SolarEdge Commercial Offering

2013

SolarEdge at a Glance

- Established the DC power optimizer segment and leads it with a market share of over 70%
- Over 1,800,000 power optimizers shipped to over 40 countries
- More than 68,000 inverters shipped
- Quarterly run rate above 100MW
- Utility, commercial and residential solutions
- Strategic partnerships across the PV value-chain from module manufacturers to integrators

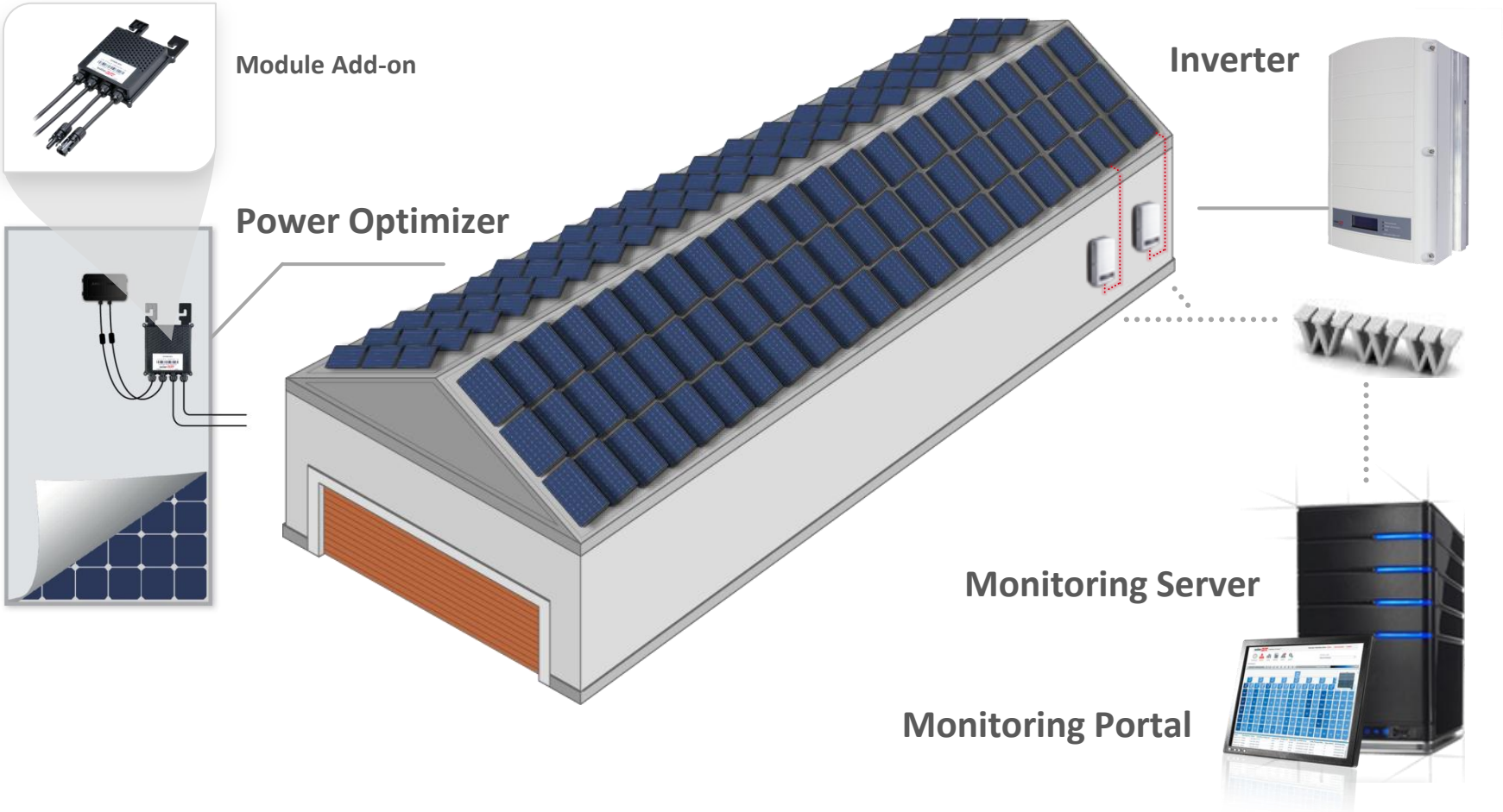
Agenda

- SolarEdge Commercial Solution Benefits
- Profit Calculation
  - Lifetime Cost
  - Lifetime Energy Produced
- SolarEdge Commercial Product Offering
- Case studies

SolarEdge Commercial Solution Benefits

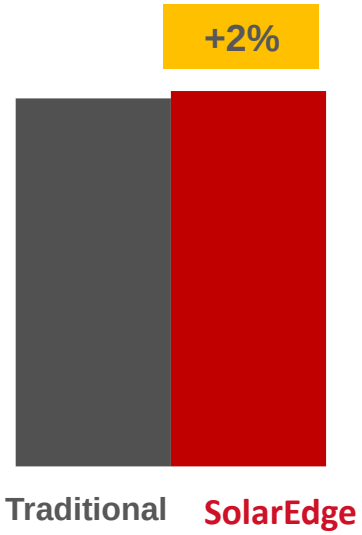
SolarEdge System Overview

- Module level optimization
- Fixed voltage – flexible design
- Module level monitoring
- Enhanced safety solution

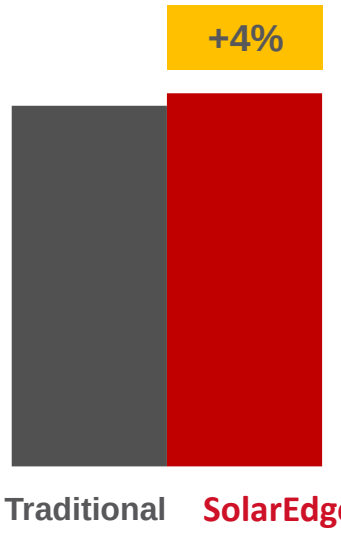


2% - 10% More Energy

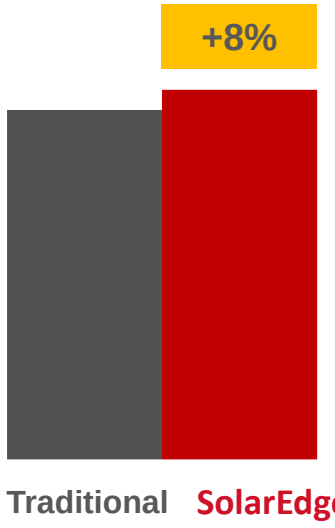
- More energy due to module-level MPPT
- Mismatch power losses eliminated:
  - No manufacturing or shipment-related mismatch loss
  - No soiling and/or aging mismatch loss
  - No inter-row shading mismatch loss



Best-case system
Inherent mismatch only (no shading, no soiling)



