHG Emissions (Metric Tons $CO_2$)* | 14,730 | 16,161 | 305-1 |
| *Scope 2 GHG Emissions (Metric Tons $CO_2$)* | 391,378 | 309,357 | 305-2 |
| *Scope 3 GHG Emissions (Metric Tons $CO_2$)* | 735,997 | 679,425 | 305-3 |
| Total GHG Intensity (Scope 1 & 2 Metric Tons $CO_2$ per Watt Produced) | 131 | 143 | 305-4 |
| Total Electricity Consumption (MWh) | 721,802 | 525,440 | 302-1 |
| Consumption of Purchased Non-Renewable Electricity (MWh) | 714,630 | 518,268 | 302-1 |
| *Consumption of Self-Generated Renewable Electricity- Solar (MWh)* | 7,172 | 7,172 | 302-1 |
| *Total Fuel Consumption From Non-Renewable Sources (MWh)* | 51,896 | 54,871 | 302-1 |
| *Natural Gas* | 12,220 | 13,073 | 302-1 |
| Diesel/Gas oil | 31,055 | 32,758 | 302-1 |
| Motor Gasoline | 8,621 | 9,040 | 302-1 |
| Manufacturing Energy Intensity (kWh per Watt Produced) | 0.23 | 0.23 | 302-3 |
| Total Water Use (Billion Liters) | 3.28 | 2.82 | 303-1 |
| *Manufacturing Water Intensity (Liters per Watt Produced)* | 1.06 | 1.23 | -- |
| *Total Waste Generation (Million Kilograms)* | 28.22 | 22.06 | 306-2 |
| *Recycled Non-Hazardous (Million Kilograms)* | 22.38 | 17.72 | 306-2 |
| *Recycled Hazardous (Million Kilograms)* | 1.39 | 1.07 | 306-2 |
| Disposed Non-Hazardous (Million Kilograms) | 2.41 | 1.66 | 306-2 |
| Disposed Hazardous (Million Kilograms) | 2.04 | 1.61 | 306-2 |
| Manufacturing Waste Intensity (Grams per Watt Produced) | 9.1 | 9.7 | -- |
| Total Wastewater Discharge (Billion Liters) | 1.83 | 1.48 | 306-1 |
| Wastewater Generation Intensity (Liters per Watt produced) | 0.59 | 0.65 | -- |
| Total Number of Associates | 5,358 | 4,130 | 102-7 |
| New Hires by Gender (% Male) | 78% | 65% | 401-1 |
| New Hires by Gender (% Female) | 22% | 35% | 401-1 |
| First Solar Recordable Injury Rate (per 200,000 hours) | 0.44 | 0.29 | 403-2 |
| EPC Site Recordable Injury Rate (per 200,000 hours) | 0.58 | 0.72 | 403-2 |
| First Solar Lost Time Injury Rate (per 200,000 hours) | 0.26 | 0.19 | 403-2 |
| EPC Lost Time Injury Rate (per 200,000 hours) | 0.12 | 0.15 | 403-2 |
| Total Training Hours | 33,014 | 35,752 | 404-0 |
| Average Training Hours by Gender (Male) | 6 | 9 | 404-1 |
| Average Training Hours by Gender (Female) | 6 | 8 | 404-1 |
| % Male Workforce | 81% | 82% | 405-1 |
| % Female Workforce | 19% | 18% | 405-1 |
| % Male Management | 82% | 81% | 405-1 |
| % Female Management | 18% | 19% | 405-1 |
| ISO 14001 Certification of Mfg. % | 100% | 100% | -- |
| OHSAS 18001 Certification of Mfg. % | 100% | 100% | -- |

* 2016 net sales data has been updated as a result of the adoption of ASU 2014-09. First Solar's recordable injury rate for 2016 was adjusted to include an injury that became recordable after the end of the year. First Solar training data excludes training related to Manufacturing, IT, EPC, O&M, HR, and other functional groups as well as on-demand training available through Biz Library.

6

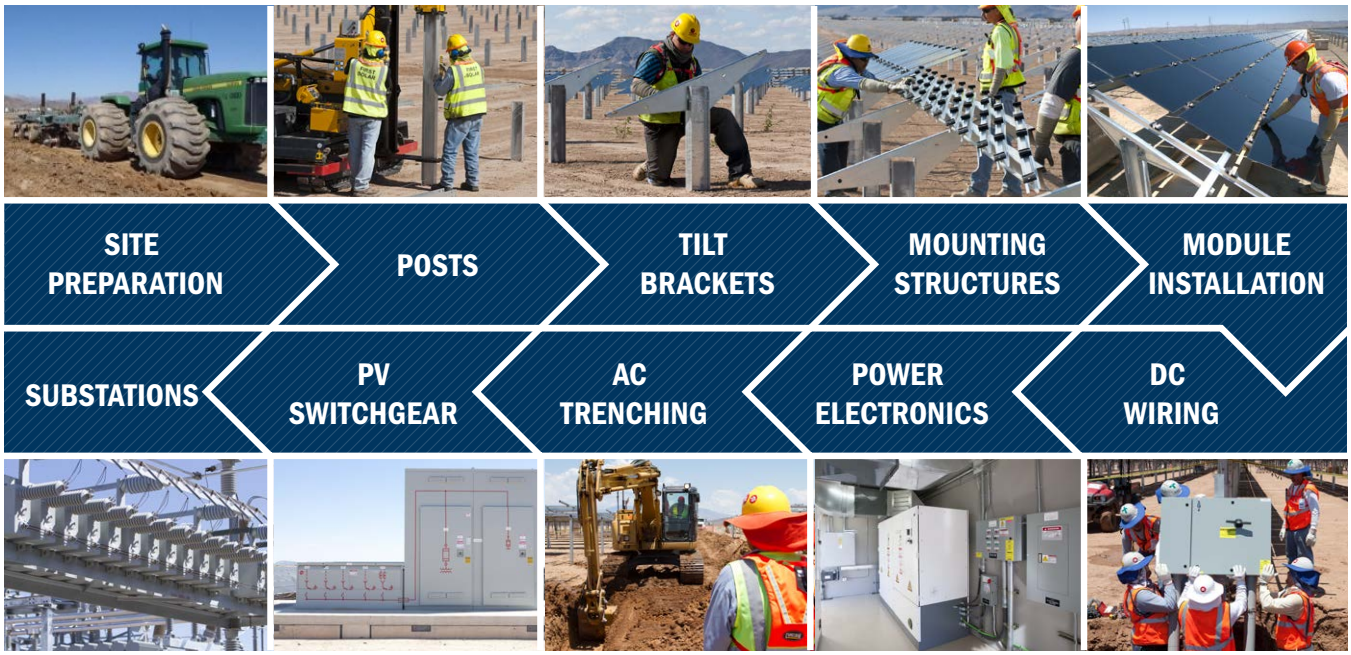
# BENEFITS OF FIRST SOLAR PV POWER PLANTS

# 6 Benefits of First Solar PV Power Plants

First Solar PV power plants provide a meaningful value proposition over conventional energy sources and deliver broad-ranging benefits throughout their construction and operation, including:

- Generating clean electricity for 25+ years with no carbon emissions or other air pollutants.
- Requiring no water to generate electricity and using less water on a life cycle basis than most alternative sources of energy generation.
- Providing reliable and cost competitive solar energy with fixed pricing and low operating costs to reduce the risk of fuel price volatility and eliminate hedging costs.
- Creating thousands of jobs and providing millions of dollars benefitting local economies.

## Construction of a Utility-Scale PV Power Plant




First Solar is committed to responsible land use and works to minimize impacts during the construction and operation of our projects. We have worked with NGOs such as the World Wildlife Fund (WWF) to identify best practices for each stage of utility-scale PV power projects– from development, to construction and decommissioning. First Solar contributed to WWF's report **"Solar PV Atlas: Solar Power in Harmony with Nature, Towards 100 percent renewable energy."** The report addresses the common misconception that solar PV requires a lot of land and demonstrates how responsibly developed PV power plants help significantly reduce greenhouse gas emissions, heavy metal emissions and water usage by displacing conventional grid electricity. We continuously strive to implement best practices in the design and development of our PV projects through an extensive site selection process, community involvement, impact mitigation and biodiversity protection.

## Site Selection

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. We strive to locate our projects in areas with the least conflicts or on previously disturbed land such as drought-stricken farmland or grazing land. For example, from the original study area of over 19,000 acres, we identified approximately 3,800 acres of least-conflict land for our 550MW Desert Sunlight project in California. Our AV Solar Ranch One, Rosamond, Lost Hills and North Star projects were sited on fallow farmland and repurposed to generate clean electricity for 25+ years. First Solar's 53MW PV power plant in Lieberose, Germany was located on a former military site which was polluted with munitions and waste. The project prompted the environmental cleanup of the area, resulting in the removal of multiple land mines, grenades and other munitions.

## Community and Stakeholder Engagement

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. We work with experts in a range of disciplines with the aim of minimizing the biological, cultural and visual impacts of our projects. 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.


**The Desert Sunlight Visitor Center provides an onsite solar learning center for students and the general public**

**Former U.S. Secretary of Interior Sally Jewell with First Solar Chief Commercial Officer Georges Antoun at the official commissioning of the 550MW Desert Sunlight Solar Farm**

## Responsible Construction

Throughout construction and operation, First Solar works with permitting authorities to minimize the biological, cultural and visual impacts of our projects. Where needed, we employ highly qualified specialists on our projects to study, monitor and help avoid sensitive habitats and protect biological, cultural and paleontological resources. Our engineers work with local jurisdictions to design our projects to minimize effects on nearby sensitive visual receptors such as neighboring residences and lines of sight from highways.

Throughout the construction of our Luz del Norte project in Chile, archaeologists closely monitored earth movement and excavation activities to ensure that we complied with local governmental requirements. Any archeological resources found during construction were preserved and reported to the National Monuments Council (CMN) so they could be sent to local museums. As part of the project's environmental management plan, First Solar relocated reptiles to a new location outside the project area with similar environmental characteristics and species to minimize impacts on biodiversity.


**Archaeologists carefully sift for artifacts at First Solar's Luz del Norte project**

To mitigate grading impacts, First Solar implements innovative "light-on-land" soil preparation techniques such as disk-and-roll and mowing which maintain the native seed in the soil and increase the likelihood of natural rehabilitation.

Disk-and-roll contours the land without changing the macro-level topography and existing drainage patterns. At project sites without hydrological or topographical constraints, we use the mowing technique which is more beneficial to grasses and other species than traditional land grading as it leaves the root structures intact to help prevent erosion. We endeavor to use the least impactful method of site preparation based on site-specific conditions.

## Waste Generation and Recycling

First Solar and its subcontractors are responsible for managing and disposing of waste generated during project construction. Waste is segregated by type and classified as either non-hazardous or hazardous. Common waste types include project refuse (e.g., trash, rubbish, packing materials, spent personal protective equipment), project dunnage (i.e., wooden crating, packing materials, plastic shrink wrap, metal straps) and small volumes (typically <1 percent) of hazardous waste. Approximately 85-95 percent of waste generated is expected to be recycled. For example, waste generated for the AVSR1 project in Los Angeles County, California, included cardboard, wood pallets, aluminum, low-density polyethylene (LDPE), steel, waste wood, wire and project refuse, with a recycling rate of over 95 percent.

