



# Powering a Brighter Tomorrow<sup>®</sup>

Our progress toward a circular  
economy in 2015–2016

SUNPOWER<sup>®</sup>

“Solar energy is regenerative by nature, and SunPower’s approach to solar product development is regenerative as well.”



Over the past century, the global economy’s “take, make and dispose” model has tested the limits of our planet’s resources. As climate change now threatens everything from our water quality to our food supply, this model is simply no longer sustainable.

SunPower is working toward a new model—a circular economic model in which resources are conserved and kept in use as long as possible. Solar energy is regenerative by nature, and SunPower’s approach to solar product development is regenerative as well. We continually innovate to meet our customers’ needs while improving sustainability at every stage of the product lifecycle: using fewer resources in manufacturing, maximizing our products’ environmental benefits and lifespan, and facilitating their reuse and recycling at the end of their life.

We are extremely proud of the progress we’ve made. In 2016, SunPower’s Mexicali, Mexico, plant became our first “triple-certified” manufacturing facility. This means it has earned three of the industry’s

most stringent sustainability certifications: the direct current E-Series and X-Series solar panels it manufactures are *Cradle to Cradle Certified™* Silver, and the facility holds LEED Gold® certification from the U.S. Green Building Council and Landfill-Free Verification from NSF Sustainability.

In 2016, SunPower’s solar panels set a new efficiency world record<sup>1</sup> and continue to deliver the highest-efficiency ratings on the market.<sup>2</sup> By producing up to 60% more energy than conventional solar panels in the same space over 25 years,<sup>3</sup> SunPower® panels help customers minimize the physical and environmental footprints of their solar solutions.

While our solar panels have a projected lifespan of up to 40 years,<sup>4</sup> we are proactively planning for their responsible recycling at end of life. In 2016, SunPower worked with the Solar Energy Industries Association (SEIA) to develop infrastructure for the first industry-wide solar panel recycling program.



“While our solar panels have a projected lifespan of up to 40 years, we are proactively planning for their responsible recycling at end of life.”

Our regenerative approach also extends to the communities we serve. Our SunPower Horizons™ program has helped inspire and educate 15,000 of tomorrow’s solar industry professionals, and we encourage SunPower employees to give back by offering dollar-for-dollar matching of their charitable donations as well as time off work to volunteer. In 2016, our team volunteered 14,300 hours, and together we gave over \$200,000 to nonprofits worldwide.<sup>5</sup>

SunPower’s sustainability leadership was recognized by the world’s leading environmental organizations. We received an A- rating from the CDP (formerly Carbon Disclosure Project) in 2016, the highest rating of any solar company. We also earned the #1 ranking and highest score ever on Silicon Valley Toxics Coalition’s 2015 Solar Scorecard.

These industry ratings reflect the ongoing innovation and hard work of SunPower’s employees, partners, suppliers and customers worldwide. We thank you for your commitment to our continuous improvement and to changing the way our world is powered.

Sincerely,



**Erin Mulligan Nelson**  
Executive Vice President

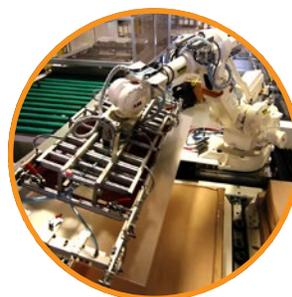
1. NREL PV Report #2K1656A, June 2016.

2. Highest of over 3,200 silicon solar panels, Photon Module Survey, Feb 2014.

3. SunPower 360W compared to a Conventional Panel on same sized arrays (260W, 16% efficient, approx. 1.6 m<sup>2</sup>), 4% more energy per watt (based on PVSyst pan files), 0.75%/yr slower degradation (Campeau, Z. et al. “SunPower Module Degradation Rate,” SunPower white paper, 2013).

4. “SunPower Module 40-Year Useful Life,” SunPower white paper. 2013. Useful life is 99 out of 100 panels operating at more than 70% of rated power.