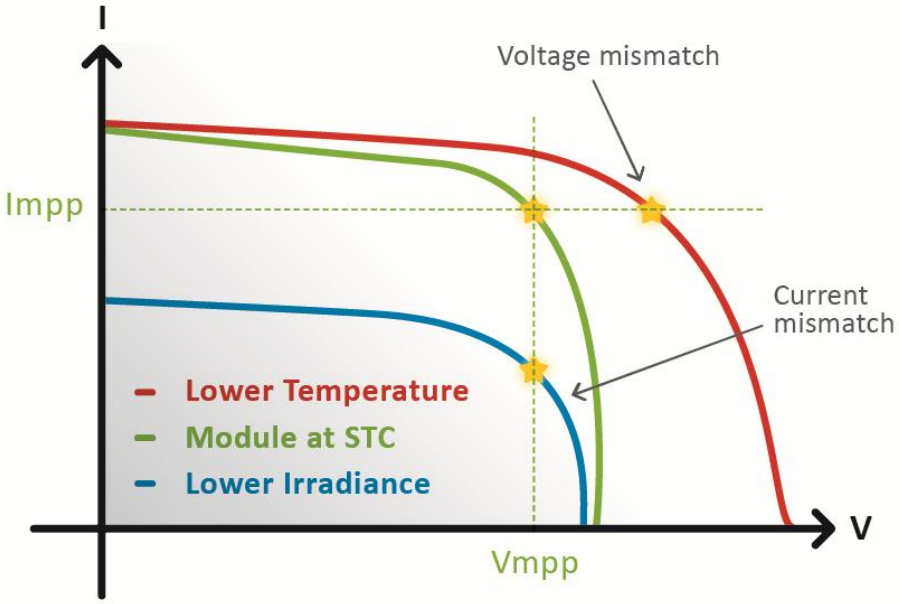
Good system design
Inherent mismatch and low shading level



Typical system
Additional minor environmental mismatch

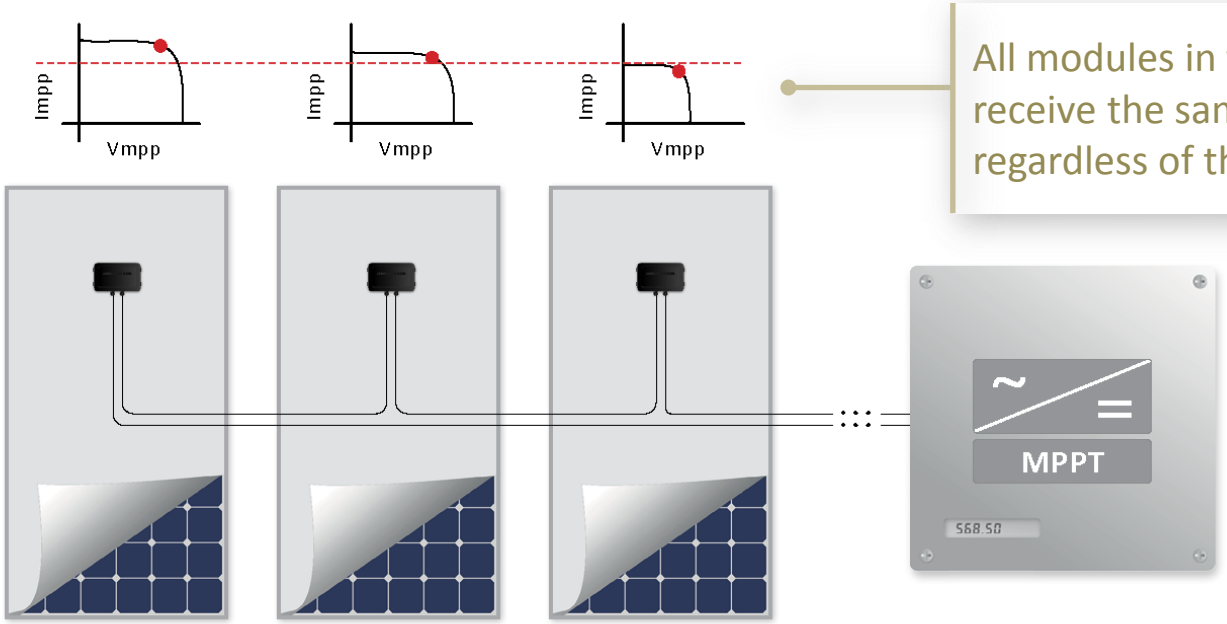
Module Mismatch Always Exists

- Each module has an individual IV curve and provides maximum power at specific optimal current & voltage (P=I*V)
  - The maximum power point is abbreviated MPP, (Pmpp= Impp*Vmpp)
  - Module IV curve depends on the individual electrical properties of the module and the ambient conditions (irradiance , temperature)
- Modules with different IV curves = module mismatch



Module Mismatch -> Power Loss

- Traditional inverters perform MPPT (Maximum Power Point Tracking) for the entire string
  - Due to the module mismatch, weaker modules either impact the output of the entire string or are bypassed