## Water Use

First Solar modules convert sunlight into electricity without the use of water which provides an additional advantage over conventional energy and concentrated solar power. Water use during solar PV project construction is primarily for site preparation and dust suppression, and varies by location and time of year. After construction, there is typically no water use during PV system operation, with the potential exception of fire protection, minor domestic use and module cleaning. First Solar's frameless Series 4 and back-frame Series 6 modules do not require cleaning as dust is periodically removed by wind and rainfall. An exception is for humid, dust-prone climates, which can transform dry dust into clustered and sticky dust. For such conditions, First Solar's Manual Dry Brush Trolley can be used to clean modules without water or electricity. For more information on water usage over the life cycle of First Solar PV systems, see our **white paper**.

**First Solar Manual Dry Brush Trolley at the 13MW DEWA solar PV power plant in Seih Al Dahal, United Arab Emirates**

## Biodiversity Protection

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 endangered animal and plant species by providing refuge from the continuous ground disturbance and predation that often occurs outside the project fences on agricultural properties.

PV power plants can provide long-term stable use of land while eliminating soil disturbances such as annual tilling and the use of fertilizers and rodenticides. During the construction and operation of utility-scale PV power plants, vegetation management activities include invasive species control, native plant revegetation and monitoring, and re-planting protected plants. After the short-term construction disturbance period, vegetation within the project fencing can return to its native origins. In fact, studies have found that the PV plant's shading effect can create varied microclimates, resulting in greater vegetation growth and higher species diversity than surrounding Stewardship Lands and control sites.[27]

PV projects provide opportunities to study and protect various endangered species such as kit fox, desert tortoise, burrowing owls, California tiger salamander, California red-legged frog, Golden Eagles and Swainson's hawk. Desert Tortoise protection measures, for example, are extensive and involve securing off-site mitigation lands, conducting pre-construction count and health surveys, translocation planning and monitoring, exclusion fencing, fence monitoring and fence "habitat" to protect any exterior tortoises that might walk the project's fence line. As a result of implementing industry best practices in responsible land use and PV power plant construction, some of our utility-scale projects are turning into "solar reefs" and providing sanctuaries for fauna and flora to thrive.

**The first documented short-eared owl nest in Santa Barbara County was discovered on our Cuyama project site. The owl has since fledged and construction was able to continue without threatening the fledgling.**

**Wildlife corridors enable Pronghorn Antelope and other species to pass freely through field arrays.**

**Biologists carefully relocate Northern Pacific rattlesnakes found onsite. Though not endangered, rattlesnakes are important to our ecosystem.**

27 P. Sinha, B. Hoffman, J. Sakers, L. Althouse, Best Practices in Responsible Land Use for Improving Biodiversity at a Utility-Scale Solar Facility, Case Studies in the Environment, 2018. DOI: 10.1525/cse.2018.001123

In addition to on-site mitigation measures, a portion of the mitigation measures for large-scale solar often includes acquiring conservation land to offset project impacts. In 2017, First Solar helped to conserve nearly 9,000 acres of conservation land for our California Flats, Rosamond, and Willow Springs projects, which is equivalent to more than 3 times the size of Central Park in New York City or more than 6,800 American football fields. For these projects, we either acquired or had a third-party acquire control of properties for conservation through purchase, conservation easements or deed restrictions. To date, First Solar has contributed to the conservation of more than 38,700 acres of mitigation land (larger than the size of San Francisco) and provided over $89 million to multi-species habitat funds in North America. In addition, First Solar retired 54,000 acres of grazing rights (larger than the size of the Acadia National Park in Maine) on Bureau of Land Management (BLM) lands as part of the mitigation for our Stateline project. BLM grants ranchers the right to graze on certain BLM controlled lands. By paying ranchers to retire their grazing rights and permanently stop grazing, First Solar is helping to minimize potential impacts on sensitive species habitats.

As part of our EPC project site restoration activities, First Solar takes steps to proactively restore adjacent habitats, even when we do not cause the impacts ourselves. We use a technique called “Vertical Mulching” where we transplant native plants, brush and debris to revegetate tracks and roadways created by off-road vehicles in areas adjacent to our project sites. By creating a physical barrier, vertical mulch helps to discourage traffic and protect local ecosystems.

**Before and after photos of vertical mulching on land adjacent to First Solar’s Stateline project site**

# Operations and Maintenance

The sustainable integration of new PV generators into the grid and electricity supply infrastructures requires advanced power plant controls and grid integration solutions. In order to maximize value and mitigate risk for our customers, First Solar operates and maintains PV power plants to optimize their performance and ensure their long-term integrity. First Solar Energy Services offers superior, customized end-to-end operations and maintenance solutions for thin film and silicon PV power plants. Our Energy Services help further reduce the levelized cost of solar electricity and maximize the profitability of our customer's solar power plants through seamless grid integration, increased reliability, and system availability maximization.

By leveraging our extensive experience in plant optimization and advanced diagnostics, we have developed the largest and most advanced Operations and Maintenance (O&M) programs in the industry. With more than 10 GW DC of utility-scale PV plants under our O&M program, we maintain a fleet average system effective availability greater than 99 percent. First Solar is able to remotely track and control the performance of a plant from the company's operations center in Tempe, Arizona.

**First Solar Operations Center in Tempe, Arizona**

First Solar's grid-friendly PV power plants create real value for power plant owners by providing sophisticated ancillary services such as spinning reserves, load following, voltage support, ramping, frequency response and regulation, and power quality, which actively stabilize and improve the reliability of the grid. In 2016, California ISO (CAISO), First Solar, and the National Renewable Energy Laboratory (NREL) conducted a series of tests on a 300MW First Solar PV plant to demonstrate its operating flexibility. The **ground-breaking study** found that the solar plant's frequency response, regulation up and down, voltage control, and active power management were comparable to, or better than, conventional resources.[28] In the case of Automated Generation Control (AGC), the study found that the regulation accuracy of the PV plant (87-93 percent) was 24 – 30 percentage points better than the best conventional generation technology, gas turbine, which had an accuracy 63 percent.

**Measured regulation accuracy of First Solar's 300 MW PV power plant compared to typical regulation up accuracy of CAISO conventional generation.**

| Solar PV | Combined Cycle | Gas Turbine | Hydro | Pump Storage Turbine |
|---|---|---|---|---|
| ~87% - 93% | ~47% | ~63% | ~47% | ~45% |

In recognition of this research, First Solar, CAISO and NREL won the National Association of Regulatory Utility Commissioners (NARUC) award for "Utility Industry Innovative Pilots or Demonstration Projects" in 2017. First Solar also received the inaugural Smarter E Outstanding Project award at Intersolar Europe in 2018 for the 300MW utility-scale PV demonstration project in grid reliability. The Smarter E review jury called the project "a game-changer

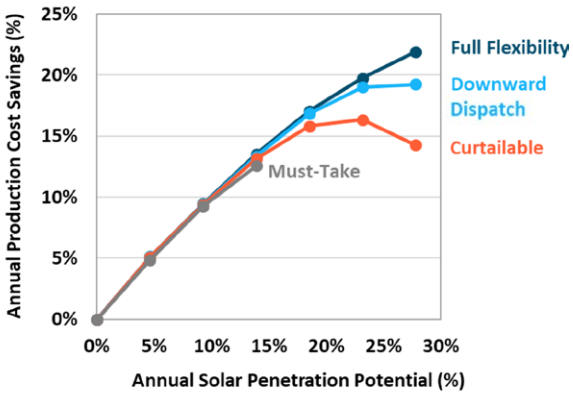
[28] Using Renewables to Operate a Low-Carbon Grid: Demonstration of Advanced Reliability Services from a Utility-Scale Solar, NREL, California Independent System Operator (CAISO), and First Solar, 2017.

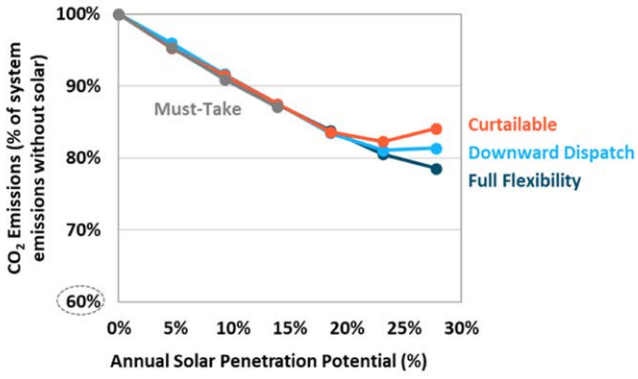
for large-scale solar plants" that demonstrates how "solar power plants can not only reduce the need for carbon-emitting resources, but can also improve system performance and operate with significantly higher levels of variable generation." The Smarter E award Program recognizes groundbreaking work in the energy transition towards a low carbon future."


Greater renewable energy penetration is often accompanied by increased curtailment in an effort to avoid oversupply. This grid management strategy however comes at the cost of lost renewable energy production. By leveraging the capabilities of fully flexible solar, grid operators can meet demand while increasing the efficiency at which they operate and cut down on fuel costs by reducing thermal generator commitments.

A **recent study** conducted by Energy + Environmental Economics in cooperation with First Solar and Tampa Electric Company (TECO), explored the economic value of flexible solar by modelling a range of utility-scale solar deployment levels (from 0 percent to 28 percent) under four different solar operating modes (must-take, curtailable, downward dispatch, full flexibility).[29] The study found that flexibly scheduling and controlling solar plants helps to reduce solar curtailment which in turn results in greater carbon emissions reductions and lower operating costs associated with fuel and operations and maintenance.

**Operation cost savings and $CO_2$ emissions as a function of solar deployment and solar operating mode[29]**



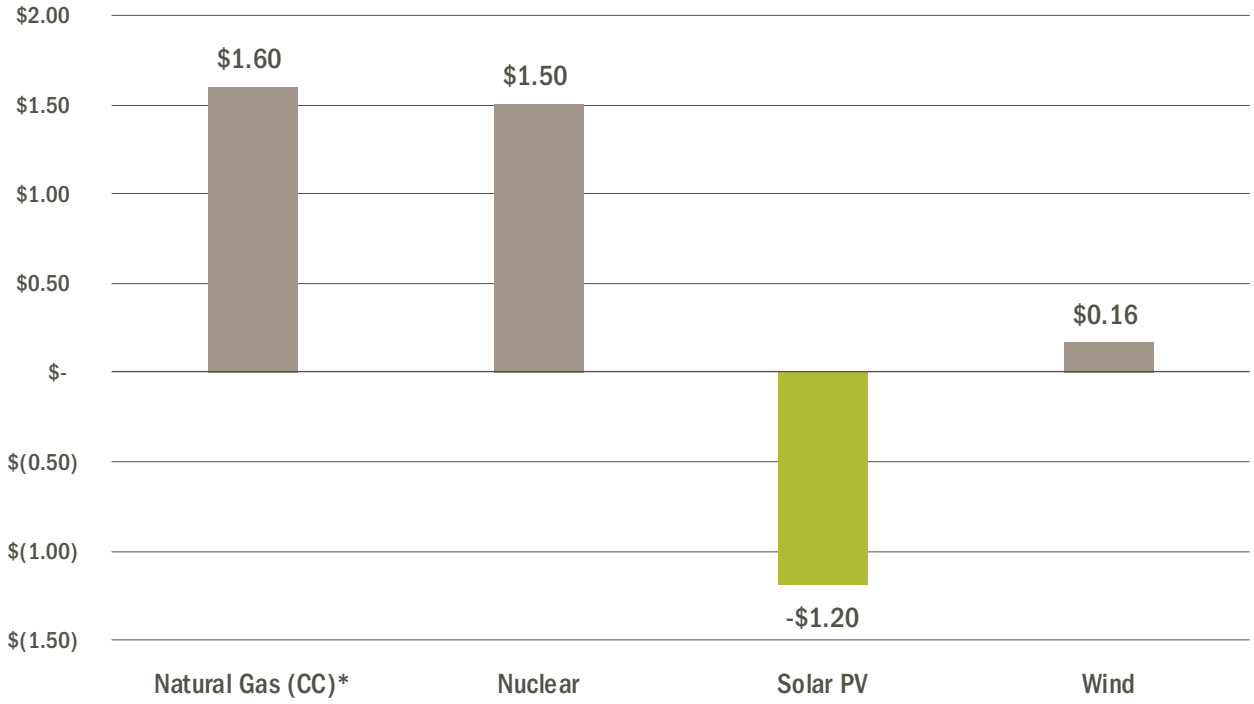

By delivering essential reliability services traditionally provided by conventional resources, First Solar's grid-friendly power plants demonstrate how renewables can help support further integration of renewable resources into the grid. Grid-friendly power plants are crucial to enabling greater renewable energy adoption and ensuring the transition to a low carbon economy is both reliable and economically viable.