5. SunPower matches up to \$2,500 per employee with a \$200,000 corporate cap.



## 1. SUSTAINABILITY

- Cradle to Cradle Certified™ Silver
- Declare label
- Energy payback time
- Environmentally sensitive materials
- Land use
- Water use
- #1 in SVTC 2015 Scorecard
- Industry's top CDP rating

## 2. FUTURE

- Job creation
- CO<sub>2</sub> emissions avoided

## 3. CUSTOMERS

- Leading corporate solar users
- World's longest solar-powered flight
- First PV recycling program
- LEED certification
- Water utilities

## 4. MANUFACTURING

- Triple certification in Mexico
- Cradle to Cradle Certified™ Silver
- Landfill-free certification
- Industry recognition

## 5. COMMUNITIES

- SunPower Horizons™ Program
- Solar Suitcase pilot
- GRID Alternatives
- Solar Service Station
- Product Discount Program
- Corporate giving



# POWERING SUSTAINABILITY

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- Declare label
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- Water use
- #1 in SVTC 2015 Scorecard
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**WORKING TOWARD THE WORLD'S  
MOST SUSTAINABLE SOLAR**

 At SunPower, we aim to build solar products that are as sustainable as the clean energy they produce. We accomplish this through our “beneficial by design” approach to product development where resources are conserved and kept in use as long as possible, and our Light on Land™ approach to solar farm development where we strive to preserve or restore native habitats.



## Reducing or eliminating environmentally sensitive materials

At SunPower, we are committed to ensuring that our products and components are as responsibly made as possible. We analyze every chemical used, down to 100 parts per million and SunPower panels undergo third-party toxicity testing for hazardous materials. Our E-Series and X-Series DC solar panels are free from harmful substances such as lead or cadmium and do not require hazardous waste handling procedures during the recycling process. In addition, SunPower's Supply Chain Sustainability Program works with our suppliers to help them meet our environmental, health, safety, labor, ethics and chemical content requirements.



SunPower power plant utilizing the Light on Land™ practices in Yolo County, California

## Optimizing land use with innovative products and development practices

SunPower's [Light on Land™](#) program is our signature land-use program for solar power plants. Its practices help us build on previously disturbed lands, restore native habitats, minimize disruptions and act as good neighbors to the surrounding communities.

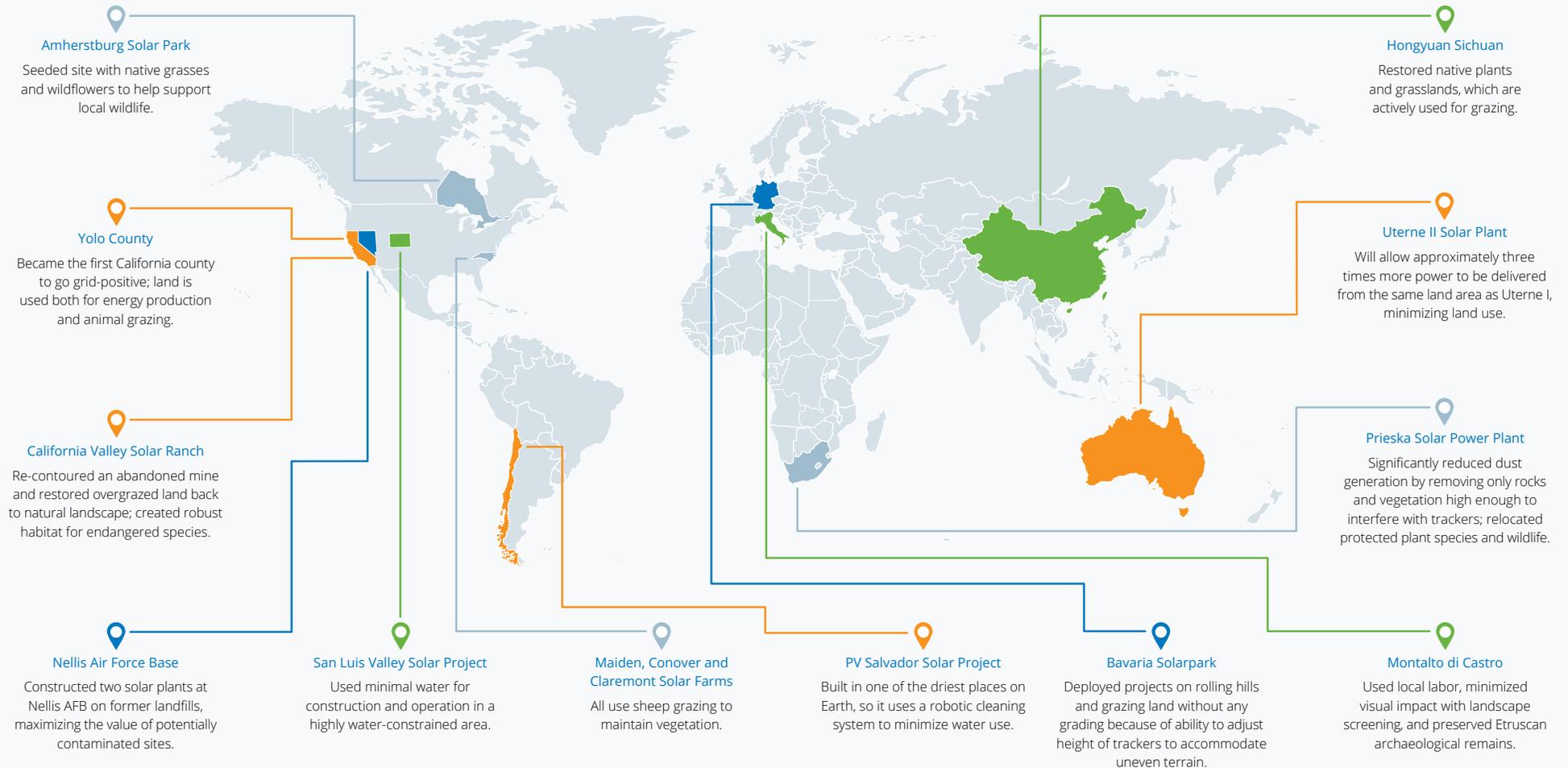
SunPower's high-efficiency [Oasis solar power plants](#) also maximize land utilization, generating 34% more energy per acre than a plant using conventional solar technology<sup>7</sup>. We build Oasis tracker rows wide enough to accommodate a tractor, with the aim of using power plant sites for both energy and agriculture. SunPower is also [partnering with the](#)

