

# SOLAREDGE COMMERCIAL SOLUTIONS FOR INCREASED REVENUE & ADVANCED ASSET MANAGEMENT



## 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. Since beginning shipments in 2010, SolarEdge has shipped more than 4.2GW of its DC optimized inverter solution and its products have been installed in PV systems in 102 countries. SolarEdge is traded on the NASDAQ under the SEDG symbol.

#### Vision

- > For every solar panel to be individually managed by DC-DC panel-level electronics
- > To accelerate the pace toward grid parity and make clean energy affordable and widespread

#### Bankability

- Bankable in major European and North American solar financing institutions and banks
- > Publicly traded on NASDAQ as SEDG

#### Global Outreach

- > Products sold in 50 countries
- > Sales via leading integrators and distributors
- > Follow the sun call centers
- > Local expert teams
- > Global manufacturing with tier 1 electronic manufacturers



INNOVATION GUARANTEED

### Business Figures

- > 15,400,000 power optimizers and over 633,000 inverters shipped worldwide
- Monitoring system continuously tracks over 374,000 PV installations

#### Annual Revenue



#### **Product Reliability**

- > Long product warranties: 25-year power optimiser warranty and 12-year inverter warranty, extendable to 20 or 25 years
- > Each SolarEdge product and component undergoes rigorous testing
- > Products and components have been evaluated in accelerated life chambers
- Reliability strategy includes proprietary application specific ICs (ASIC)

84 awarded patents and 123 additional patent applications

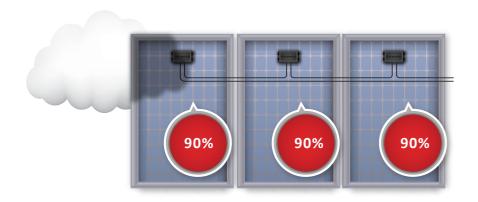
## The Importance of Inverter Selection



#### Increased Revenue

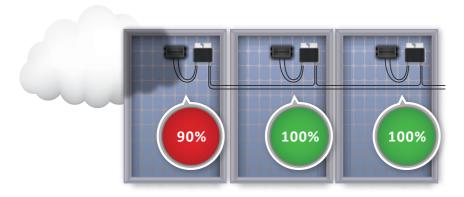
#### MAXIMUM ENERGY FROM EACH PANEL

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.



#### **Traditional Inverter**

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



#### SolarEdge System

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

#### 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 & Leaves

Panel soiling, from dirt, bird droppings or other obstructions, 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.







Soiling

Bird droppings

Leaves

#### **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 modules", 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 system lifetime
- > Automatic alerts on system issues, pinpointed on a virtual site map

#### Anytime, anywhere

> Complete system status on your mobile device





#### Future compatibility and warranty

- > 25-year power optimizer warranty; 12-year inverter warranty;
- > Any panel model can be used for future replacement & 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 around the world, 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.

Traditional string or central inverters are limited in the safety level they offer installers, maintenance personnel and firefighters. Shutting down the inverter or the grid connection will terminate current flow, but electrocution risk remains, since DC voltage in the string cables will stay high for as long as the sun is shining.

In addition, the possibility of electrical arcs, which can result in a fire, creates a threat to the asset on which the PV system is installed, as well as to people who live or work in the vicinity of the PV system.

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

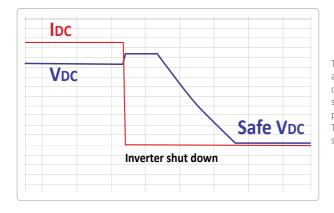
#### SAFEDC™

SafeDC™ is a built-in panel-level safety feature which minimises electrocution risk. During installation or when the grid or inverter is shut down (including during maintenance), power optimisers are designed to automatically switch into safety mode, in which the output voltage of each panel will be reduced to 1V. String voltage will be maintained below risk levels. For example, if 19 power optimisers are connected in series, the string voltage will be 19V.

Panel-level shutdown is designed to occur automatically in either of these cases:

- > During installation, as long as the string is disconnected from the inverter, or the inverter is turned off
- > During maintenance or emergency, when the inverter is turned off or when the AC connection of the building 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 to IEC/EN 60947-1 and IEC/EN 60947-3 and to the safety standards VDE AR 2100-712 and OVE R-11-1.

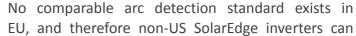


This graph represents an automatic string shutdown. As demonstrated, the current is shut down immediately once AC power or Inverter is turned off. The string voltage is reduced to safe voltage.

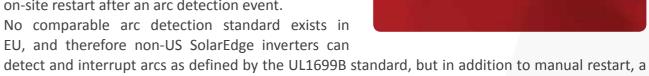
#### ARC FAULT DETECTION AND INTERRUPTION

Solar Edge 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.

The US standard, which came into effect as part of NEC2011, includes requirements for serial arc detection (i.e. arcs within the string) and for manual, on-site restart after an arc detection event.



mechanism for auto-reconnect is enabled.