[29] Investigating the Economic Value of Flexible Solar Power Plant Operation, Energy and Environmental Economics, First Solar, and Tampa Electric Company, 2018.

## Decommissioning

First Solar's responsibly developed PV projects enable a site to be restored to its original state at the end of a project's useful life. Over 90 percent of a First Solar PV power plant is recyclable. As part of our commitment to responsible life cycle management, we provide an industry-leading PV module recycling program that enables PV power plant owners to meet their decommissioning and end-of-life requirements simply, cost effectively and responsibly.

**Solar PV has the lowest decommissioning costs of all energy technologies[30]**




The recovery value of a PV system can exceed its decommissioning costs, resulting in the lowest decommissioning costs of all energy technologies. A recent Columbia University study found that recycling modules and the balance of system structure could generate a net revenue of up to $1.58 per module area, primarily from copper, steel and aluminum.[31] Monte Carlo analysis by ERM[32] indicated up to 95%-100% confidence in a net profit from PV plant decommissioning depending on whether the land value was included and on plant design scenarios such as above-ground cabling, versus below-ground cabling.[33]

[30] M.A. Brown, D. D'Arcy, M. V. Lapsa, I. Sharma, L, Yufei, Solid Waste from the Operation and Decommissioning of Power Plants, Oak Ridge National Laboratory, 2017. https://www.osti.gov/scitech/biblio/1339360

[31] V. Fthenakis, Z. Zhang, and J.K. Choi, Cost Optimization of Decommissioning and Recycling CdTe PV Power Plants. Proc. IEEE PVSC. Washington D.C., 2017.

[32] A. Cates and R. Stifter, "PV Power Plant Net Decommissioning Cost Model Technical Report", Environmental Resources Management (ERM), San Francisco, CA., 2017.

[33] P. Sinha, S. Raju, K. Drozdiak, A. Wade, Life cycle management and recycling of PV systems, Photovoltaics International Technical Briefing, 2018. http://go.firstsolar.com/l/474372/2018-05-22/45c6f.

A. Wade, P. Sinha, K. Drozdiak, E. Brutsch, "Beyond waste – the fate of end-of-life photovoltaic panels from large scale PV installations in the EU - the socio-economic benefits of high value recycling compared to reuse". In Proceedings 33rd EU PVSEC. Amsterdam, The Netherlands, 2017. https://doi.org/10.4229/EUPVSEC20172017-5EO.1.1.

# Case Study: California Flats Solar Project

The 280MW California Flats solar project is located in southeast Monterey County, California, on approximately 2,900 acres of previously dryland farmed, private land owned by the Hearst Corporation. Initial construction began in 2016 and is expected to be completed in December 2018. When fully operational, the project will generate enough clean solar energy to serve the needs of about 100,000 average homes per year, displacing over 109,000 metric tons of $CO_2$ annually based on the PG&E grid—the equivalent of taking approximately 22,000 cars off the road. The project will also displace over 152 million liters (or 40 million gallons) of water consumption annually based on the average California grid. The project site is strategically located to minimize environmental impacts, and is not visible from any public gathering points or major roads.

| California Flats Solar Project | |
|---|---|
| **Site** | Monterey County, CA, USA |
| **Size** | 280MW AC |
| **Owner** | Capital Dynamics |
| **PPA** | Pacific Gas & Electric (150MW)<br>Apple Inc. (130MW) |
| 109,000 tons of $CO_2$ displaced annually | |
| 100,000 homes powered | |
| 22,000 cars removed from the road | |
| ~300 construction jobs and 11 ongoing O&M positions | |

## Economic Benefits

The California Flats project supports job creation by generating wages and benefits for approximately 300 construction jobs on average and up to 11 ongoing operation and maintenance positions. Job fairs were held in King City to support the hiring of qualified local residents. The project is expected to generate over $176 million in local economic benefits over the project's life, including nearly $95 million in direct spending on established Monterey County Businesses. In addition to increasing sales and use tax revenue by approximately $3.8 million in Monterey County, the California Flats project supports local residents, businesses, suppliers and service providers with over $80 million in indirect supply chain and induced spending. The 130MW power purchase agreement (PPA) is one of the largest in the industry to provide clean solar electricity to a commercial end user.

*"Quite frankly we're doing this because it's right to do, but you may also be interested to know that it's good financially to do it. We expect to have a very significant savings because we have a fixed price for the renewable energy, and there's quite a difference between that price and the price of brown energy."*

***— Tim Cook, CEO of Apple, Inc.***

## Environmental Benefits

The California Flats site is located in an area identified by the State of California as a Competitive Renewable Energy Zone and was carefully designed to protect species, enhance the environment, and sustain local ranching operations. The California Flats project occupies merely 3 percent of the Jack Ranch and was designed to sit low to the ground in order to minimize visual impacts. The project site is surrounded by tens of thousands of acres of active ranchland and will be compatible with current cattle ranching operations.

First Solar's project development team spent over three years surveying the site and working closely with multiple stakeholders to create an environmentally-sensitive project design, carefully avoiding all designated critical habitat areas. Wildlife-friendly fencing was used to allow kit fox, badgers and other small mammals into the project site while excluding coyotes, one of their main predators. The site supports multiple breeding pairs of the endangered San Joaquin Kit Fox. In 2017, there were 10 pups from two pairs and in 2018, there were 13 pups from three pairs. To aid in their survival, the project will be installing dozens of artificial dens for kit fox and burrowing owls.

Many other species thrive on the California Flats site, demonstrating how nature and large-scale solar can go hand-in-hand. We had three nesting pairs of Golden Eagles onsite in 2017 and 2018. Eagles are regularly observed by workers feeding on ground squirrels near the project. Vernal pool fairy shrimp, a rare and federally endangered species, hatch seasonally in ephemeral pools at the project site. Fairy shrimp require careful habitat management to ensure their continued existence.

Onsite vegetation is maintained through periodic sheep grazing, demonstrating how PV power plants can also accommodate livestock husbandry. The project will result in the permanent preservation of over 6,200 acres of mitigation land to help foster the growth of all species within the surrounding area. As of July 2018, the project successfully implemented the first phase of the habitat management and revegetation plan, reaching target success criteria within year one of the post-construction monitoring period.

© **The Hearst Corporation.** Good fences make good neighbors: Specially designed fences help small mammals find sanctuary while keeping their natural predators out.

© **Althouse and Meade, Inc.** Two families of kit fox puppies mingle at the California Flats project site.

© **Jason Dart.** The elusive Vernal Pool Fairy Shrimp emerged in vernal pools during construction.

California Flats is one of the first projects to significantly reduce trenching by housing electrical cables above ground. In cooperation with tribal partners, First Solar used cable trays to dramatically reduce excavations and the potential for impacts on cultural resources. The avoidance of trenching also minimizes the potential for disturbing ground-dwelling animals, reduces fugitive dust emissions and water used for dust suppression, avoids emissions from heavy equipment, and reduces risks to workers posed by exposed trenches and soil-dwelling fungal pathogens.[34]

[34] P. Sinha, B. Hoffman, J. Sakers, L. Althouse, **Best Practices in Responsible Land Use for Improving Biodiversity at a Utility-Scale Solar Facility**, Case Studies in the Environment, 2018. DOI: 10.1525/cse.2018.001123

## Cultural Benefits

The California Flats solar project is situated in the foothills at the southern end of the Diablo Range near Cholame Valley, on terraces above a perennial stream called Cottonwood Creek. The area is known to have been occupied by prehistoric peoples for thousands of years, supported by populations of large game, oak woodlands, and numerous freshwater springs. The site is uniquely situated between occupied coastal and central valley cultures, and was little studied prior to this project. Teams of archaeologists and tribal members documented prehistoric sites prior to construction and monitored earth work during construction. Artifacts and other data collected have significantly increased the knowledge of prehistoric cultures in the area.

© **Jason Dart.** Artifacts discovered at the California Flats project site shed light on prehistoric cultures that occupied the site for thousands of years.

## Community Benefits

First Solar is committed to being a good neighbor through our community involvement and has donated over $270,000 since 2014 to support local charitable causes and events, including:

- $20,280 donation to French Medical Center Foundation, a not-for-profit hospital in San Luis Obispo County.
- $78,500 donation to Parkfield Community Library Fund and Parkfield Community Club to help build a library.
- $34,000 donation and a 50-module training system to The Offset Project which helps businesses and communities establish sound waste policies and implement best practices in environmental stewardship.
- $5,000 donation to the Shandon Unified School District.
- $8,000 donation to the San Luis Obispo YMCA.
- $3,000 for the San Luis Obispo County Cattlemen's Association.
- $500 donation to Rancho Cielo, a comprehensive learning and social services center for underserved and disconnected youth in Monterey County.

In 2017, First Solar partnered with California Flats owner Capital Dynamics and other project partners to raise more than $50,000 for the 14th Best Buddies Challenge: Hearst Castle bike race. Best Buddies International is a nonprofit dedicated to creating opportunities for friendship, employment and leadership development for people with intellectual and developmental disabilities (IDD). In 2018, Team California Flats sponsored at the $65,000 level.