[University of California, Davis](#), a global leader in agricultural studies, to study co-location of agriculture with Oasis technology and to evaluate possible crop varieties and yield.

7. Layout optimization completed in SunPower Oasis GEO™ System. SunPower Oasis power plant with SunPower P-Series modules modeled at 0.5% annual degradation against 315W polysilicon-based generic module with 0.7% annual degradation in a generic, linked single axis tracker at 50 degree tilt.

## Achievements using the *Light on Land*™ approach

Building solar power plants with the environment in mind.





### Using robots to reduce water use

Solar equipment, especially on solar farms, needs to be cleaned regularly to remove dust and optimize energy production. SunPower's cleaning robots can handle this chore more efficiently, using 75% less water than manual cleaning.<sup>8</sup> They also work at night to avoid disrupting energy production.

### Ranked #1 on Silicon Valley Toxics Coalition 2015 Scorecard

SunPower ranked above all other solar PV manufacturers on Silicon Valley Toxics Coalition's (SVTC) 2015 Solar Scorecard. SVTC aims to ensure the solar PV industry is safe for the environment, workers and communities. Its annual scorecard scores manufacturers across 10 dimensions including recyclability, energy use, water use and toxicity.

### Secured the industry's top rating from the CDP

SunPower was the only solar company to receive an A- rating from the CDP (formerly Carbon Disclosure Project) for its 2016 environmental impacts, the highest rating in the industry. CDP is a globally used standard for emissions and energy reporting, and by proactively reporting to the CDP we aim to demonstrate our commitment to tackling climate-related risks and opportunities.

<sup>8</sup> Based on experience with robotic cleaning at actual SunPower sites, compared to data tracked by subcontracted manual cleaners utilized at a SunPower project.



# POWERING THE FUTURE

- Job creation
- CO<sub>2</sub> emission avoided



## Growing the solar industry and the economy

As the solar industry grows, so do job opportunities. According to the [2016 National Solar Jobs Census](#):



**More than 260,000** people currently work in the solar industry (three times more than in 2010)



**Solar jobs** grew by more than 20% for the fourth consecutive year, adding 51,000 jobs



**1 in 50** new U.S. jobs were in the solar industry, representing 2% of all new jobs

Additionally, while the solar industry employs its fair share of scientists and engineers, most solar jobs don't require a bachelor's degree. According to the Department of Energy the construction industry employs 40% of solar workers, with solar installers making an average of \$26 per hour according to the census.

