solaredge

# Commercial Offering for Solar Investors & System Owners

# About SolarEdge

## About us

In 2006, SolarEdge invented an intelligent inverter solution that has changed the way power is harvested and managed in PV systems. Today, we are a global leader in smart energy technology. By deploying world-class engineering capabilities and with a relentless focus on innovation, we create smart energy products and solutions that power our lives and drive future progress.

## Vision

We believe that continuous improvement in the ways we produce and consume energy will lead to a better future for us all

## Bankability

- SolarEdge has been audited and approved by major banks and financial institutions for projects and funds worldwide
- SolarEdge (SEDG) is traded on NASDAQ
- Our financial strength and stability, combined with our cutting-edge technology, has propelled us to become one of the largest inverter manufacturers in the world

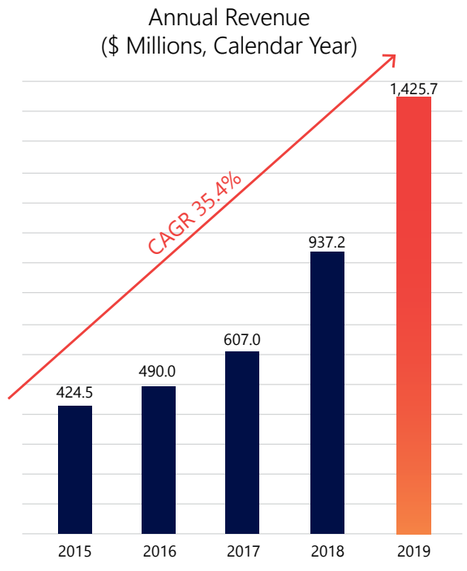
## Global reach

- Systems installed in over 130 countries across five continents
- Sales via leading integrators and distributors
- Follow the sun call centers
- Local teams of sales, service, marketing, and training experts
- Global manufacturing capabilities with tier 1 electronic manufacturing service companies

Received nearly 30 awards from prestigious organisations including Red Herring, Frost & Sullivan, Intersolar, the Stratus Award, and the Edison Awards™

## Shipping since 2010

- Over 2.5 million inverters and 60 million power optimisers shipped worldwide
- SolarEdge's monitoring platform continuously tracks over a million installations across the globe




## Corporate social responsibility

- As an industry leader in renewable energy technologies, SolarEdge strives to limit the harmful effects of traditional energy sources by promoting the spread of clean, sustainable energy around the world
- SolarEdge is in full compliance with international standards on quality and control, ethical conduct and environmental protection

## Patents

SolarEdge has a vast portfolio of intellectual property, with hundreds of awarded patents and patent applications

## Product reliability

- 25-year power optimiser warranty and 12-year inverter warranty, extendable to 20 years
- SolarEdge products and components undergo rigorous testing, and have been evaluated in accelerated life chambers
- Reliability strategy includes proprietary application specific ICs (ASIC)

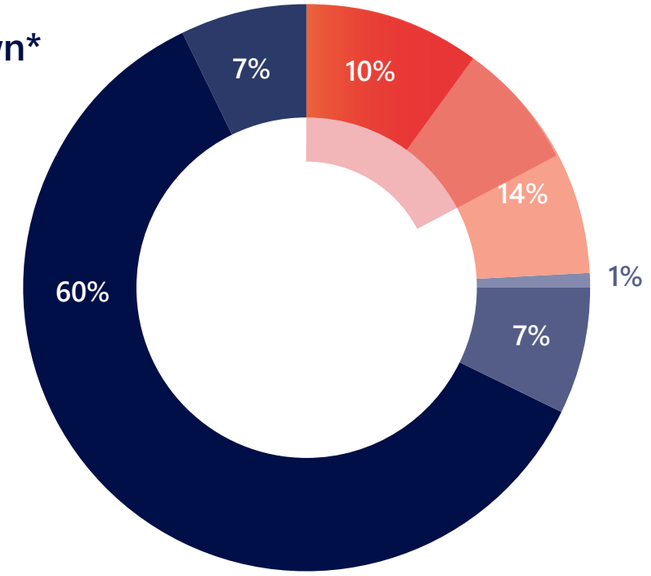
# The Importance of Inverter Selection

## Commercial rooftop installation cost breakdown*

**Inverters account for less than 10% of the system cost but,**

- Manage 100% of system production
- Influence up to 20% of system cost
- Control O&M expenses through PV asset management solutions