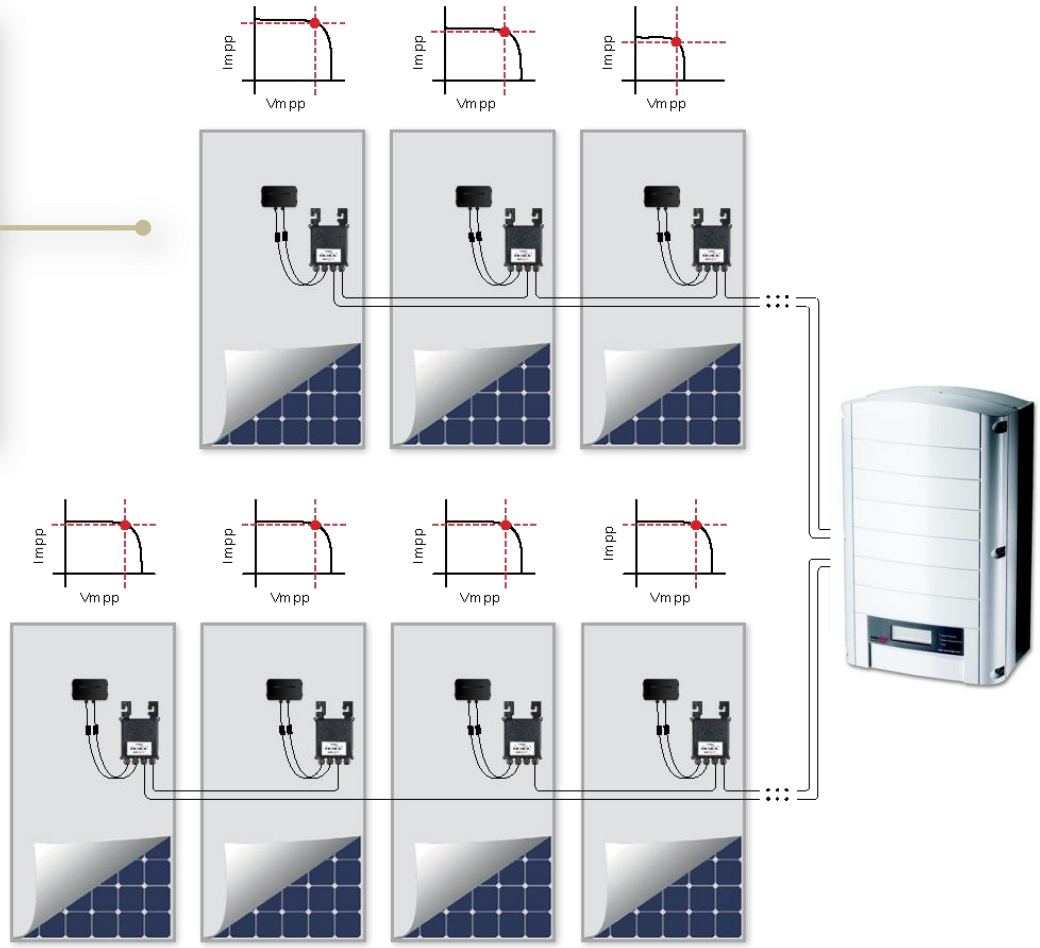
Module-Level Power Optimizers

Up to 10% More Energy for commercial systems

Module-level MPPT

Current & voltage adjusted per module

→ eliminating module mismatch
→ maximum power from each module individually



Multiple Mismatch Sources

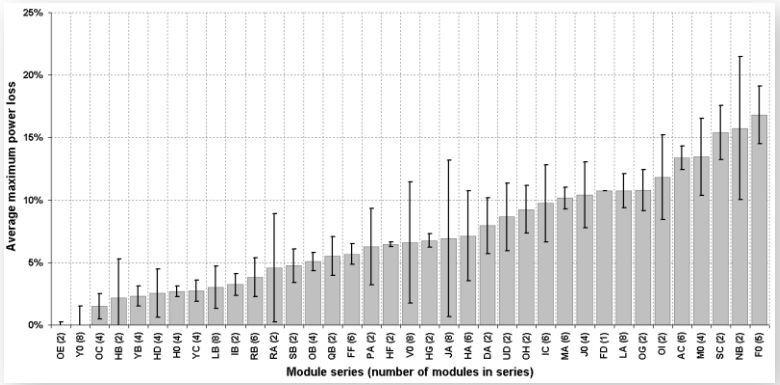
Module mismatch challenges PV plant planners, installers & owners

- Manufacturing tolerance
- Undetected transport damage
- Temperature mismatch
- Soiling mismatch
- Uneven module aging rate
- Partial shading – inter-row, and cloud fronts

Perfect site design, shading prevention, and even sorting by factory flash test reports cannot resolve mismatch power loss

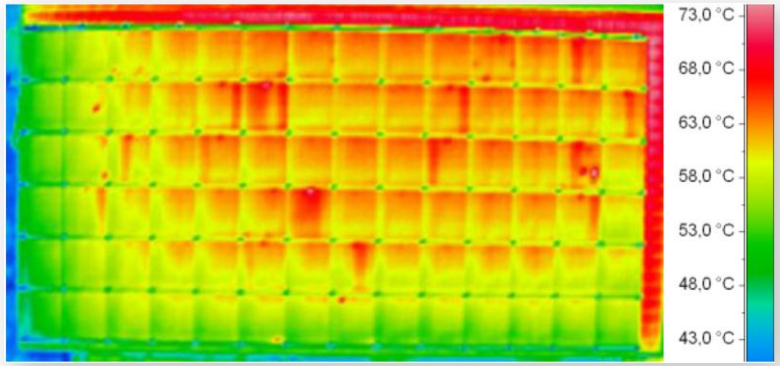
Uneven module ageing

Black lines: Power variance of identical modules after 20 years



Temperature mismatch

13°C temperature decrease from the top module row to the bottom row (7.8m distance), due to convective heat transfer

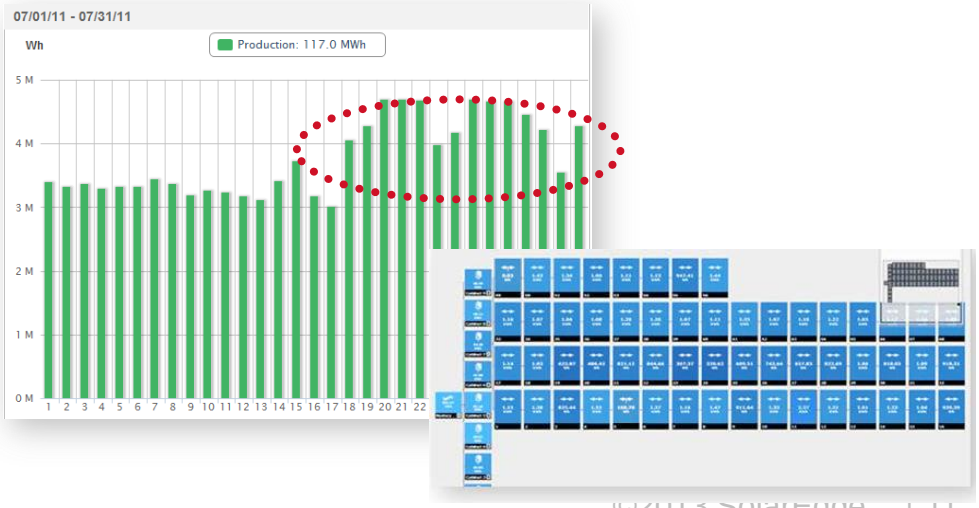


Mismatch Due to Soiling

- Module soiling by dirt or bird droppings contributes to mismatch between modules and strings (beyond power loss due to sunlight blockage)
- Soiling mismatch exposed by a SolarEdge monitoring system connected to the strings of a 700kW plant, installed flat on a winery roof in California:

Before: String mismatch due to uninterrupted soiling (shade of blue = daily string energy)

After: cleaning the modules increased power output by over 30% (1MWh per day)

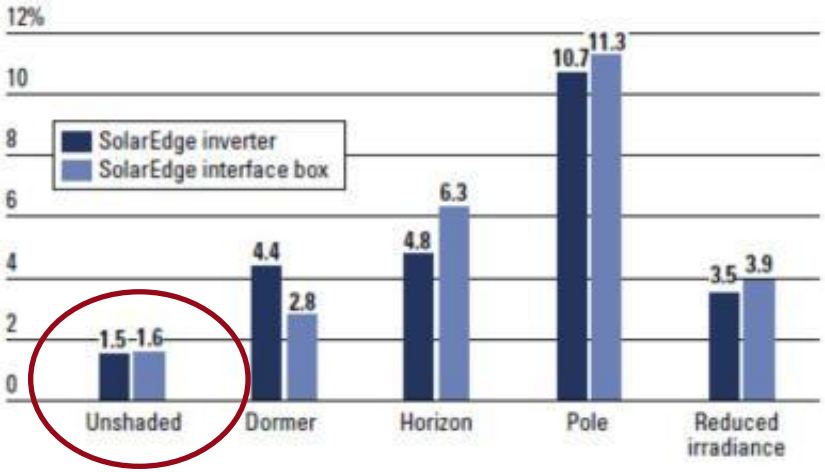


Source: SolarEdge Monitoring Portal. 700kW site monitored by SolarEdge String Monitoring Combiner Box (MCB), 7/2011