At the end of 2016, SunPower employed over 7,000 people globally, adding 1,000 jobs and growing our workforce by 15%

since December 2013. We also provided opportunities to more than 10,000 workers through our network of 400 local dealers and installers.

## Reducing global greenhouse gas emissions

By generating electricity from the sun instead of fossil fuels, SunPower's products have avoided 27 million tons of CO<sub>2</sub> since 2006. According to estimates provided by the [U.S. Environmental Protection Agency](#), that's equivalent to the annual CO<sub>2</sub> emissions from powering 2.85 million homes (roughly the population of Chicago). And results are improving every year. In 2016 alone, installed SunPower® products avoided 7.27 million tons—equivalent to the annual CO<sub>2</sub> emissions from powering 767,000 homes (roughly the population of Seattle).





# POWERING OUR CUSTOMERS

- Leading corporate solar users
- World's longest solar-powered flight
- First PV recycling program
- LEED certification
- Water utilities

## POWERING OUR CUSTOMERS

 At SunPower, we empower our customers to generate their own clean, affordable, emissions-free electricity. In 2016, we set a new solar cell efficiency record for the industry, which enabled our customers to do even more with fewer resources—from flying around the world to running retail enterprises.

## Powering the industry's leading solar users

According to a 2016 report by [Advanced Energy Economy](#), 71% of Fortune 100 companies and 43% of Fortune 500 companies have set renewable energy or sustainability targets. SunPower is helping many of those companies meet their ambitious goals. In 2016, the majority of the [U.S.'s top 10 corporate solar users had SunPower systems](#): Apple, Hartz Mountain Industries, Macy's, Prologis, Target and Walmart.

Additionally, SunPower powers more than 500,000 households worldwide. While in the U.S. alone we power more than 100 federal, state and local government agencies; 37 colleges and universities; and 42 K-12 school districts.

## Businesses and organizations save money and reduce greenhouse gas emissions with SunPower

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*And many more like Hartz Mountain Industries, Prologis, Stanford University, Lowe's, Ford, HP, Toyota, FedEx, JCPenney, and Johnson & Johnson.*



## Powering the world's longest solar-powered flight

In 2016 the Solar Impulse 2, an airplane powered exclusively by SunPower solar cells, became the first solar plane to fly around the world. During its record-breaking 21,000-mile journey, the plane acted as a global messenger for renewable energy's power to fight climate change. The Solar Impulse team plans to use what they learned from the flight to explore new applications of clean technology solutions worldwide.

[Watch the Solar Impulse 2 in action](#)

## Creating the first photovoltaic (PV) recycling program

SunPower was one of the first solar companies to offer PV recycling options to

customers. And in 2016, we worked with the Solar Energy Industries Association (SEIA) to develop the first industry-wide PV recycling program. Together with other solar companies, we are creating a national network of recyclers who can responsibly manage PV waste and keep it out of landfills. Building this infrastructure will make it easier for customers to recycle their panels at end of life.

## Enabling customers to achieve LEED certification

SunPower helps builders and businesses earn additional LEED points because our direct current E-Series and X-Series panels are Cradle to Cradle Certified™ Silver and our packaging materials are recyclable or reusable, which reduces construction waste. On a typical commercial system<sup>9</sup>



SunPower panels contribute up to 35% of the credits required for LEED certification. In fact, organizations can achieve up to 14 more LEED points with SunPower panels.

9. A typical project assumes core and shell or major renovation with at least 10% of the energy offset by solar, sufficient products to qualify for Material and Resource categories, and 33% of the hardscape covered with solar, or other heat island reducing coverings.



San Francisco Exploratorium

### **Net-Zero Building**

SunPower helped the San Francisco Exploratorium achieve its vision of building a net zero facility. A 1.3-megawatt SunPower rooftop system now generates about 80% of the power for the museum, which is certified LEED Platinum®.

### **Reducing water-related energy costs and emissions**

It takes a lot of energy for a utility to produce potable water and deliver it to customers. The cost of that electricity has been increasing in many parts of the country. When the Phelan Piñon Hills Community Services District (PPHCSD) in San Bernardino County, Calif., saw its electricity bill increase by more than

\$300,000 in two years, it worked with SunPower to turn a retired dairy farm into a 1.5-megawatt solar site. This site now produces enough energy to offset 40% of the district's water-related electricity costs. By using clean energy, each year PPHCSD avoids CO<sub>2</sub> emissions equivalent to burning 2.5 million pounds of coal—enough to power 245 homes for one year.