Therefore, the inverter selection is critical for the long term financial performance of a PV system as it can maximise energy production and reduce lifetime costs.

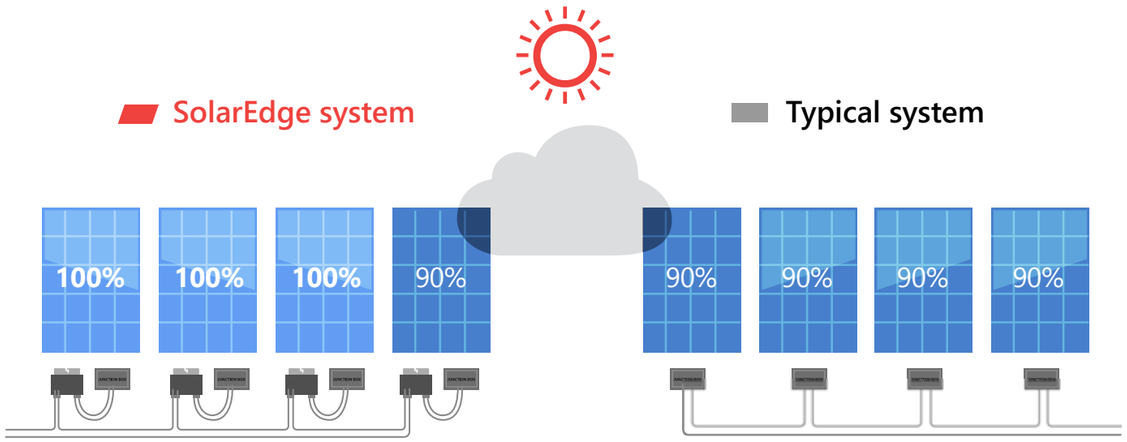



* Based on SolarEdge market analysis, assuming total cost of ~€1/Wp

# Increased Revenue

## Maximum energy from each panel

In a PV system, each panel has an individual maximum power point. Differences between panels are unavoidable in commercial installations. With traditional inverters, the weakest panel reduces the performance of all panels. **With SolarEdge, each panel produces the maximum energy, and mismatch-related power losses are eliminated**.




- Maximum power produced and tracked from each panel individually
- 2%-10% more energy from the PV system

- Weak panels reduce the performance of all panels in the string or are bypassed
- Power losses due to panel mismatch

## Power losses can result from multiple factors, including:

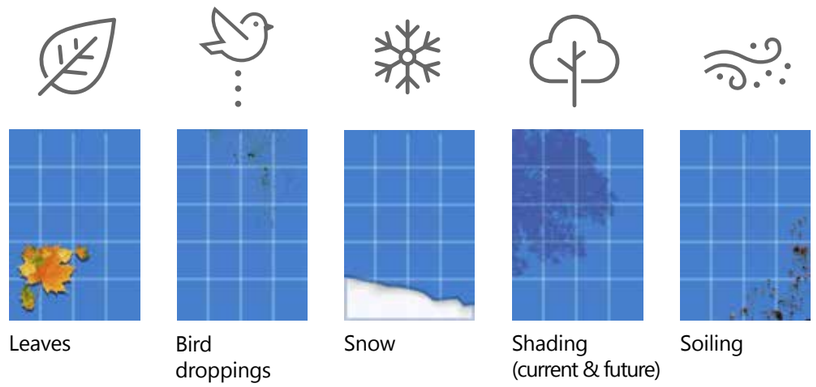
### Manufacturing tolerance mismatch

The warranted output power range for PV panels received from a manufacturing plant may vary greatly. A standard deviation of ±3% is sufficient to result in ~2% energy loss.