## 4.2GW OF SYSTEMS SHIPPED WORLDWIDE

#### **GROUND MOUNT**



**INDUSTRIAL ROOFTOPS** 



#### **FARMS & AGRICULTURE**



**PUBLIC BUILDINGS** 



**CARPORTS & SAFETY** 



## **GROUND MOUNT**









## **INDUSTRIAL ROOFTOPS**







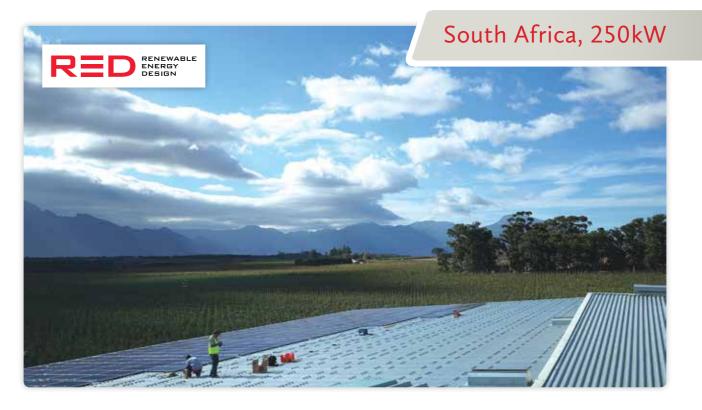


## AGRICULTURAL ROOFTOPS







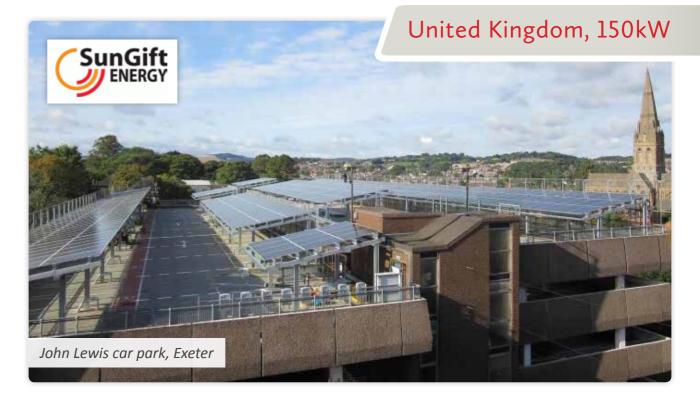


## Featured References CARPORTS









## Featured References SCHOOLS









## FIREFIGHTER STATIONS









"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



"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.

## Featured References GAS 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 gas 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



"Without SolarEdge's SafeDC $^{\text{TM}}$  technology, installation would not have been approved and we would have missed out on this important business opportunity."

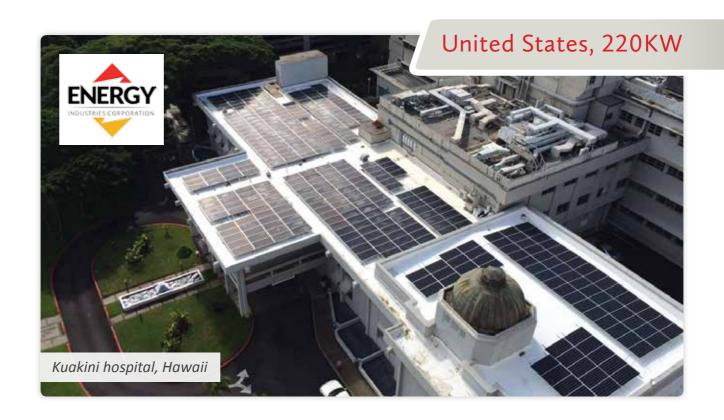
> Barry Davis, Director, Kwikelec

## Featured References HEALTH CARE





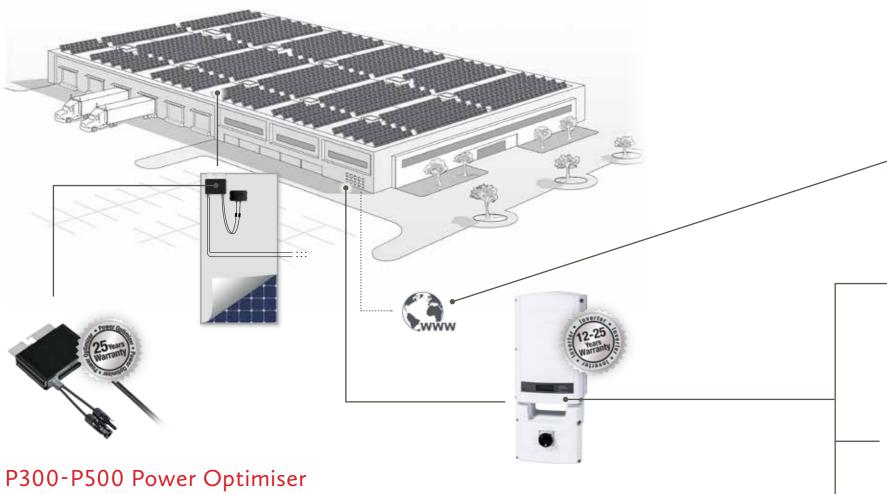






## Commercial System Diagram

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



## Configuration

Panel-level MPPT – no mismatch power losses Compatible with all SolarEdge inverters SafeDC<sup>™</sup> – automatic panel-level safety shutdown

#### 10kVA - 27.6kVA Inverter

Lower cost compared to traditional inverters High efficiency Simple and reliable

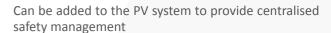


Full visibility of system performance

Access via browser or any Android, iOS smart phone or tablet

Automatic performance and alert reports

#### Firefighter Gateway



Gives real-time indication of the system's DC voltage

### Smart Energy Management

Increasing self-consumption by export limitation and consumption-monitoring

#### **Environmental Sensors**

Connection of environmental sensors for advanced site monitoring to calculate site performance ratio and environmental conditions





The SolarEdge DC optimized inverter maximizes power generation at the individual PV module-level while lowering the cost of energy produced by the PV system for a higher return on investment.

By connecting power optimizers to each module, the system enables superior power harvesting and module management. Enhanced PV asset management including reduced O&M costs are enabled through module-level monitoring and remote troubleshooting. Another benefit is the automatic DC shutdown, for installer, maintenance personnel, and firefighter safety, through the SafeDC™ mechanism.

SolarEdge is a bankable, top 10 global inverter manufacturer, with more than 4.2GW of our systems installed in 102 countries worldwide.

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