# PIONEERING SUSTAINABLE MANUFACTURING

- Triple certification in Mexico
- Cradle to Cradle Certified™ Silver
- Landfill-free certification
- Industry recognition

## PIONEERING SUSTAINABLE MANUFACTURING

 At every step of the product lifecycle, from manufacturing to end of life, we work to minimize resource usage and maximize environmental benefits.



### Achieving our first triple certification in Mexico

SunPower's Mexicali, Mexico, plant became our first manufacturing facility to be "triple certified" by earning three of the industry's most stringent and prestigious certifications: Leadership in Energy and Environmental Design (LEED) from the U.S. Green Building Council, Landfill-Free Verification from NSF Sustainability, and the Cradle to Cradle Certified™ Silver product standard from the Cradle to Cradle Products Innovation Institute.



The Mexicali facility:

- Attained LEED Gold certification from the U.S. Green Building Council in August 2016. It is the only manufacturing facility in Mexico to be LEED-EBOM Gold-certified (LEED for Existing Buildings: Operations & Maintenance). The facility also earned the fourth-highest LEED score among the 56 LEED-certified manufacturing facilities in Mexico.
- Earned Landfill-Free Verification from NSF Sustainability in August 2015. The facility was the first of any industry in Mexico to be third-party verified as landfill-free.
- Has been producing Cradle to Cradle Certified™ Silver direct current E-Series and X-Series solar panels since 2014.



### Expanding Cradle to Cradle manufacturing

In 2014, SunPower was awarded the prestigious Cradle to Cradle Certified™ Silver distinction by the Cradle to Cradle Products Innovation Institute for panels manufactured in Mexicali, Mexico. By the end of 2016, 100% of our direct current E-Series and X-Series panels—manufactured in our four facilities in Mexico, France and the Philippines—carried this certification. Unlike single-attribute eco-labels, Cradle to Cradle Certified is a comprehensive product quality standard that evaluates product design, manufacturing and sourcing practices as well as corporate citizenship and ethics principles.



### Making more facilities landfill-free

At the end of 2015, SunPower facilities in De Vernejoul and Toulouse, France, joined the Mexicali facility in earning landfill-free verification from NSF Sustainability. This certification means these three facilities divert more than 99% of their waste, with 1% or less going to landfills.



### Increasing our LEED-certified footprint

The Mexicali facility was SunPower's latest site to earn LEED certification. The others include our LEED Gold-certified headquarters in San Jose, Calif., a LEED Platinum-certified administration building and a LEED Gold-certified manufacturing facility in Malaysia, and a LEED Platinum-certified regional operating headquarters in the Philippines. LEED is the international standard of excellence in green building, and assesses design, construction, operation and maintenance.



Cradle to Cradle Certified™ Silver E-Series and X-Series DC panels were recognized as a 2016 Environmental Leader Product of the Year



SunPower received the industry's top rating in 2016 from the CDP (formerly Carbon Disclosure Project)



Won the 2015 Guardian Sustainable Business Award for innovation in the Net Positive category, recognizing our operation's unique focus on environmental and social impacts



Earned the #1 ranking and highest score ever on the Silicon Valley Toxics Coalition's 2015 Solar Scorecard



Recognized as one of Green Builder's 2015 Eco-Leaders



Won a 2015 Patents for Humanity award from the U.S. Patent and Trademark Office for our contributions to the Solar Service Station (3S) project



# EMPOWERING OUR COMMUNITIES

- SunPower Horizons™ Program
- Solar Suitcase pilot
- GRID Alternatives
- Solar Service Station
- Product Discount Program
- Corporate Giving

## EMPOWERING OUR COMMUNITIES

○ According to the International Energy Agency, nearly 1 in 5 people worldwide do not have access to electricity. SunPower is pioneering new programs that not only help individuals obtain safe, affordable electricity, but also bring new jobs and revenue sources to underserved communities. Additionally, we are using these programs to educate young people about global energy needs while giving them the science, technology, engineering and math (STEM) skills they'll need to become tomorrow's solar industry innovators.