Guaranteed power output from panel manufacturers
**0~+3%**

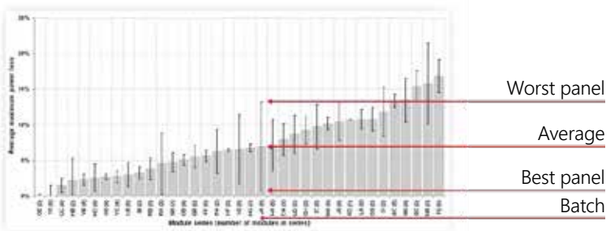
### Soiling, shading and leaves

Panel soiling, from dirt, bird droppings or snow, contributes to mismatch between panels and strings. While there may be no obstructions during site design, throughout a system's lifetime, a tree may grow or a structure may be erected that creates uneven shading.

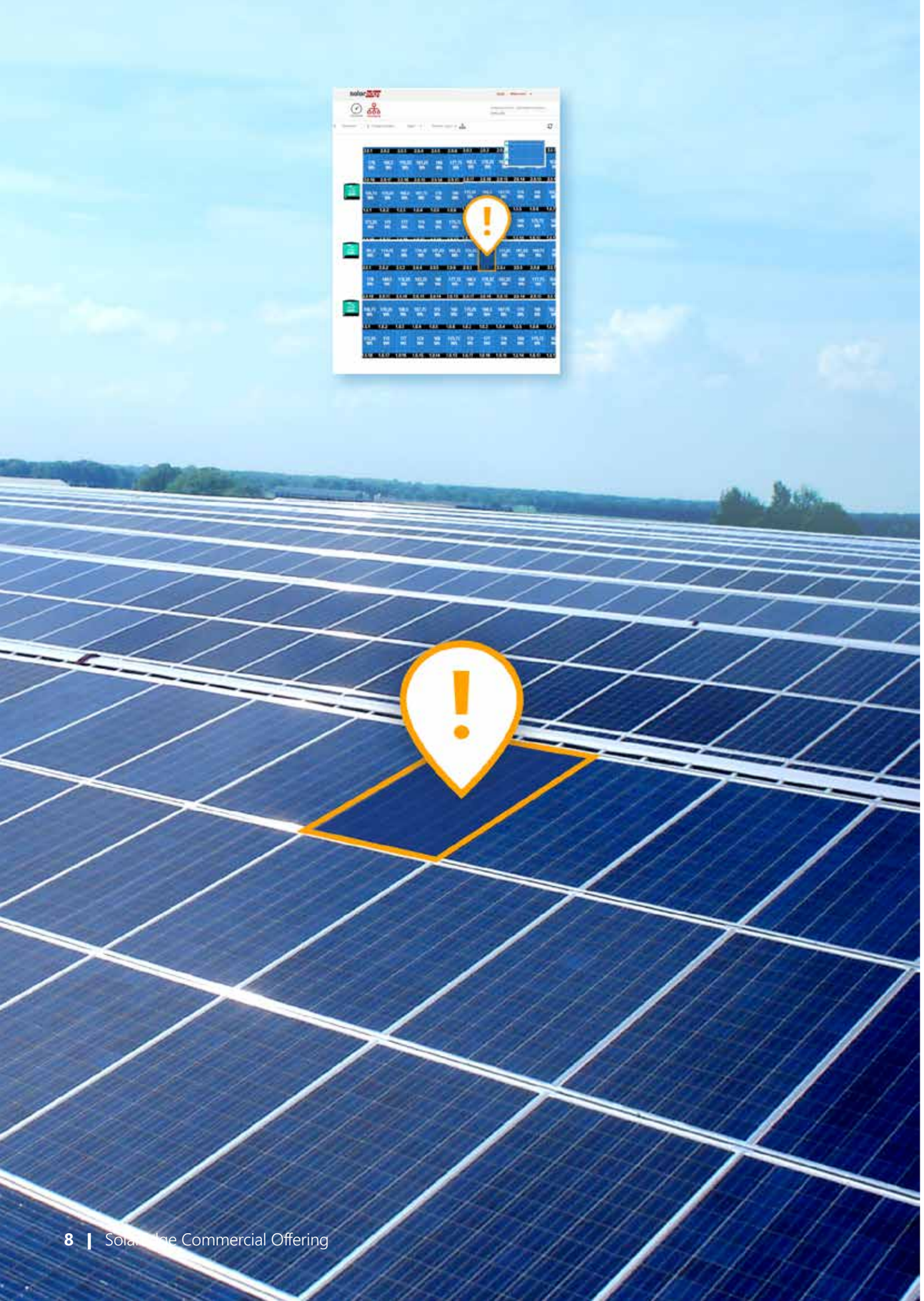



### Uneven panel aging

Panel performance can degrade up to 20% over 20 years, however, each panel ages at a different rate, causing aging mismatch, which increases over time.




Source: A. Skoczek et. al., "The results of performance measurements of field-aged c-Si photovoltaic panels", Prog. Photovolt: Res. Appl. 2009; 17:227–240



# Advanced Asset Management

## Full visibility of your system's performance

- Full visibility into your assets through panel-level monitoring – free for 25 years
- Automatic alerts on system issues, pinpointed on a virtual site map

## Anytime, anywhere

- Complete system status on your mobile device (iOS or Android)

## Future compatibility and warranty

- 25-year power optimiser warranty; 12-year inverter warranty; Low cost warranty extension to 20 years
- A variety of panel models can be used for future replacement and extension
- For agricultural areas – products are certified for ammonia resistance


## For system lifetime

- Automatic performance reports
- Remote troubleshooting and enhanced maintenance capabilities