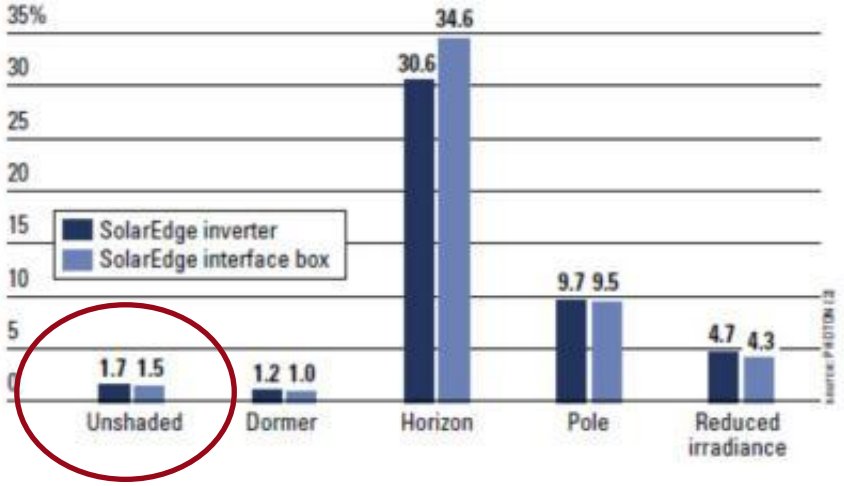
Added Energy – In All Scenarios

- **PHOTON Magazine** proves: added yield ranges between 2% - 25%
  - PHOTON Labs tested and compared the added energy output of SolarEdge power optimizers to a traditional inverter in the October 2011 issue

Additional yield produced by SolarEdge power optimizers - two parallel strings of seven modules each



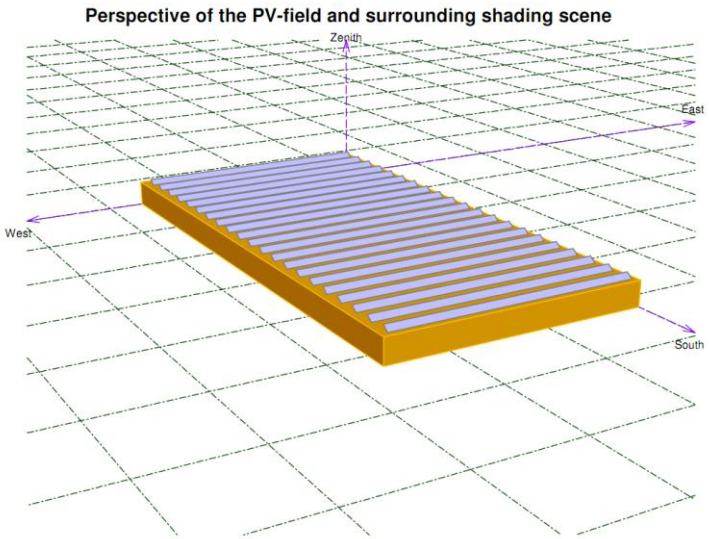
Additional yield produced by SolarEdge power optimizers - one string of 14 modules

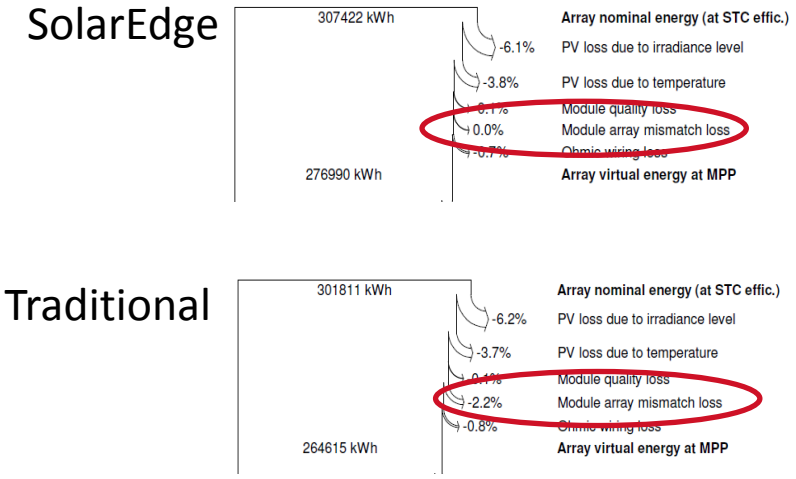


Added Energy – No Shade

Module manufacturing mismatch

- Even if shading is avoided completely, module manufacturing mismatch still gives SolarEdge an advantage
  - **2%** standard energy gain for SolarEdge on module manufacturing tolerance according to leading simulation software (PVsyst, PVSol):





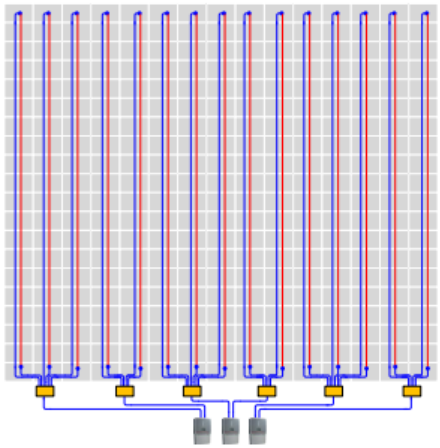
BoS Saving by Longer Strings

- Up to 50 modules (power optimizers) per string

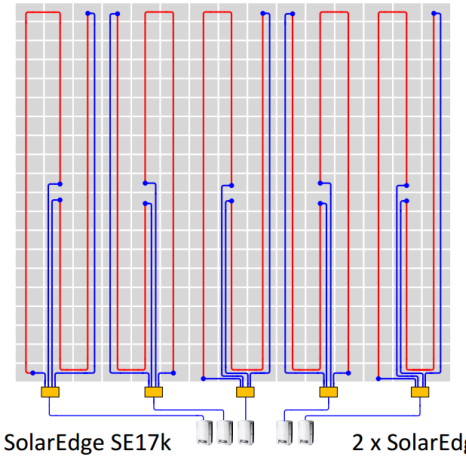
Fewer strings

Less wiring, combiner boxes, fuses, etc.