## Educating the next generation of solar industry innovators

### SunPower Horizons™ Program

Since 2008, we've reached more than 15,000 students through our [SunPower Horizons™ program](#), our hands-on education program to prepare K-12 and college students for careers in the clean energy sector. All SunPower school district customers have free access to this program, the most substantive in the industry. In 2015 and 2016, we reached 6,000 students through the SunPower Horizons Program and doubled the number of [Summer Solar Energy Academies](#), reaching 450 students through an intensive, week-long learning experience.



### Solar Suitcase Pilot

In 2016, we completed a [one-year pilot program](#) with We Care Solar, which brought together SunPower employees, teachers and secondary students in Yolo County, Calif., to create We Share Solar® Suitcases. More than 250 students built a total of 60 solar suitcases, which will provide rural schools and underserved communities in the Philippines with safe and reliable electricity sources.

## Providing energy to those in need



\$28M 

SunPower contributes products and volunteer hours to GRID Alternatives, an organization that with SunPower support has provided 1,022 low-income families with an estimated \$28 million in expected savings on electricity over 25 years.

### In the US: GRID Alternatives

In 2016, SunPower announced a three-year extension of our partnership with GRID Alternatives, the nation's largest nonprofit solar installer, to support their new Solar Futures education program for K-12 students. Our partnership has brought solar power to 1,022 families in need since 2006. With a combined 3.57 megawatts of solar installed, these families are expected to save \$28 million over 25 years. In addition to donating SunPower products, we also donate our time—SunPower employees have volunteered 97,000 hours on installations since 2013. Through the partnership, GRID Alternatives has also provided solar installation training to more than 21,000 individuals.



## In the Philippines: Solar Service Station (3S)

SunPower's Solar Service Station (3S) [pilot program](#) brought safe, clean and affordable lighting to more than 1,000 impoverished residents of Smokey Mountain, a massive garbage site in Manila, Philippines. Residents go to the 3S units—portable, solar-powered structures—to rent rechargeable solar lanterns for half the price of candles or kerosene lamps. Local partner organizations lead daily operations and maintenance, providing jobs and training for the community. 3S is modular, self-sustaining and easily scalable to other communities.

SunPower won a 2015 [Patents for Humanity](#) award from the U.S. Patent and Trademark Office for our contributions to the 3S project.



[Watch the Video >](#)



One 3S storefront provides seven jobs, serves 300 families and positively impacts 1,000 people.



Smokey Mountain residents previously spent 35% of their \$1.00-3.00 daily earnings on candles and kerosene.



Rechargeable solar lanterns are 50% cheaper than candles or kerosene.



Smokey Mountain residents have more money for food, necessities and more hours to read, sew, study and work.



### Making solar more affordable for educators

SunPower's Product Discount Program enables universities and qualified organizations to purchase SunPower products at a significant discount for educational purposes and community-related projects. For example, this program served many teams from the U.S. Department of Energy's [2015 Solar Decathlon](#). We reinvest these proceeds to strengthen the 3S and We Share Solar suitcase programs.

### Engaging SunPower employees in philanthropy

SunPower encourages employees to give their time and money to the causes that matter to them. The SunPower Foundation offers dollar-for-dollar matching of employees' donations to their favorite causes. In 2016, employee donations and SunPower matching funds together provided approximately \$270,000 to 250 nonprofit organizations. SunPower gives all U.S. employees three days off from work to volunteer each year, and we provide a

\$270K 

In 2016, employee donations matched by SunPower totaled \$270,000, helping 250 nonprofit organizations.

comprehensive global volunteer program with regular events at all sites. In 2016, SunPower employees volunteered more than 14,300 hours for 90 nonprofits, nearly doubling our corporate goal of 7,500 hours. Their work benefited official SunPower partners including GRID Alternatives and We Care Solar, as well as local community organizations such as food banks, children's shelters and conservation groups.



Protecting the environment isn't always easy, but it's well worth the effort. SunPower salutes all those working hard to build a brighter future—no matter the obstacles. We're inspired by the perseverance and boundless optimism of others, and we remain committed to changing the way our world is powered.

Visit [sunpower.com/sustainability](https://sunpower.com/sustainability)

DEMAND BETTER SOLAR™

SUNPOWER®