# Superior Safety

With millions of photovoltaic (PV) systems installed worldwide, this technology is designed to be relatively safe and reliable. However, as traditional PV installations can reach voltages as high as 1,500VDC, precautions should be taken to ensure the safety of people and assets. With traditional inverters, shutting down the inverter or the grid connection will terminate current flow, but DC voltage in the string cables will stay high for as long as the sun is shining. In addition, electrical arcs, which can result in a fire, create a threat to people and assets in the vicinity of the PV system.

**The SolarEdge system provides a superior safety solution for both electrocution and fire risks.**

## SafeDC™

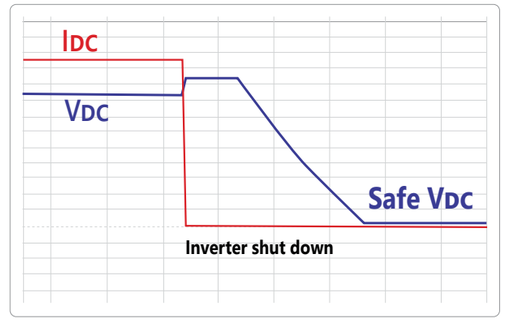
SafeDC™ is a built-in panel-level safety feature which minimises electrocution risk.
To maintain string voltage below risk levels, power optimisers are designed to automatically switch into safety mode, in which the output voltage of each panel will be reduced to 1V in either of these cases:

- During installation, when string is disconnected from the inverter, or the inverter is turned off
- During maintenance or emergency, when the inverter or AC connection is shut down
- When the thermal sensors of the power optimisers detect a temperature above 85 ˚C

The SolarEdge SafeDC™ feature is certified in Europe as a DC disconnect according toIEC/EN 60947-1 and IEC/EN 60947-3 and to the safety standards VDE AR 2100-712 and OVE R-11-1.