- Up to 50% reduction in BoS cost



Traditional inverter



3 x SolarEdge SE17k

2 x SolarEdge SE16k

Design Efficiency

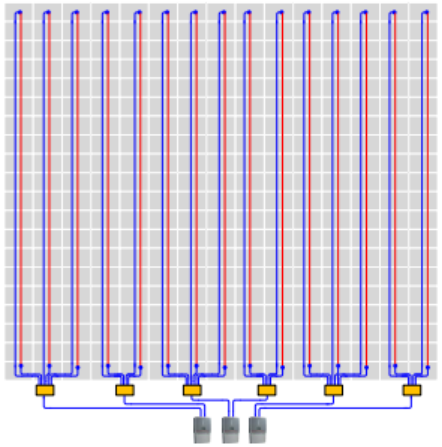
Unique SolarEdge feature - Fixed String Voltage enables:

- Simple system design:
  - No need to calculate string length based on Voc/Vmpp
  - Strings of different lengths
  - Partial/ inter-row shading allowed
- Longer strings:
  - Up to 50 power optimizers per string
  - Fewer combiner boxes and fuses
- Maximum roof utilization:
  - Parallel strings of unequal lengths
  - Modules on multiple roof facets
  - Modules with different power ratings
- Future replacement of modules with any type/model/capacity

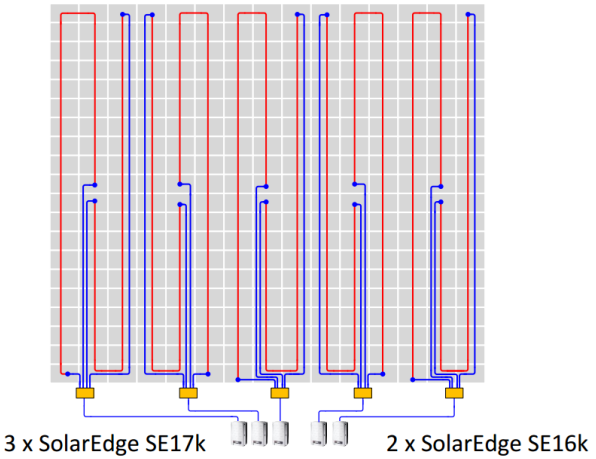
BoS Saving – 84kW System

- 50% BoS saving

	Leading Traditional Inverter	SolarEdge
Modules	300 x 280W	300 x 280W
Inverters	3 x 27.6kW	3 x SE17k and 2 x SE16k
Strings	15 strings, 20 modules each	10 strings, 30 modules each
6mm² PV wire	336 m	225 m
10mm² PV wire	120 m	92 m
String boxes	6	5
Inverter DC breakers	3	5
Cost	**100%**	**50%**