# Case Study: Manildra Solar Farm

The 48.5MW Manildra Solar Farm is located on 120 hectares of land approximately 1 km east of Manildra in New South Wales (NSW), Australia. The project is powered by approximately 466,000 First Solar PV modules and produces enough solar energy to serve the needs of approximately 14,000 average NSW homes. This will displace more than 91,000 metric tons of carbon dioxide emissions per year – equivalent to taking about 24,000 cars off the road. The Manildra Solar Farm provides significant economic and environmental benefits, in addition to creating direct and indirect jobs, developing skills in a growing industry, and supporting local small businesses.

| Manildra Solar Farm | |
|---|---|
| **Site** | Manildra, New South Wales, Australia |
| **Size** | 48.5MW AC |
| **Owner** | New Energy Solar |
| **PPA** | Energy Australia |
| **EPC** | RCR O'Donnell Griffin Pty ltd. |
| 91,000 tons of $CO_2$ displaced annually | |
| 14,000 homes powered | |
| 24,000 cars removed from the road | |
| ~ 100 construction jobs | |

As part of its Community Engagement Plan, the Manildra Solar Farm established a community fund to support local initiatives and events that target a range of community needs including environment, education, youth, social, culture, sport, recreation and economic development. An open communications channel with the community is ensured through a 24/7 dedicated phone line, project specific email and website, and through the use of social media. All community and stakeholder interactions are maintained in a database at the First Solar Operations Centre (FSOC).

In accordance with the project's environmental management plan, strategic grazing is to be employed in the spring and winter to manage exotic grasses and forbs and minimize damage to native grasses. Nest boxes were installed on the biodiversity offset site for the rare and endangered Superb Parrot. In addition, our module packaging was converted into mulch for use as a binding agent for organic waste composting, creating a sustainable option for end-of-life packaging materials.

In addition to contributing to Australia's goal of generating 23.5 percent of its energy from renewable resources by 2020 and further establishing New South Wales as a leader in renewable energy, the Manildra Solar Farm is preserving 29.52 hectares (~73 acres) of native grassland in perpetuity to offset project impacts.

**Module packaging is being converted into mulch for composting.**

7

# SOCIAL RESPONSIBILITY

# 7 Social Responsibility

## Global Charitable Giving Program Overview

First Solar makes four kinds of donations under its Global Charitable Giving Program: corporate donations (i.e., donations made through the First Solar Corporate Charitable Fund), site donations (i.e., donations made through First Solar local offices and manufacturing sites), project-related donations (i.e., donations associated with a First Solar project), and business development donations (i.e., donations related to First Solar sales activities). In 2017, First Solar donated $791,549 in total cash and in-kind contributions.[35]

| Donations | Type | $Amount |
|---|---|---|
| **Manufacturing and office site donations** | Community | $178,590 |
| **Project-related donations** | Community | $136,889 |
| **Corporate Charitable Fund donations (including module donations)** | Charitable | $476,070 |
| | **Total** | **$791,549** |

In line with our environmental, social and economic giving values, First Solar's Global Charitable Giving Program prioritizes initiatives that support the following UN Sustainable Development Goals (SDGs):


- Empowering the next generation through education for sustainable development
- Ensuring access to clean energy and water
- Promoting economic inclusion, diversity and equal opportunity to reduce inequality
- Enabling a circular economy to ensure sustainable and responsible consumption

[35] Cash contributions include grants, sponsorships and cash equivalent grants (e.g., check, gift card, gift certificate, debit card, etc.) and in-kind (i.e. non-cash) donations include First Solar modules, PV systems (or components thereof), capital equipment and other goods.

## Site Donations

First Solar implements local community engagement and development programs at locations where our associates live and work. First Solar's local Contribution Committees approve requests for monetary and "in kind" gifts to assist charities and non-profit organizations that promote health and safety, environmental responsibility, education and community services.

**Our associates help fulfill the company's commitment to improving the environment and contributing to local communities.**

In 2017, First Solar Malaysia donated $62,600 to local initiatives and festivities as part of the site's community giving program. In conjunction with the Lunar New Year 2017 celebration, First Solar Malaysia organized a charity visit to the Rumah Sejahtera Old Folks Home, a residential shelter for homeless senior citizens. First Solar volunteers also helped spread Christmas cheer at the Sunshine Cottage Welfare Home in Kulim for children, youth, seniors and disabled citizens in need. For the sixth year in a row, First Solar volunteers served free drinks and food to members of the public attending the annual Indian Thaipusam Festival at the Penang Waterfall Temple. First Solar supported Raya Qurban (a religious celebration for Muslims) at the Sungai Kob Mosque. First Solar Malaysia helped support less fortunate children with disabilities by participating in a fundraising program organized by the U.S. Embassy and the American Malaysian Chamber of Commerce (AMCHAM) for the School of Mentally Retarded Children and the Penang Ru Yi Home.

**First Solar Malaysia associates at the Rumah Sejahtera Old Folks Home for homeless senior citizens.**

As part of our commitment to empowering the next generation through education, First Solar sponsored AMCHAM Malaysia's Young Enterprise Program which gives students an opportunity to learn about business through hands-on experience. First Solar Malaysia hosted an exhibition booth at the Penang International Science Fair 2017 to raise awareness of the importance of green energy for a sustainable future. The fair exposes young minds to science and engineering through a unique, stimulating and innovative experience. First Solar Malaysia showcased the latest advances in the thin film technology at the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM) which helps to introduce students to solar science and technology. First Solar Malaysia also sponsored the ASEAN Essay Writing Competition and donated IPads for the winners.


In 2017, First Solar Perrysburg donated $105,990 to local community and charitable initiatives such as Cocoon Shelter, Walk for Water Toledo, Huron County Human Society, Imagination Station, Toledo Museum of Art and many more. In line with our charitable giving goal to enable a circular economy, First Solar sponsored the Toledo Zoo's Terracycling program. TerraCycle is an international program that aims to eliminate the idea of waste by recycling the non-recyclable. The program is helping to keep items such as plastic cups, cereal and potato chip bags, energy bar wrappers, food pouches, water filters, beauty and oral care products, ink cartridges, and markers, out of landfill.

**First Solar Perrysburg associates and their families participated in the annual "Clean Your Streams" day in Ohio.**

Every year since 2009, our Perrysburg associates volunteer for a non-profit community organization called Partner for Clean Streams (PCS), which works to improve the water quality of Ohio's Maumee River by partnering with businesses, governmental agencies, non-profit organizations and local volunteers. In line with our commitment to environmental responsibility, First Solar proudly sponsors PCS and provides volunteers and supplies during the stream cleaning activities. In 2017, 73 associates and their families collected approximately 150 bags of trash (weighing 4,500 pounds) along with 20 tires out of the Maumee River. First Solar retained the title of "Watershed Warrior," the highest corporate recognition for the most volunteers.

In 2017, the Arizona Contribution committee donated $10,000 to local and national non-profits including Act One which provides lower-income school children in Maricopa and Pima counties the opportunity to experience arts performances and exhibitions through field trips to professional theaters and museums, Make a Wish Arizona which helps grant the wishes of more than 400 Arizona children, the Adult Congenital Heart Association's heart walk, Queen of Peace Elementary School's Home Economics Start Up Program which helps improve the everyday life of their 242 students that come primarily from low-income families, the Puerto Rico Disaster Direct Relief fund, and Boy Scouts of America's Taste of Arizona Festival which helped raise funds to enable at-risk youths in low-income and culturally diverse areas to participate in after-school and weekend activities. First Solar associates from our Tempe and Mesa offices led an effort to collect and wrap donations for 12 area families in need to ensure these families would have gifts under their trees and a very merry Christmas.

For the fourth year in a row, First Solar associates from our Sydney office volunteered their time to mentor at-risk teens through a charity called Raise. The volunteers met with their mentees from Matraville Sports High School once a week for six months a year and recently celebrated their successful graduation after providing guidance and support through their high school years.

**First Solar Australia associates gave back to the community as mentors to students at Matraville Sports High School in Sydney.**

## Scholarships, Internships And Educational Outreach

First Solar is committed to promoting solar technology education and empowering the next generation by providing scholarships and internships, developing solar PV curriculums and supporting local training programs. We donate modules, provide solar equipment and design curriculums for training programs to help local community members pursuing a solar career develop the skills needed to excel in the industry. Solar training programs provide access to stable and fulfilling green jobs to both students about to enter the workforce and experienced workers looking for a career change.

Over the past three years, First Solar has donated nearly $50,000 to the Ohio Foundation of Independent Colleges (OFIC). In all, nineteen students received scholarships in the amount of $2,500 each. The students attended Ohio Northern University, Ohio Wesleyan University and Malone University and majored in Mechanical Engineering, Business, Mathematics, Accounting, Nursing and Environmental Studies.

*"Scholarships like First Solar Corporation Scholarship allow my family and me to breathe easier knowing that I can attend a highly ranked and successful school without the stress of massive student loans when I graduate."*

*—Advanced Mathematics student at Ohio Northern University*

First Solar sponsors research on the next generation of solar technology and partners with universities on R&D initiatives to drive cost-effective PV module efficiency gains and long-term durability and performance improvements. In 2018, First Solar rolled out a U.S. internship program in partnership with Arizona State University, Bowling Green State University, Michigan State University, Howard University, New York University, the University of Toledo, and the University of Arizona. First Solar's internship program aims to help students enrolled in a Bachelor's, Master's or PhD program fulfill a graduation requirement. In 2018, we had 59 interns across the U.S, up from 35 in 2017.

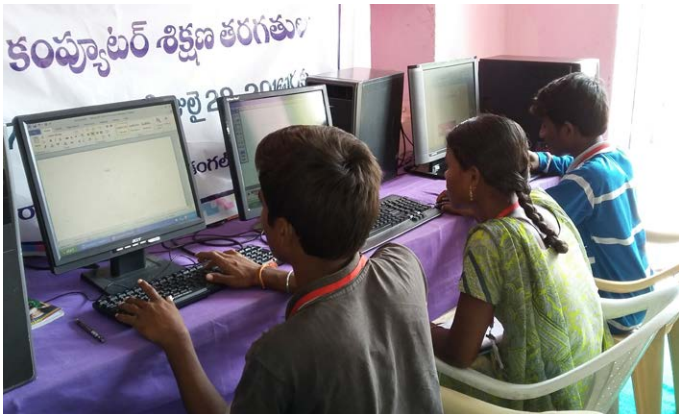
First Solar Malaysia has partnered with local universities and colleges since 2012 to support our internship program. The program helps to develop future employees and enables students to gain hands-on working experience at First Solar, including internship placements in our industrial training program. First Solar Malaysia provided internships to 269 students in 2017 and 209 students in 2018 for a period of 3 to 9 months. First Solar Malaysia also offers 1-year internships to unemployed graduates through a formal Graduate Employability Program in collaboration with local educational institutions.Under this program, interns participate in customized training modules while doing on-the-job training at First Solar, with the potential opportunity of being hired permanently at the end of the internship period.

In 2017, First Solar hosted 16 visiting engineering scholars from Pakistan for a tour of our Operations Center in Tempe, Arizona. The scholars were part of the U.S.-Pakistan Centers for Advanced Studies in Energy (USPCASE) program, an initiative between Arizona State University and two leading Pakistani universities- the National University of Sciences and Technology (NUST) and the University of Engineering and Technology (UET) Peshawar. The USPCASE program focuses on applied research relevant to Pakistan's energy needs and helps produce skilled graduates in the energy field.

## Project-Related Donations

First Solar is committed to being a good neighbor and responsible partner in local communities throughout the development, construction, and operation of our projects. In 2017, First Solar donated $97,300 to initiatives and charitable funds across the U.S. including Best Buddies International, the Las Vegas Victims' Fund, the Moapa Band of Paiute Indians, the Rotary Club of Hanford, the Kings Community Action Organization's Barbara Saville Shelter for victims of domestic violence, the Blythe emergency food pantry for seniors and people with disabilities, the Cuyama Joint Unified School District, Ann Parish Elementary School, and the volunteer fire department in Butler, Georgia.