## Arc fault detection and interruption

SolarEdge inverters have a built-in protection designed to mitigate the effects of some arcing faults that may pose a risk of fire, in compliance with the UL1699B arc detection standard. Currently there is no comparable arc detection standard in the EU and therefore non-US SolarEdge inverters can detect and interrupt arcs as defined by the UL1699B standard. In addition to manual restart, a mechanism for auto-reconnect can be enabled during system commissioning.




This graph represents an automatic string shutdown.

As demonstrated, the current is shut down immediately once AC power or Inverter is turned off. The string voltage is reduced to safe voltage.

The SolarEdge safety solution also meets FM Global DS 1-15 engineering requirements.

# 21GW of Systems Shipped Worldwide

## Ground mounts

## Industrial rooftops

## Farms and agriculture

## Public buildings

## Carports, floating systems and safety

# Ground Mounts

Turkey, 5MW

Denmark, 2MW

Ground and roof mounted

France, 2.7MW

Ground and roof mounted

FL, United States, 1MW

# Industrial Rooftops


The Netherlands, 2MW

ZONNEGILDE
Duurzame energie op maat

Italy, 1.3MW

ELETTRONORD

United Kingdom, 1.63MW

Western International Market, London, The installation won the 2015 Annual European Energy Service Awards for 'Best Energy Project'

Sunstruck Energy

NJ, United States, 525kW

amberjack solar energy

# Agricultural Rooftops

Denmark, 1.22MW

The Netherlands, 303kW

Israel, 700kW

South Africa, 250kW

# Carports

**The Netherlands, 3MW**
39 Electric Car Charging Stations

FASTNED

**Germany, 1MW**
Carport of TSG Hoffenheim Stadium, Sinsheim

WIRSOL

**OH, United States, 335kW**
Honda Motorcars, Ohio

DOVETAIL Solar and Wind

**United Kingdom, 150kW**
John Lewis car park, Exeter

SunGift ENERGY

# Schools

## Singapore, 1MW

American School

## The Netherlands, 303kW

De Meerwaarde, Barneveld

## United Kingdom, 250kW

United Kingdom, 250kW


## United States, 756kW

Farmington Central School District #265, Illinois

# Fire Stations

## United Kingdom, 700kW on 15 sites

Hampshire Fire and Rescue Service

"Fire precautions and revenue reduction are important factors for all Hampshire County Council projects. We have standardised our Solar PV solution for the whole estate in order to isolate the PV energy in fire alarm events"

> Paul Roebuck MIET, Engineering Manager, Hampshire County Council

## United States, 42kW

Putnam Lake Fire Department, New York

"I am truly proud of this installation, Putnam Lake Fire Department & New York State Solar Farm Inc. have set the standard of what is possible in a community that wants to take control of its energy future using quality products and a great local installer.  The best part is that this fire station will be a training facility for other first responders about PV safety."

> Anthony Sicari Jr., CEO of New York State Solar Farm Inc.

# Petrol Stations


## Israel, multiple 50kW

Petrol stations

"We have been working with the SolarEdge solution for commercial systems for a long time, and when we were asked as advisors for Dor Alon petrol stations to recommend a PV solution, SolarEdge was the obvious choice, not only for the added yields it provides, but also because of the comprehensive safety solution it offers, which is particularly important in this kind of installation."

> Eyal Baharav, Owner, Golan Solar

## South Africa, 20kW

Port Elizabeth

"Without SolarEdge's SafeDC™ technology, the installation would not have been approved and we would have missed out on this important business opportunity."

> Barry Davis, Director, Kwikelec

# Health Care


South Africa, 100kW

3 NHC health care centers

United States, 220kW

Kuakini hospital, Hawaii

United Kingdom, 32kW

Birds Hill nursing home

# Floatovoltaic Systems

## The Netherlands, 780kW

De Krim Holiday Resort, Texel Island

"De Krim Resort invested in a solar PV system to be environmentally friendly and generate our own electricity. Thanks to asset reuse, high performance, and a positive impact on water quality, the floating installation is expected to far exceed the estimated return on our investment."