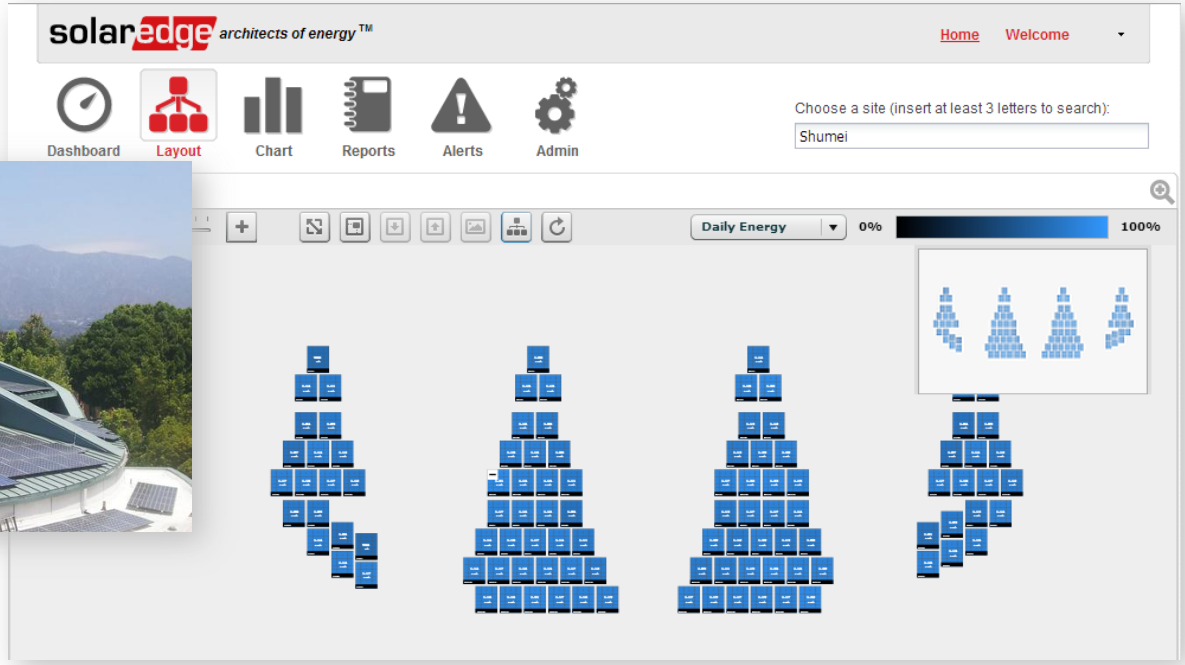


Traditional inverter



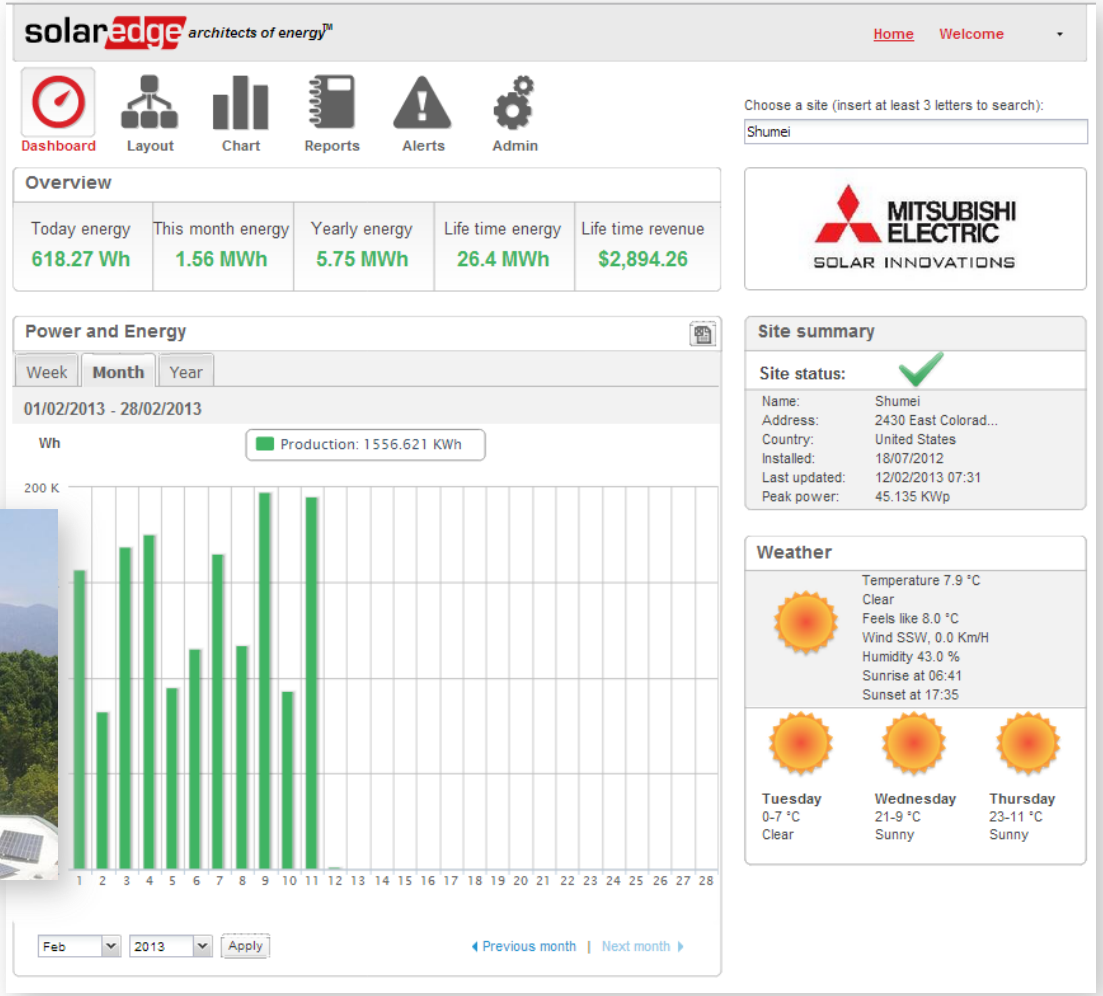
Cost Saving Maintenance

- Module-level performance monitoring & remote troubleshooting
  - Module-level performance data available in real-time
  - Module-level data is presented on a virtual site map
  - Automatic and immediate alerts on system issues pinpointed to module location
  - Easy access via web browser from any device



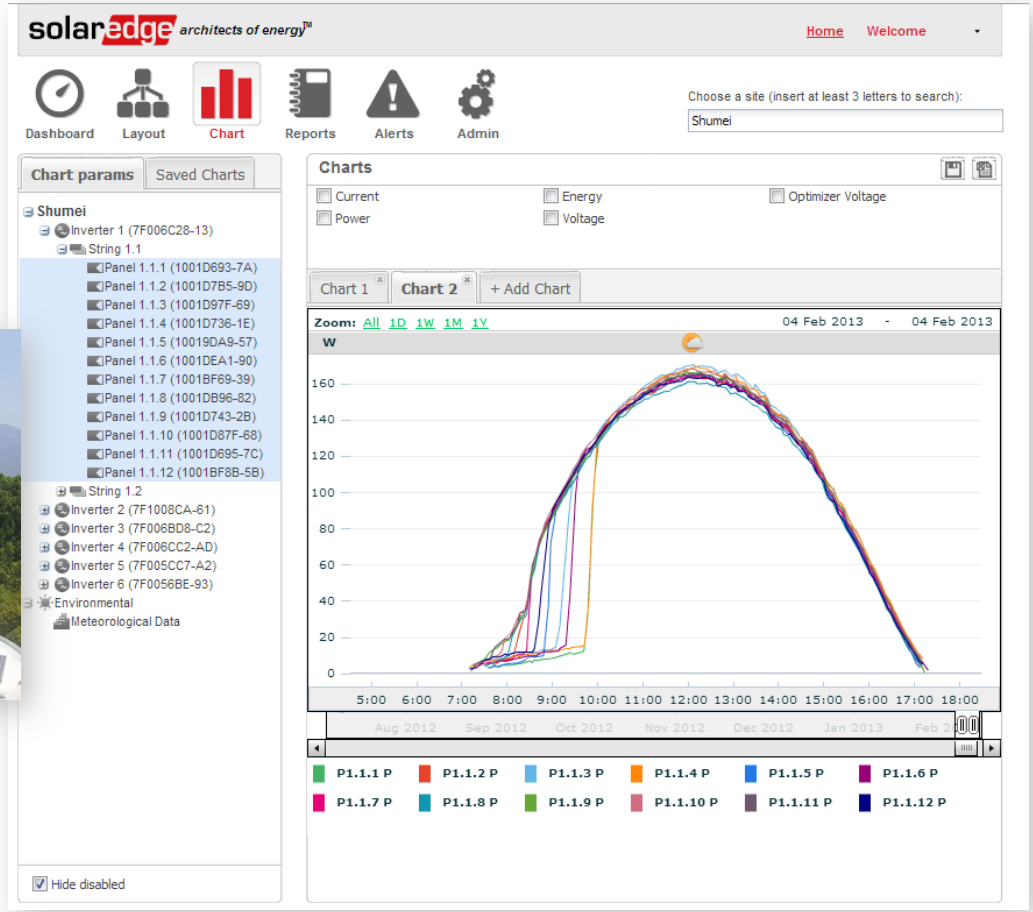
Enhanced System Performance

- Increased system availability and yield



Enhanced System Performance

- Remote diagnostics
- Resolution of issues undetected by string inverters
- Easy location of faults in field based on virtual map