As part of our local corporate social responsibility (CSR) program in India, First Solar donated $38,680 in 2017 for training programs and the construction of two community centers. First Solar hosted skill development workshops in the Indur village of the Vikarabad District near our Tandur project site in Telangana. In line with our charitable giving goal to promote economic inclusion, diversity and equal opportunity to reduce inequality, the workshops aimed to equip undergraduate children with basic Microsoft computer language skills and empower women in the village with the tools and skills to make dresses, toys and bags that can be sold at the market. 100 boys and girls participated in the 30-day computer awareness and training program and 100 women participated in the 30-day tailoring and bag making training program. First Solar also contributed infrastructure, computers, and sewing machine kits. In the Beechiganipalli village adjacent to our Hindupur project site in Andhra Pradesh, First Solar helped construct two community halls which will enable the local community to host social functions such as marriages and cultural events.



## Corporate Donations

First Solar's Corporate Charitable Fund aims to improve the quality of life in communities around the world by partnering with non-governmental organizations (NGOs) to empower the next generation through education for sustainable development, provide access to clean energy and water in underserved areas, enable a circular economy, and promote economic inclusion, diversity and equal opportunity through cash contributions, sponsorships, or module, system and capital equipment donations. We have community giving projects throughout the world including Australia, Chile, India, Malaysia, Thailand, Indonesia, Burkina Faso, South Africa, Germany, Nicaragua, Tanzania, Cameroon and the U.S.

| | | | |
|---|---|---|---|
| **2017** | **USA** | **Ohio Foundation of Independent Colleges** | $10,000 endowment to provide scholarships for students majoring in Science, Technology, Engineering and Math (STEM). |
| **2017** | **USA** | **RE-volv Solar Ambassador Program** | $10,000 grant for training and mentoring college students to facilitate the installation of solar projects that benefit non-profits in their home communities. |
| **2017** | **USA** | **National Park Trust** | 1.1MW module donation (roughly equivalent to $385,000) and $15,000 grant for a solar installation on Santa Rosa Island, part of the Channel Islands National Park. The PV installation generated power to support park staff, partners, researchers and visitors utilizing the island. |
| **2017** | **USA** | **Ohio State University** | $25,920 grant to support interactive scientific learning field trips to Stone Lab for up to 240 students and chaperones from the Toledo area. Participants collected environmental and biological data from Lake Erie aboard a research vessel and then studied the specimens at the Gibraltar Island research facility. |
| **2017** | **USA** | **The American Red Cross** | The fund contributed $30,150 to support the Hurricane Harvey disaster relief effort. This included matching donations made by First Solar associates. |
| **2016** | **Global** | **Friends of Cave Creek Canyon** | Donated modules and $15,000 to install a well pump that supplies water to Willow Tank pond, an important site for migratory birds and other wildlife in Arizona. |
| **2016** | **USA** | **Read for Literacy** | $10,000 grant to launch interactive green education programs at the Claire's Day event and other back to school events. |
| **2016** | **USA** | **RE-volv Solar Ambassador Program** | $10,000 grant to provide training and mentoring to college students on installing solar projects to benefit a nonprofit in their home communities. |
| **2016** | **USA** | **Toledo Museum of Art** | Donated $30,000 to support a public sensory garden project on the museum's campus in Ohio. |
| **2016** | **USA** | **Ohio Foundation of Independent Colleges** | $10,000 endowment to provide scholarships for students majoring in Science, Technology, Engineering and Math (STEM). |
| **2016** | **Global** | **Global Greengrants** | Donated $50,500 to support green education, access to clean water and energy, and the development of innovative and sustainable technologies in Nigeria and other countries around the world. |

**First Solar donated modules and $15,000 to Friends of Cave Creek Canyon (FoCCC) to help install a well pump that supplies water to Willow Tank pond, an important site for migratory birds and other wildlife in Arizona.**

In 2015, First Solar provided a $50,000 grant to the Arizona State University Foundation for the USAID Research & Innovation Fellowship Program that was used to support student-led sustainable development projects in Brazil, South Africa, Botswana, Senegal and Panama over a two-year period.

The Global Development Research Program's projects focused on areas including community sustainability, appropriate usage of shared water resources, optimal control of small wind turbines and solar arrays for agricultural activities, and the impacts of climate change on pollinators in Panama. In Brazil, the program supported the village of Rio Claro's goal of becoming a model sustainable community by 2020 (**Rio Claro Sustentavel 2020 program**). In 2017, Rio Claro celebrated its first sustainability festival, a half day event that included several presentations and discussions on the goals of the sustainability vision, demonstration of solar energy applications and educational games for children. The event marked the launch of the community's 2017-2018 implementation plan which involves achieving zero waste to reduce pollution, clean water projects that focus on extracting solid waste from the local river, and reducing energy costs with solar energy and energy efficiency.

**Demonstration of a low cost solar water heater prototype in Rio Claro, Brazil, as part of Arizona State University's Global Development Research Program.**

**Children learned about the importance of proper waste separation and disposal in marked bins at Rio Claro's first sustainability festival in July 2017.**

Every year, the National Park Trust organizes **"Kids to Parks Day"**, a national day of outdoor play that encourages children and families to explore the outdoors and build lifelong bonds with their local parks. In 2018, more than one million families participated in over 1,200 park events across the U.S.

First Solar has been sponsoring the Kids to Parks Day National School Contest since its inception in 2012 to give underserved schools an opportunity to learn about nature, park stewardship, outdoor recreation, STEM and history by experiencing their local, state and national parks and public lands. First Solar's $25,000 sponsorship provided scholarships for bus transportation, administration of the program and Buddy Bison award packages that benefitted 1,824 students from 28 states plus Washington D.C. during the 2017/2018 school year. Approximately one-third of the 5,086 students participating in the Kids to Parks Day National School Contest were funded by the First Solar grant. First Solar is committed to empowering the next generation through environmental education and nature conservation as part of our vision of leading the world's sustainable energy future.

**Students from the Shafter Youth Center in California hiked through Sequoia National Park and learned about the redwoods and their fire resistance.**


**110 students from Arbor Station Elementary in Georgia visited Martin Luther King Jr. National Historical Park and toured the visitor center, visited the Ebenezer Baptist Church, viewed the reflecting pool and helped to pick up trash.**

Students from Chinook Elementary school in Alaska visited the Kenai Fjords National Park to get a first-hand look the glaciers.

50 high school students from South Tech Academy in Florida visited Biscayne National Park to study the effects of plastic waste on the ocean and tour a sea turtle rescue facility.

Students from Desert Rose High School in Nevada visited Valley of Fire State Park and explored petroglyphs at Atlatl Rock, identified petrified wood, spotted bighorn sheep and helped to pick up trash.

# External Sustainability Initiatives and Charters

- **Carbon Disclosure Project (CDP):** First Solar has participated in and publically reported to CDP since 2011.
- **Solar Energy Industries Association (SEIA) Commitment:** First Solar and its solar affiliates participate in SEIA's Commitment to Environmental and Social Responsibility, a voluntary commitment which details a set of solar industry guidelines to promote environmental and social responsibility.
- **Product Environmental Footprint (PEF):** First Solar is a leading member of the Technical Secretariat to develop Life Cycle Assessment-based Product Environmental Footprint Category Rules for PV electricity generation under the European Commission's Single Market for Green Products Initiative Pilot process on Product Environmental Footprinting.
- **International Energy Agency Photovoltaic Power Systems Program Task Committees 12:** As a member of Task 12, First Solar promotes international collaboration on PV safety and sustainability.
- **International Renewable Energy Agency (IRENA):** First Solar is a founding member of IRENA's multi-stakeholder Coalition for Action which works to dispel common misperceptions and factual inaccuracies about renewable energy.
- **International Energy Agency Renewable Industry Advisory Board (IEA RIAB):** As member of the Renewable Industry Advisory Board, First Solar is providing insight to technology developments and providing advice and feedback to the International Energy Agency on photovoltaics in the global energy markets.
- **NSF Photovoltaic Module Sustainability Leadership Standard:** First Solar is part of the Joint Committee which is developing a Photovoltaic Module Sustainability Leadership Standard under the umbrella of the National Center for Sustainability Standards NSF.
- **SEIA National PV Recycling Program:** First Solar is partnering with the Solar Energy Industries Association to help make affordable PV recycling solutions more accessible to consumers by establishing a network of cost-effective recyclers that can responsibly manage PV waste.
- **Climate Leadership Council:** As a founding member, First Solar supports the Climate Leadership Council's mission and carbon dividends plan as a cost-effective, equitable and politically-viable climate solution. The plan calls for a substantial, gradually rising, revenue-neutral carbon tax with the revenue distributed to citizens.

8

# WORKING AT FIRST SOLAR

# 8 First Solar Workforce

First Solar is committed to creating an engaging and rewarding work environment for our associates. We strongly promote ongoing training and career progression opportunities, as well as an open communication environment that encourages diverse ideas, creative problem-solving and innovation.

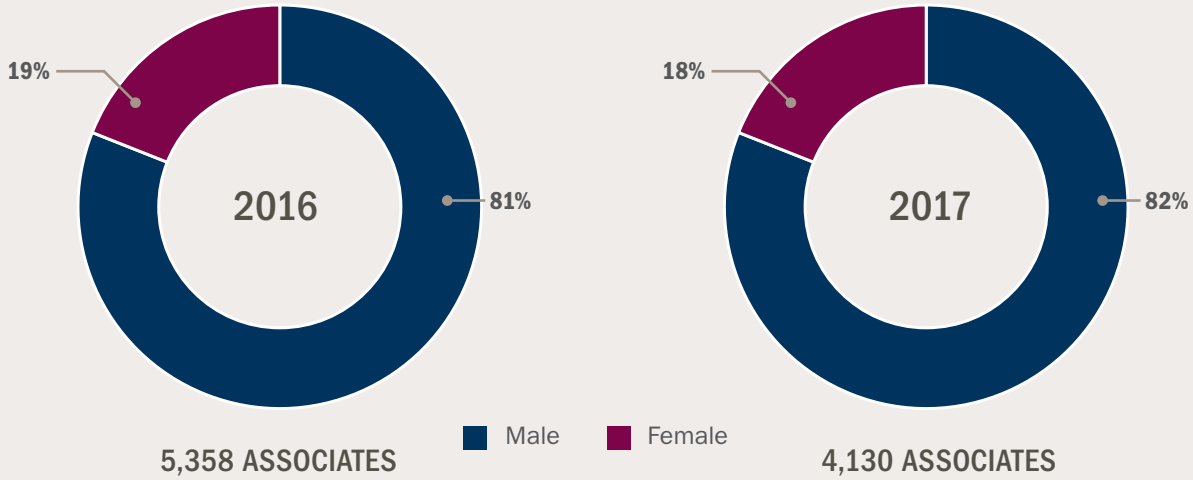
In 2017, First Solar Malaysia received a Golden Globe Tiger Award for "Organization with Innovative HR Practices and Best Leadership Development Program for Workers" as well as the HR Excellence bronze award for "Excellence in Workplace Wellbeing." First Solar Malaysia was recognized for its "Wellness for Life" program which promotes a healthier working environment through weekly Zumba and aerobics sessions, healthy eating campaigns, Solarthon fun runs and Cyclethons, quarterly blood donation campaigns, and a Wellness rewards program that allows associates who participate in wellness events to collect points that can be redeemed for prizes.