> Iwan Groothuis, Managing Director, De Krim Resort

## The Netherlands, 232kW

Everstekoog Sewage Treatment Plant, De Koog

"The use of floating solar PV at water treatment facilities that have available water bodies and need to use electricity for water treatment operations is gaining traction. The floating solar park at the Everstekoog water treatment site powers all public street lamps (LED) on Texel Island."

> Nicol Schermer, Manager, Texel4trading

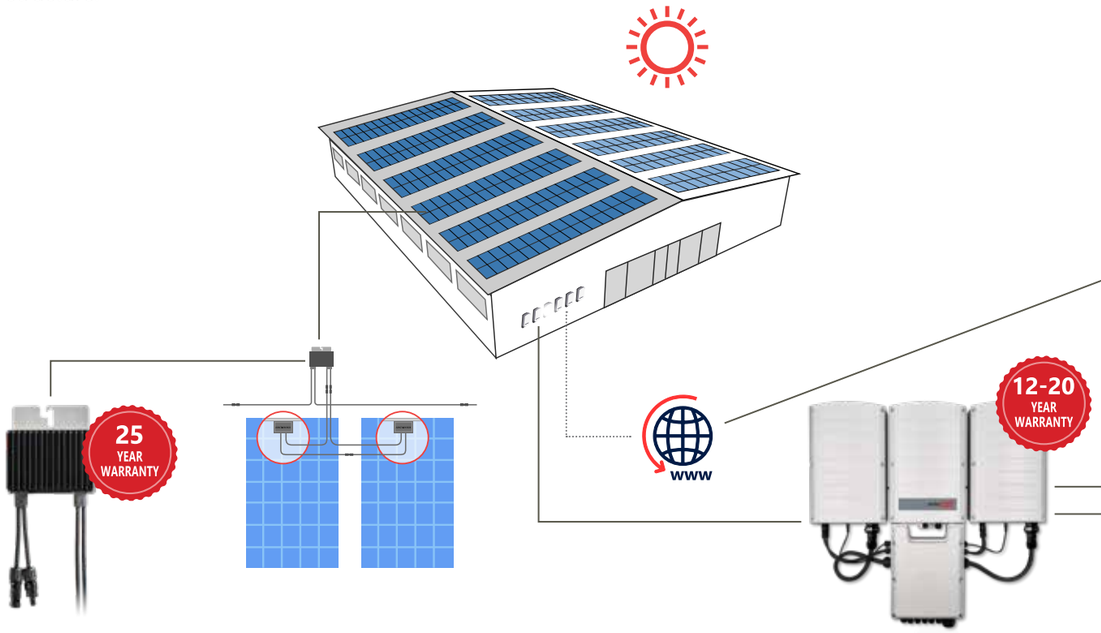
## United States, 386kW

Far Niente Winery, California

The 386kW installation, partially ground-mounted and partially floating on pontoons atop the winery's irrigation pond, has become a net-zero energy establishment. The floating system enables the winery to preserve nearly an acre of vineyard land, and helps to reduce the amount of water lost to evaporation by shading the previously uncovered pond.

# Commercial System Diagram

The SolarEdge solution consists of inverters, power optimisers, and a monitoring platform. The technology provides superior power harvesting and panel management by connecting power optimisers at the panel level. The ability to connect two or four panels to just one power optimiser, combined with DC to AC conversion and grid interaction being centralised at a simplified PV inverter, maintains a competitive cost structure.




## 2:1 power optimiser configurations

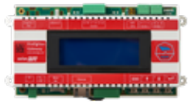
- Panel-level MPPT - no mismatch power losses
- Strings of uneven lengths, panels on multiple azimuths and tilts
- Compatible with SolarEdge inverters SE15K and larger
- SafeDC™ - automatic panel-level safety shutdown

## 15kVA - 100kVA inverters

- Specifically designed to work with power optimisers
- High efficiency
- Simple and reliable


## Monitoring platform

- Full visibility of system performance
- Access via browser or any Android, iOS smart phone or tablet
- Automatic performance and alert reports

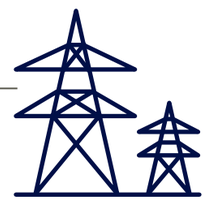


## Firefighter gateway

- Can be added to the PV system to provide centralised safety management
- Gives real-time indication of the system's DC voltage

## Performance monitoring

Calculate site performance ratio and measure environmental conditions, using environmental sensors or a satellite-based service.