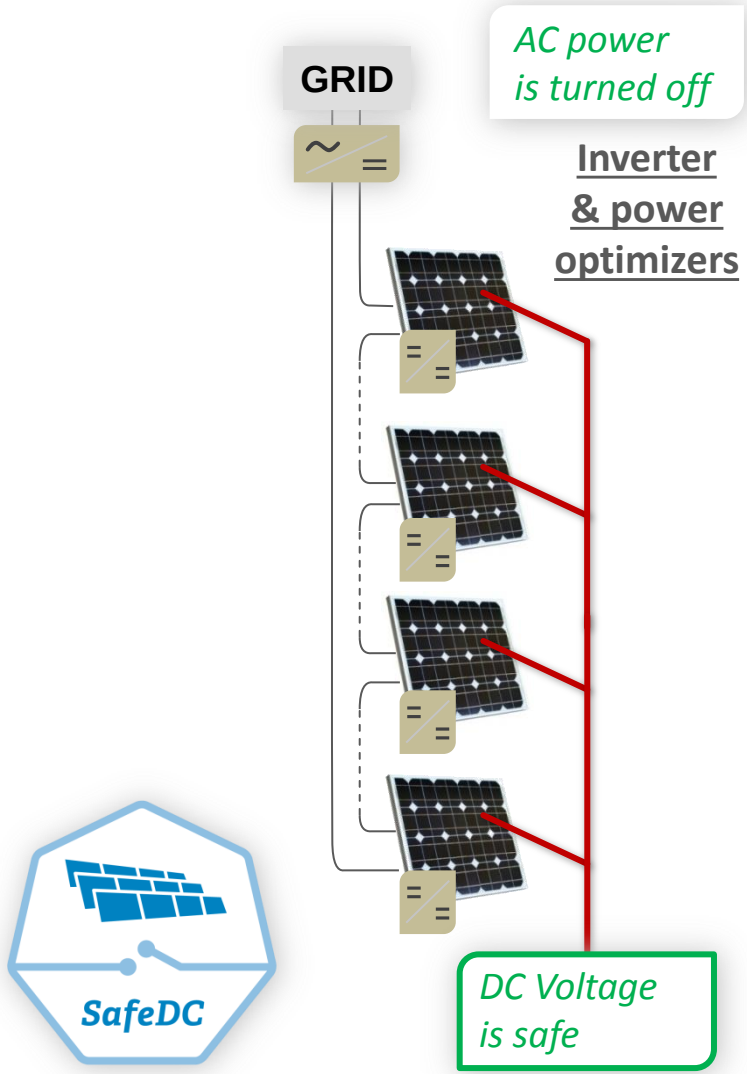
Superior DC Safety

- Safety during installation, maintenance, firefighting & other emergencies
- Automatic module-level shutdown of DC current & voltage
  - Fire prevention: automatic prevention of electric arcs

450kW installation on the rooftops of a sustainable neighborhood, New Orleans, Louisiana, USA.
Installed by Pontchartrain Mechanical Co.

SolarEdge SafeDC™ Solution

- Each module is equipped with a power optimizer
- When AC power is shut off the inverter stops sending a signal and all power optimizers shut off
- Each module produces 1V safety voltage (string <50v)

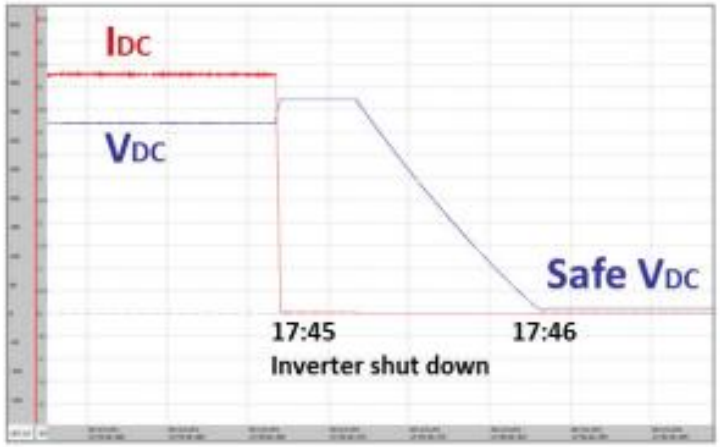


SolarEdge's SafeDC™ Benefits

- Higher security for installers, maintenance teams & firefighters
  - Installation: safe string voltage - until inverter & AC supply are turned on
  - Maintenance:
    safe string voltage – automatic once inverter is turned off
  - Emergency:
    safe string voltage - automatic after grid disconnection
- Improved asset protection

Automatic DC shutdown

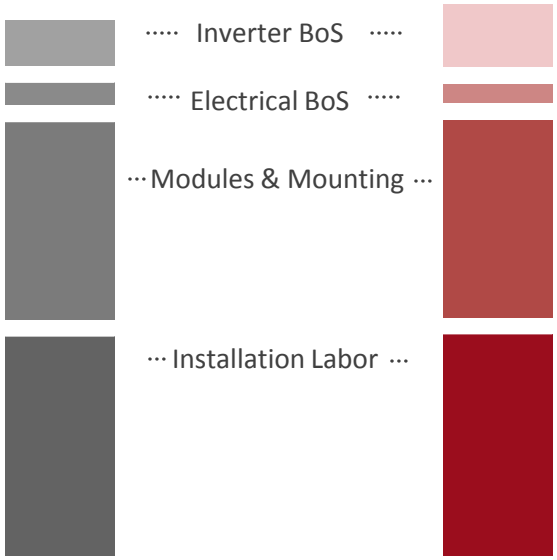
Safe DC voltage within 180 sec.



ROI Calculation

Lifetime Cost
50kW - System

Initial System Investment



Traditional

SolarEdge OP600

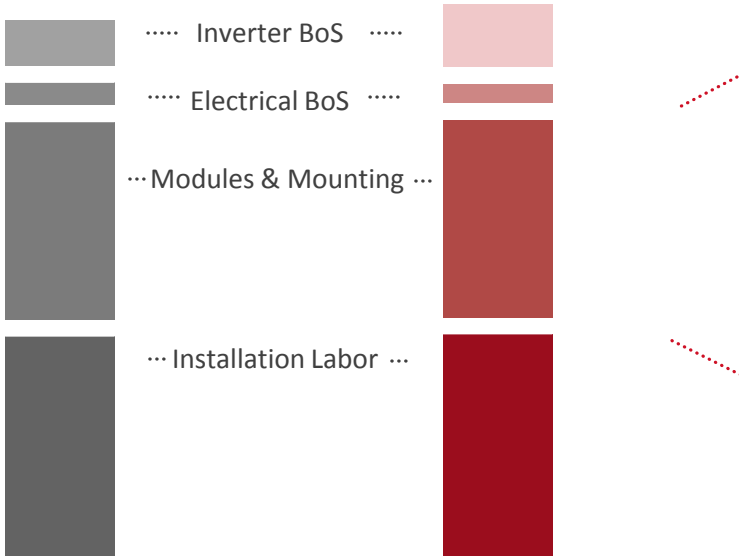
Labor

Installation labor for all components.