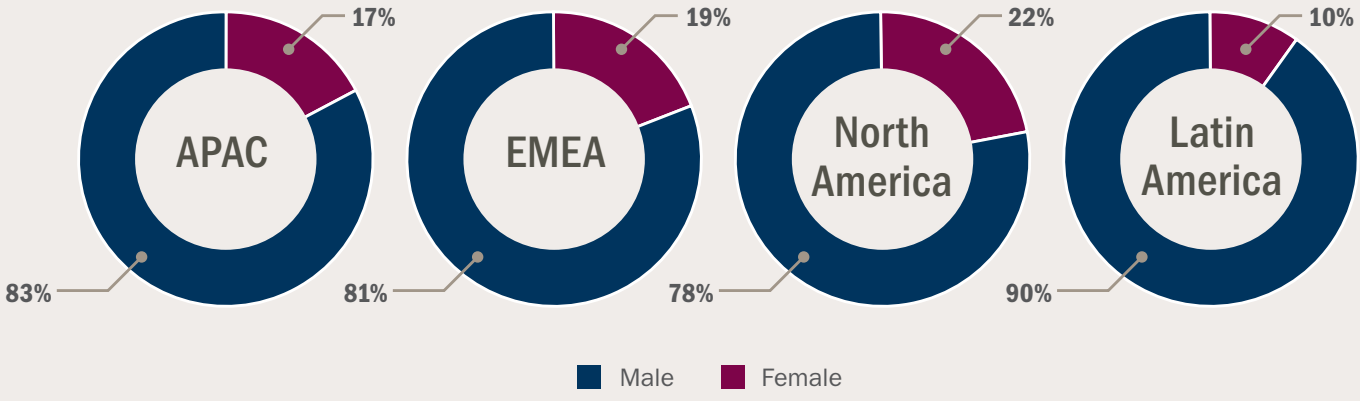
**First Solar Malaysia's Wellness for Life Committee organized the first "Solarthon" for Kulim associates in 2017.**

As of December 31, 2017, we had approximately 4,100 associates. The 24 percent reduction in our workforce was due to ramping down production of our Series 4 modules in order to enable the transition to our Series 6 module technology.

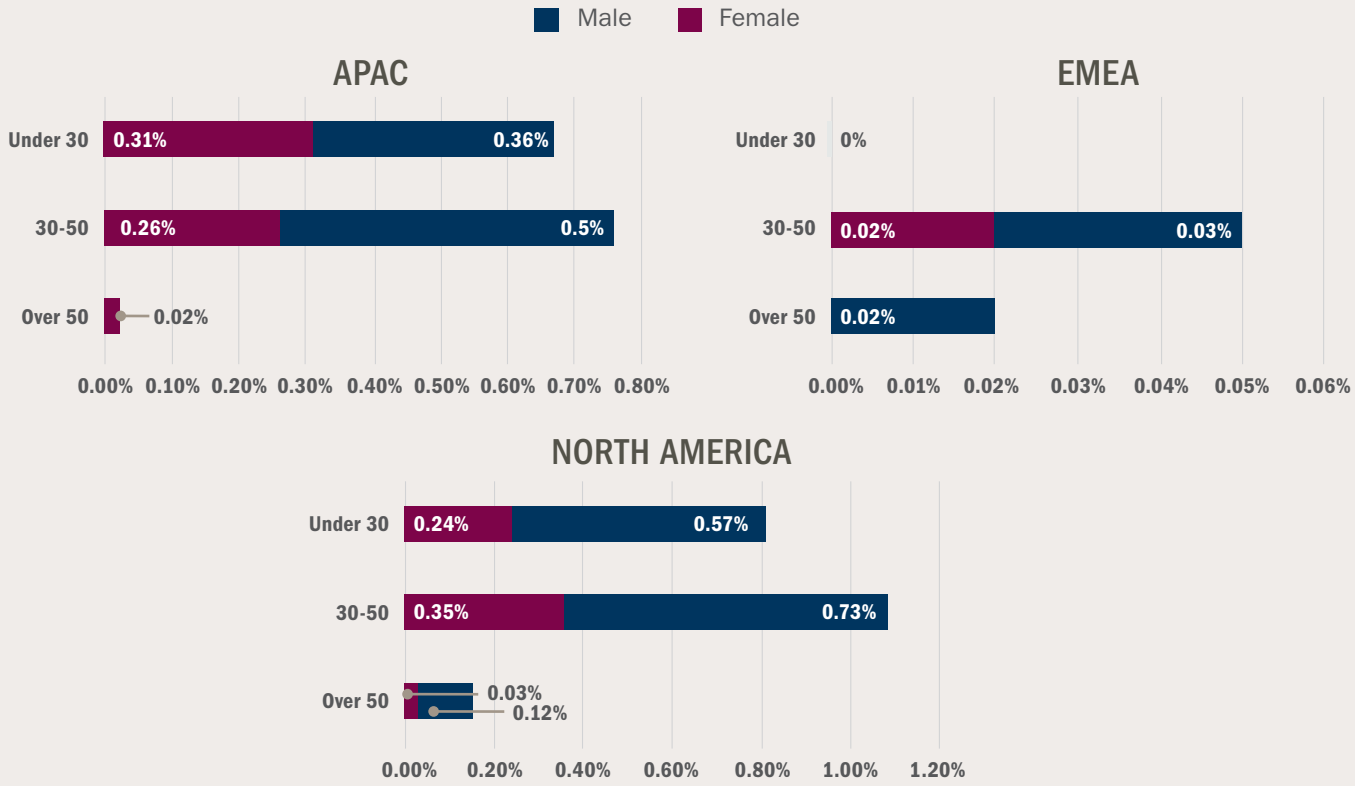
## Workforce Breakdown by Gender




## Workforce Gender Breakdown by Region in 2017

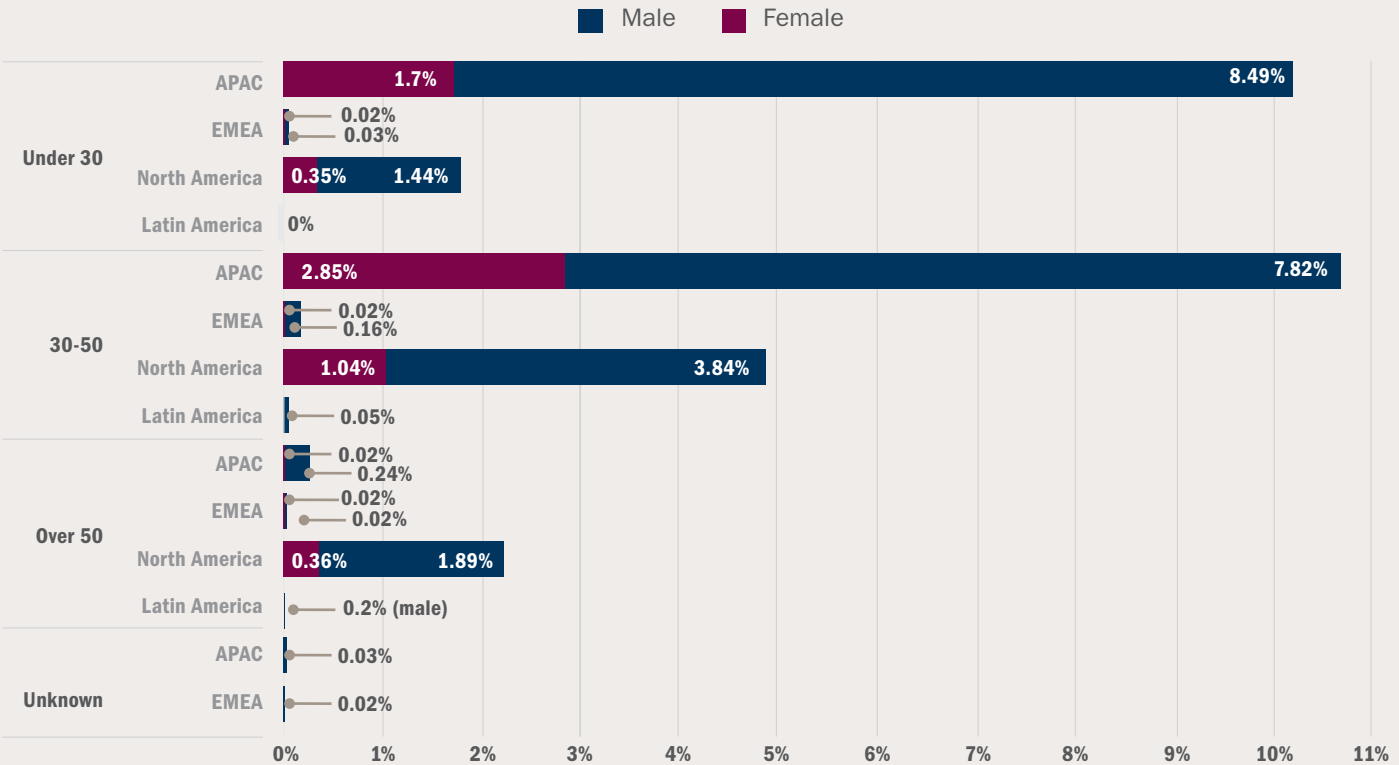


## New Associate Hires by Age, Gender and Region in 2017*




*The new hire rate is calculated as a percent of the total workforce. There were no new hires in Latin America in 2016.

## Associate Turnover Rate by Age, Gender and Region in 2017*




*The turnover rate is calculated as a percent of the total workforce (as of December 31, 2016). Includes voluntary and involuntary turnover. Total involuntary turnover amounts to approximately 7%.

# Diversity

First Solar is an Equal Opportunity Employer (EOE) that values and respects the importance of a diverse and inclusive workforce. As a company we prohibit biases based on race, color, gender, sexual preference, age, religion, national origin, disability, military status, genetic information or any other protected classifications. At First Solar, we hire, pay and promote based on an individual's qualifications, skills, ability to do the required work, merit and overall potential. First Solar's entry-level wages are above the minimum wage in all jurisdictions we manufacture in. First Solar has an Affirmative Action Policy (AAP), which consistently looks at women and minorities in the organization as a whole, including leadership. First Solar makes good faith efforts to improve year over year its representation in those areas. First Solar's EOE policy is available online: **http://www.firstsolar.com/en-EMEA/-/media/First-Solar/Documents/Careers/FirstSolar_EEO_Statement.ashx?la=en**.

First Solar monitors ethnicity and gender diversification on an annual basis through our Affirmative Action Plan reports and takes action as appropriate. In addition, our Talent Acquisition team annually evaluates the breakdown of applicants and hires based on gender and ethnicity. First Solar ensures that all our candidate pools include a diverse candidate by sending job postings to diversity and minority sites for targeted recruitment. We perform annual audits on our Performance Review Process to ensure that the process does not negatively impact our female and diverse populations.