## Grid interaction

Supports power control, e.g. zero export limitation, local and remote active/reactive power control, inverter AC relay control for secondary grid protection; low voltage and frequency ride through

# UK Council Testimonials

"Fire precautions and revenue reduction are important factors for all Hampshire County Council projects. We have standardised our Solar PV solution for the whole estate, and are able to automatically isolate the PV energy outside of the building on the roof if a Fire Alarm event occurs. This ensures the internal electrical services can be safely turned off for fire fighting saving buildings quickly.

"Hampshire County Council can reassure the Fire Service that the building is safe for their activity using the fire alarm interface and the Firefighters gateway supported with diagrams of where the PV is fitted.

"The interfacing of the Inverters to standby generators is critical in the event of power supply failure where a generator may start and electrically damage inverters in both generator and PV.

The online monitoring and ability to view individual panels means that PV performance and yield can be clearly seen, and maintenance (if needed) targeted at the right time. Hampshire County Council haven't cleaned any panels yet, we check for the next rain cloud !

If the PV should be accidentally turned off or stop working, we get an Email so we can get the PV generating again fast. The "on line" interface also provides the ability to view the generation meter reading saving another phone call or a visit.

Low maintenance and staff support means low revenue cost and more generation efficiency".

"Wycombe District Council installed 99.9 kWp of solar panels on our Council Offices with SolarEdge Technology in October 2015. The system has been running successfully since that date, without any problems. The major benefit is the on-line monitoring system that allows us to monitor the performance. An added safety benefit that is really important to us is the ability to shut down the system to a safe voltage for maintenance and firefighting purposes".

"Bridgend County Borough Council have specified SolarEdge on a number of projects which include their Civic Centre Offices in the centre of Bridgend and a number of In House designed Primary Schools under the 21st Century for Schools Programme.

"When specifying Photovoltaic systems the designer chose to include power optimisers connected to the panels which would alleviate the risks associated with generating DC voltages, maximise the systems efficiencies whilst offering remote monitoring which will assist in the systems future operation and maintenance".

"Safety is of high priority when it comes to public buildings that Exeter City Council are responsible for, this is also the case when connecting Solar PV. Sungift Solar, who have installed all our PV systems, specify SolarEdge inverters which provide exceptional quality and safety benefits. Including, a 12 year warranty as standard, improved output and panel optimisation, excellent monitoring platform and importantly the ability to significantly reduce the risks of electrocution. The Safety benefits, including being able to Isolate the high DC voltage coming from the solar panels, are very important to us when it comes to safety of the public. We are reassured and confident by having SolarEdge we can isolate the DC coming from the solar panels on the roof at an accessible point. We take safety very seriously as solar installations become more frequent. Exeter City Council chooses SolarEdge for the added performance and the monitoring system that's included. This reduces maintenance costs for the life of the system which can be expensive, and together with the safe DC function makes SolarEdge our preferred choice of inverter selection".

SolarEdge is a global leader in smart energy technology. By leveraging world-class engineering capabilities and with a relentless focus on innovation, SolarEdge creates smart energy solutions that power our lives and drive future progress.

SolarEdge developed an intelligent inverter solution that changed the way power is harvested and managed in photovoltaic (PV) systems. The SolarEdge DC optimised inverter maximises power generation while lowering the cost of energy produced by the PV system.

Continuing to advance smart energy, SolarEdge addresses a broad range of energy market segments through its PV, storage, EV charging, UPS, and grid services solutions.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