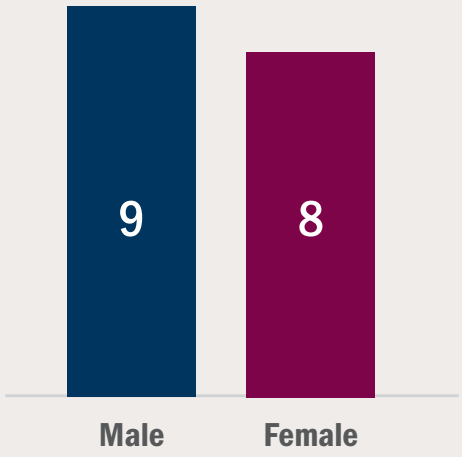
Gender diversity is a priority in selecting managers for our leadership development programs. We strive for a participant mix of 20 percent female managers. Over the last two years, 24 percent of female leaders (director level and above) have been or are in the process of being executive coached by a First Solar Sponsored Coach (compared to 8.5 percent of male leaders). Partnering with an executive coach can help a leader focus on using their strengths and building key competencies needed to achieve strategic business objectives. These leaders are encouraged to have development plans in place to support their career development. First Solar's minority networking groups and women's affinity groups such as Tempe's Curie Club, Perrysburg's Women's Networking Group, and Kulim's Women@FirstSolar, contribute to both formal and informal efforts to promote diversity and inclusion across the company. In 2017, six diversity trainings were sent out to the organization under our monthly Organizational Development & Training email. First Solar continues to develop programs and policies such as alternative work schedules to enable women to work part-time while transitioning back into the workforce.

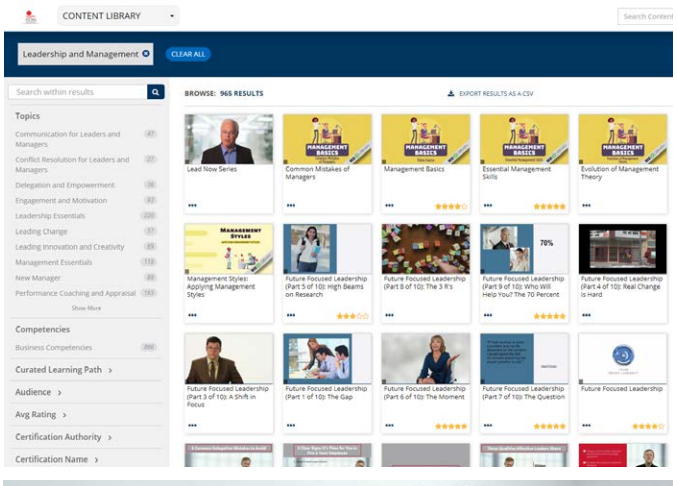
# Training and Education

All of First Solar's current, full-time employees receive regular performance and career development reviews. First Solar associates and managers can access training on-demand. Associates are offered access to a video library that contains micro learning, in-depth video courses, and eLearning. We also support training to meet specific learning needs. Total training hours in 2017 amounted to 35,752 hours. This excludes training related to Manufacturing, IT, EPC, O&M, HR, and other functional groups as well as on-demand training available through our video library (Biz Library).

First Solar's Associate Educational Assistance Program (AEAP) provides financial support for US associates seeking to pursue higher education at certificate, diploma, degree and doctorate level. The AEAP encourages associates to improve their skills and knowledge to prepare them for new opportunities within the company.

## Training Hours by Gender in 2017





# Performance Management

First Solar's Performance Management process is designed to support associates in achieving their highest performance and potential levels. Objectives include aligning individual and team goals to First Solar goals; establishing accountability; and fostering ongoing and meaningful conversations.

Discussions about alignment and development are expected to be regular, at least each quarter in the form of a Check-In meeting. These quarterly meetings are used to discuss goals, development plans, feedback, and recognition. One-on-one meetings with managers are conducted weekly or bi-weekly with the objective of addressing operational tasks and day-to-day work.

First Solar facilitates a 'Balanced Review' to ensure well-rounded feedback by including the following components:

- **Goals:** Associates' goals are set early in the year, cascaded from the top, focused; and then discussed during quarterly check-ins.
- **Feedback:** Both associates and managers may request formal feedback in our HR system at any time.
- **Development:** Every associate in a professional role is asked to have a Development Plan (a unique plan for professional growth) logged in our HR system.
- **Self-Summary:** Before the annual manager evaluation launches, associates are invited to share summaries of their annual accomplishments.
- **Manager Review:** In addition to providing informal feedback on a quarterly basis, managers are required to provide a formal evaluation at the end of each year, taking into consideration the 'Balanced Review' inputs.

# Career Development and Leadership Programs

First Solar offers short-term programs and long-term career development opportunities for individuals at various levels in the company. Our leadership programs provide a broad range of executive, managerial and leadership training, plus continuing opportunities for professional development.


## First Solar Way

In 2018, First Solar partnered with the highly recognized Arizona State University to offer First Solar Way to senior leaders across the company. First Solar Way provides classroom lectures by internal executives and external experts, experiential learning, strategic project work, leadership assessments, and career planning over a three-month period. First Solar's executive staff selects participants during talent review based on job performance, potential, and functional area of expertise. During the program, participants worked with high performing peers from other business functions to gain the skills to be outstanding contributors to our success.

## Leadership Essentials

First Solar Leadership Essentials is a two-part learning experience program designed for mid-level managers, nominated by a Director or Vice President, to develop their leadership skills. The program provides First Solar executive insights on leadership and has multiple learning objectives including communication and conflict management, emotional intelligence, cross-functional team development, business and financial acumen, and personal coaching and development planning.

## Management Foundations

The newest program offering in leadership development is Management Foundations. This two and a half day program is aimed at helping new people managers build skills to effectively lead people and teams. This includes having meaningful one-on-one discussions, setting goals and expectations, coaching, delegation and recognizing associates. The program highlights the various roles that a manager occupies as a learner, coach, team builder, motivator and communicator. The program experience includes action planning and development plans to support continuous manager and associate development.

# Employee Recognition Program

First Solar's company-wide reward and recognition program – YOUshine – regularly recognizes associates for their great work and contribution to the company. YOUshine is a social recognition program used by all global associates to give and receive recognition. Additionally, the tool recognizes associate milestone anniversaries, inviting peers to share congratulations. Points are awarded for various levels of achievement and may be redeemed for gift cards and merchandise. Over the last three years, since the program launch in April 2015, First Solar associates enjoyed over 37,842 recognition moments. 75 percent of our workforce received at least one award annually.

## Excellence in Action Awards

The Excellence in Action Awards (formerly CEO Awards) are the highest YOUshine rewards and recognition levels at First Solar. Via a nomination process, the executive leadership team selects associates and/or teams who went above and beyond while also demonstrating the company's culture attributes— Agility, Collaboration, and Accountability. In 2017, we received 126 nominations and recognized four initiatives and 48 associates. In 2018, we received 70 nominations and will recognize 13 initiatives and 121 associates.


## Long-Term Incentive Stock Awards

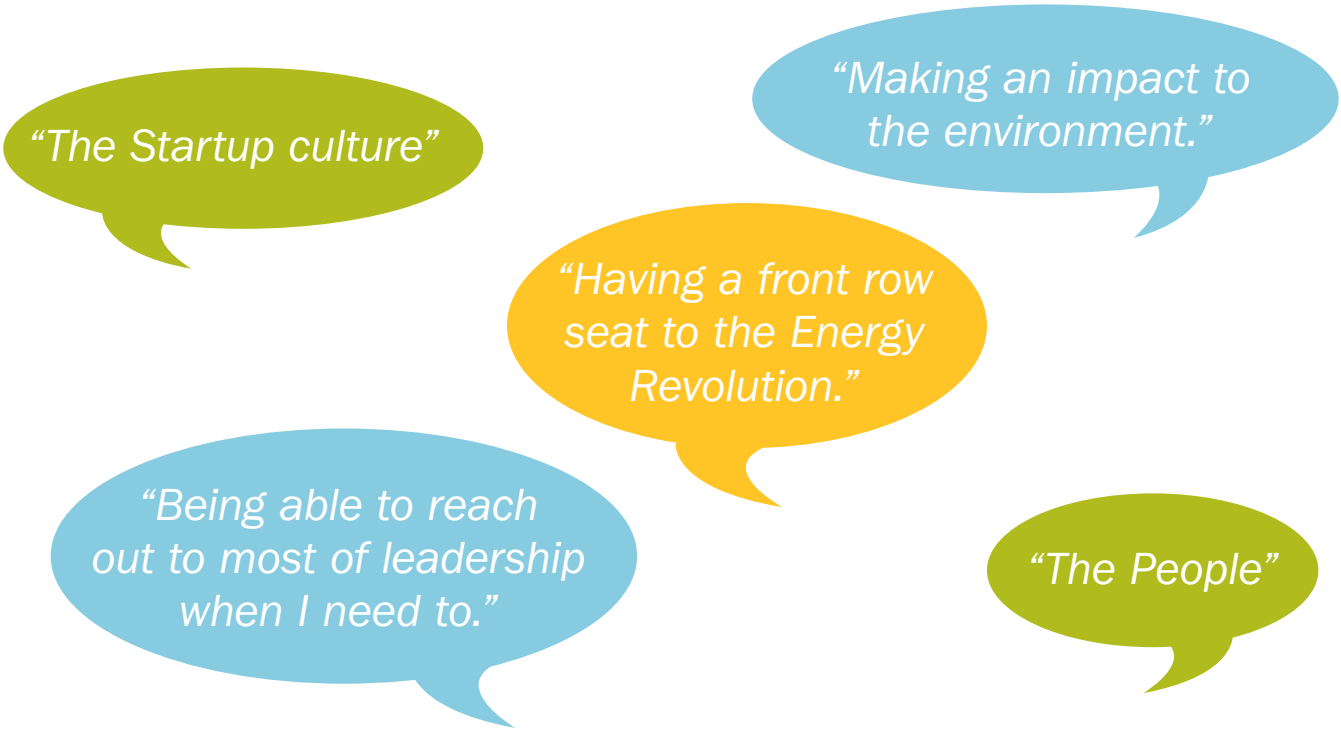
First Solar provides Exceptional Long-Term Incentive (ELTI) Stock Awards to recognize and retain First Solar's exceptional performers at the manager level and below through stock ownership in the company, vested over four years. Exempt associates below Director-level are eligible for the ELTI program. All First Solar Directors and above receive Long-Term Incentive (LTI) Stock Awards.

# Associate Engagement Survey

First Solar's Voice of the Organization engagement survey is an opportunity for our global associates to give feedback on our company and our culture. At First Solar, we value every voice, and ask for honest and candid feedback semi-annually. The current survey strategy launched in 2018, evolved from survey solutions executed in 2012, 2015, and 2017.

The 2018 surveys achieved 85% and 87% response rates: 3,783 responded in April 2018 and 4,641 responded in October 2018. Overall, our associates remain engaged, proud and committed to First Solar. The latest engagement score was 86%, meaning that 86% of associates scored questions in this category favorably. Other high scoring areas included Clarity of Direction, Agility, Sustainability Programs, and Manager Relationships. We continue to build on these strength areas and address opportunity areas.

High-level results are shared transparently in global webcasts, manager resources, and on our intranet. Action plans to address the feedback are folded into our corporate goals and objectives. Feedback is also used to pinpoint focus areas for the next survey; open-ended questions are altered for each survey in order to gain new and different insights.



# 9

# ABOUT THIS REPORT

# 9 About this Report

First Solar's Sustainability Report was developed in accordance with the Global Reporting Initiative's (GRI) Core Sustainability Reporting Standard. This report covers significant economic, social and environmental impacts associated with our global operations and PV power plant projects. The reporting period spans 1 January 2017 up to and including 31 December 2017. Unless otherwise specified, this report includes environmental performance data from all of First Solar's manufacturing plants (with the exception of our Vietnam facility since it was not yet operational in 2017) and its major R&D facility. We have not sought third-party verification for this report, however our 2014 greenhouse gas emissions inventories of Scope 1 and Scope 2 sources are externally verified on a triennial basis with the International Standard ISO 14064 Part 31 (ISO 14064-3) as well as the WRI/WBCSD GHG Protocol.

To provide feedback on our Sustainability Report, please contact: **Sustainability@firstsolar.com**

# Sustainability Materiality Assessment[36]

As part of our stakeholder mapping and materiality assessment process for our first Sustainability Report, First Solar conducted a survey with our external-facing departments including business development, public affairs, project development and investor relations, to identify key aspects that significantly impact the company and our stakeholders, both within and outside our organization. First Solar's stakeholders were prioritized according to their ability to significantly influence or be significantly impacted by the company.

The table below lists all material aspects that we believe to be important to our stakeholders based on the survey results. Each aspect was grouped according to a key topic including company and product viability, environmental impact, local communities, work environment and supply chain sustainability. These key topics form the basis of our report's main chapters. Going forward, we will look to refine our report and validate our view internally through our Sustainability Council and externally by engaging with our key stakeholder groups. Over the past few years, First Solar participated in the development of the PV industry's first sustainability leadership standard (NSF 457). The multi-stakeholder process identified corporate reporting criteria that are most relevant for the PV industry. The identified material topics will be incorporated into our next sustainability report. We encourage our stakeholders to provide feedback on the report by contacting us at: **Sustainability@firstsolar.com**

| Sustainability Material Topics and Aspects | | | | |
|---|---|---|---|---|
| **Company & Product Viability** | **Environmental Impact** | **Local Communities** | **Supply Chain Sustainability** | **Workplace** |
| • Economic Performance<br>• Regulatory Compliance<br>• Anti-Corruption<br>• Quality & Reliability<br>• Investment<br>• Product Cost, Efficiency & Bankability<br>• Product Offering & Strategy | • Effluents, Waste & Recycling<br>• Carbon Footprint<br>• Energy Payback Time<br>• Energy Use<br>• Water Use<br>• Emissions<br>• Biodiversity | • Employment<br>• Indirect Impact<br>• Labor/ Management Relations<br>• Local Communities | • Procurement Practices<br>• Raw Material Availability<br>• Conflict Minerals | • Occupational Health & Safety<br>• Non discrimination<br>• Diversity & Equal Opportunity<br>• Equal Remuneration<br>• Training & Education<br>• Freedom of Association |

[36] First Solar's Sustainability Materiality Assessment was developed in accordance with the Global Reporting Initiative's G4 guidelines for defining report content. The Global Reporting Initiative (GRI) is an international independent organization that provides a leading corporate sustainability reporting framework based on multi-stakeholder input from a wide range of civil society organizations, labor groups, businesses, academics, and other experts.

# Stakeholder Engagement

First Solar engages with various stakeholder groups including employees, customers, industry associations, NGOs, local communities, scientific organizations, media, investors and shareholders. The following chart depicts First Solar's approach to stakeholder engagement; including frequency of engagement by type and by stakeholder group as well as key topics and concerns that have been raised:

| Stakeholder Groups | How We Engage | Material Topics | | | | | Frequency |
|---|---|---|---|---|---|---|---|
| | | Company & Product Viability | Environmental Impact | Local Communities | Work Environment | Supply Chain Sustainability | |
| First Solar Employees | Training Sessions, Meetings, Newsletters, Surveys | ✓ | ✓ | ✓ | ✓ | ✓ | Daily, Ongoing Basis |
| Customers | Meetings, Seminars & Conferences, Technical Workshops, Product Presentations | ✓ | ✓ | ✓ | ✓ | ✓ | Ongoing Basis |
| Suppliers | Meetings, Newsletters, Surveys, Audits | ✓ | ✓ | | ✓ | ✓ | Ongoing Basis |
| NGOs | External Surveys, Partnerships, Group Meetings, Workshops | ✓ | ✓ | ✓ | ✓ | ✓ | Ongoing Basis, Annually |
| Scientific Community | Conference Presentations, Workshops, Meetings, Working Groups, Technical Seminars, Collaboration, Peer Reviews | ✓ | ✓ | | | ✓ | Ongoing Basis, Annually |
| Industry Associations | Calls & Meetings, Industry Events/ Conferences, Newsletters, Board meetings | ✓ | ✓ | | ✓ | | Ongoing Basis |
| Government and Regulators | Meetings & Hearings, Conference Presentations, Seminars & Workshops, Committees, Tax Audits | ✓ | ✓ | ✓ | ✓ | ✓ | Ongoing Basis |
| Investors | Meetings, Earnings Calls, Analyst Days | ✓ | ✓ | | ✓ | | Quarterly, Annually, Ongoing Basis |
| Local Communities | Meetings & Town Councils, Presentations to Community Organizations, School Visits, Local Tours, Training Programs | ✓ | ✓ | ✓ | | | Ongoing Basis |

10

# GRI CONTENT INDEX

# 10 GRI Content Index

| GRI Standard Title | Disclosure Number | Description | Cross-Reference |
|---|---|---|---|
| **General Disclosures** | 102-1 | Name of the organization | First Solar Inc. |
| **General Disclosures** | 102-2 | Products and services and activities | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-3 | Location of headquarters | 350 W Washington St #600, Tempe, AZ 85281, United States |
| **General Disclosures** | 102-4 | Location of operations | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-5 | Ownership and legal form | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-6 | Markets served | About First Solar |
| **General Disclosures** | 102-7 | Scale of the organization | About First Solar: Our Operations |
| **General Disclosures** | 102-8 | Information on employees and other workers | About First Solar: Our Operations |
| **General Disclosures** | 102-9 | Description of the organization's supply chain | First Solar Supply Chain Overview |
| **General Disclosures** | 102-10 | Significant changes to the organization and its supply chain | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-11 | Precautionary Principle or approach | Continuous Improvement: Change Management System and EHS Peer Reviews |
| **General Disclosures** | 102-12 | External Initiatives | External Sustainability Initiatives and Charters |
| **General Disclosures** | 102-13 | Membership of Associations | 2017 CDP submission section 12.3 |
| **General Disclosures** | 102-14 | Statement from senior decision-maker | Message from the CEO |
| **General Disclosures** | 102-15 | Key impacts, risks and opportunities | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-16 | Values, principles, standards and norms of behavior | Code of Business Conduct and Ethics |
| **General Disclosures** | 102-18 | Governance structure | Corporate Governance and Website |
| **General Disclosures** | 102-40 | List of stakeholder groups | About this Report: Stakeholder Engagement |
| **General Disclosures** | 102-41 | Collective bargaining agreements | First Solar 2017 Annual Report and Form 10-K |
| **General Disclosures** | 102-42 | Identifying and selecting stakeholders | About this Report: Stakeholder Engagement |
| **General Disclosures** | 102-43 | Organization's approach to stakeholder engagement | About this Report: Stakeholder Engagement |
| **General Disclosures** | 102-44 | Key topics and concerns raised | About this Report: Stakeholder Engagement |
| **General Disclosures** | 102-45 | Entities included in the consolidated financial statements | First Solar 2017 Annual Report and Form 10-K |

| | | | |
|---|---|---|---|
| **General Disclosures** | 102-46 | Defining report content and topic Boundaries | About this Report |
| **General Disclosures** | 102-47 | List of material topics | About this Report: Materiality Assessment |
| **General Disclosures** | 102-48 | Restatements of information | |
| **General Disclosures** | 102-49 | Changes in reporting | n/a |
| **General Disclosures** | 102-50 | Reporting period | 1 January 2017 – 31 December 2017 |
| **General Disclosures** | 102-51 | Date of most recent report | 7 August 2017 |
| **General Disclosures** | 102-52 | Reporting cycle | Biennial with periodic updates |
| **General Disclosures** | 102-53 | Contact point for questions regarding the report | Sustainability@firstsolar.com |
| **General Disclosures** | 102-54 | "In accordance" option | Core |
| **General Disclosures** | 102-55 | GRI Content Index | GRI Content Index |
| **General Disclosures** | 102-56 | External assurance | About this Report |
| **Management Approach** | 103-1 | Explanation of material topic and its boundary | About this Report |
| **Economic Performance** | 201-1 | Direct economic value generated and distributed | 2017 Financial Highlights |
| **Economic Performance** | 201-2 | Financial implications and other risks and opportunities due to climate change | CDP submission section 2 |
| **Economic Performance** | 203-2 | Significant indirect economic impacts | Benefits of First Solar PV Power Plants |
| **Procurement Practices** | 204-1 | Proportion of spending on local suppliers | Supply Chain Sustainability |
| **Anti-Corruption** | 205-2 | Communication and training on anti-corruption policies and procedures | Ethical Business Conduct: Anti-Corruption |
| **Materials** | 301-2 | Recycled input materials used | Raw Material Availability |
| **Energy** | 302-1 | Energy consumption within the organization | Operational Excellence: KPI Chart |
| **Energy** | 302-3 | Energy intensity | Operational Excellence: Manufacturing Energy Intensity |
| **Water** | 303-1 | Total water withdrawal | Operational Excellence: KPI Chart |
| **Biodiversity** | 304-3 | Habitats protected or restored | Benefits of First Solar PV Power plants |
| **Emissions** | 305-1 | Direct greenhouse gas (GHG) emissions (Scope 1) | Operational Excellence: KPI Chart |
| **Emissions** | 305-2 | Indirect GHG emissions (Scope 2) | Operational Excellence: KPI Chart |
| **Emissions** | 305-4 | GHG emissions intensity | Operational Excellence: Greenhouse Gas Emissions Goal |
| **Effluents and Waste** | 306-1 | Total water discharge by quality and destination | Operational Excellence: Effluents and Waste |
| **Effluents and Waste** | 306-2 | Total weight of waste by type and disposal method | Operational Excellence: Waste by Type and Destination |

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| **Employment** | 401-1 | New employee hires and employee turnover | Working at First Solar |
| **Occupational Health and Safety** | 403-1 | Workers representation in formal joint management-worker health and safety committees | Operational Excellence: Recordable Injury Rate |
| **Occupational Health and Safety** | 403-2 | Type of injury and rates of injury, occupational diseases, lost days and absenteeism and total number of work-related fatalities | Operational Excellence: Recordable Injury Rate and KPI Chart |
| **Training and Education** | 404-3 | Percentage of employees receiving regular performance and career development reviews | Working at First Solar: Training and Education and Performance Management |
| **Local Communities** | 413-1 | Operations with local community engagement, impact assessments, and development programs | Social Responsibility |
| **Customer Health and Safety** | 416-1 | Assessment of the health and safety impacts of product and service categories | Change Management System and Peer Reviews |