SolarEdge: includes added labor for power optimizers

* Prices are estimates based on open available market prices

Initial System Investment



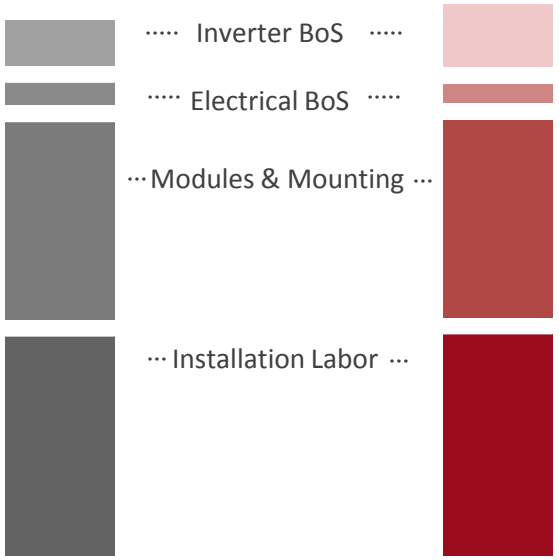
Traditional

SolarEdge OP600

Modules & Racking
Same cost for both systems

* Prices are estimates based on open available market prices

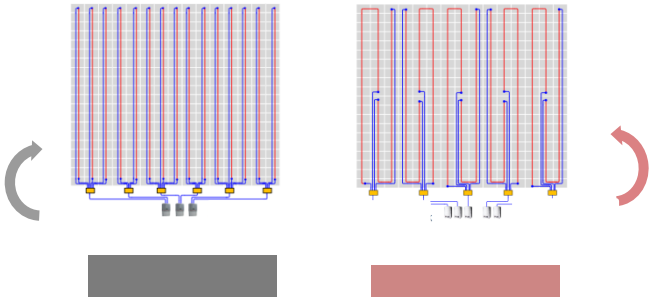
Initial System Investment



Traditional

SolarEdge OP600

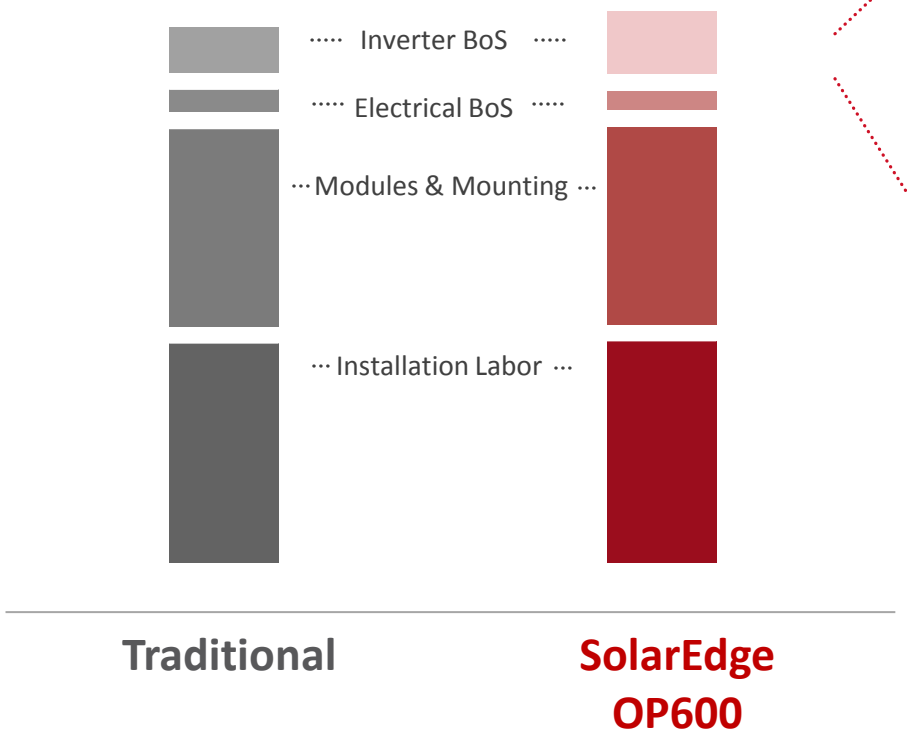
Electrical BoS



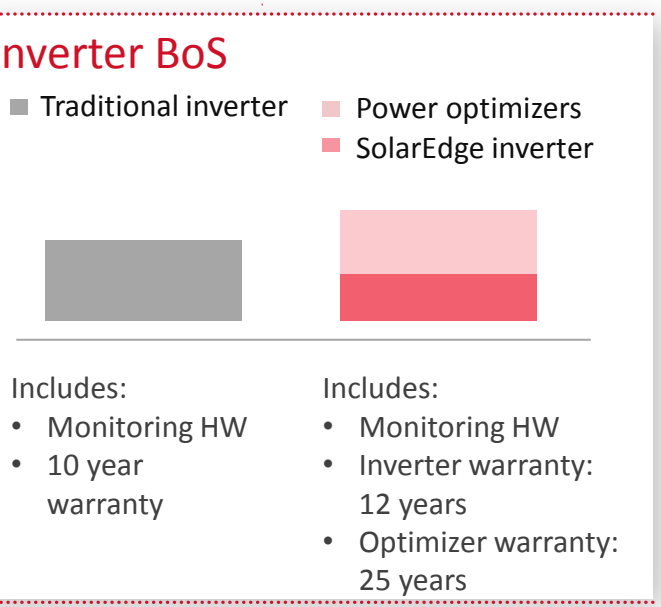
SolarEdge: longer strings save **>50%** on DC cables, combiner boxes, etc.

* Prices are estimates based on open available market prices

Initial System Investment



Inverter BoS



Includes:
- Monitoring HW
- 10 year warranty

Includes:
- Monitoring HW
- Inverter warranty: 12 years
- Optimizer warranty: 25 years

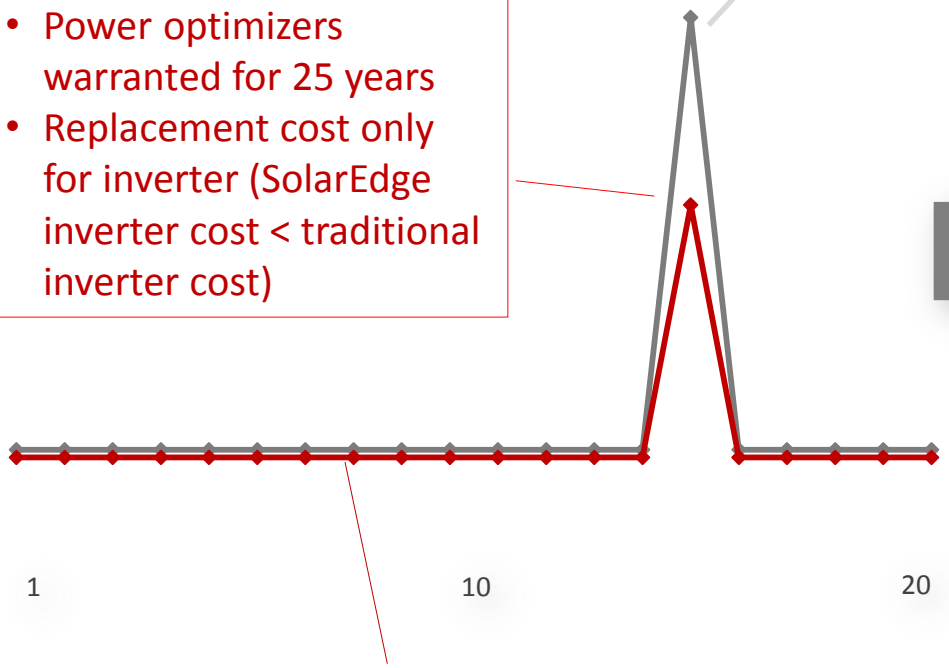
* Prices are estimates based on open available market prices

Maintenance and Replacements

Lifetime O&M Timeline, 25 years

Traditional inverter replacement cost post warranty

- Power optimizers warranted for 25 years
- Replacement cost only for inverter (SolarEdge inverter cost < traditional inverter cost)



Total O&M (NPV), 25 years

20% O&M cost saving with SolarEdge

Traditional SolarEdge

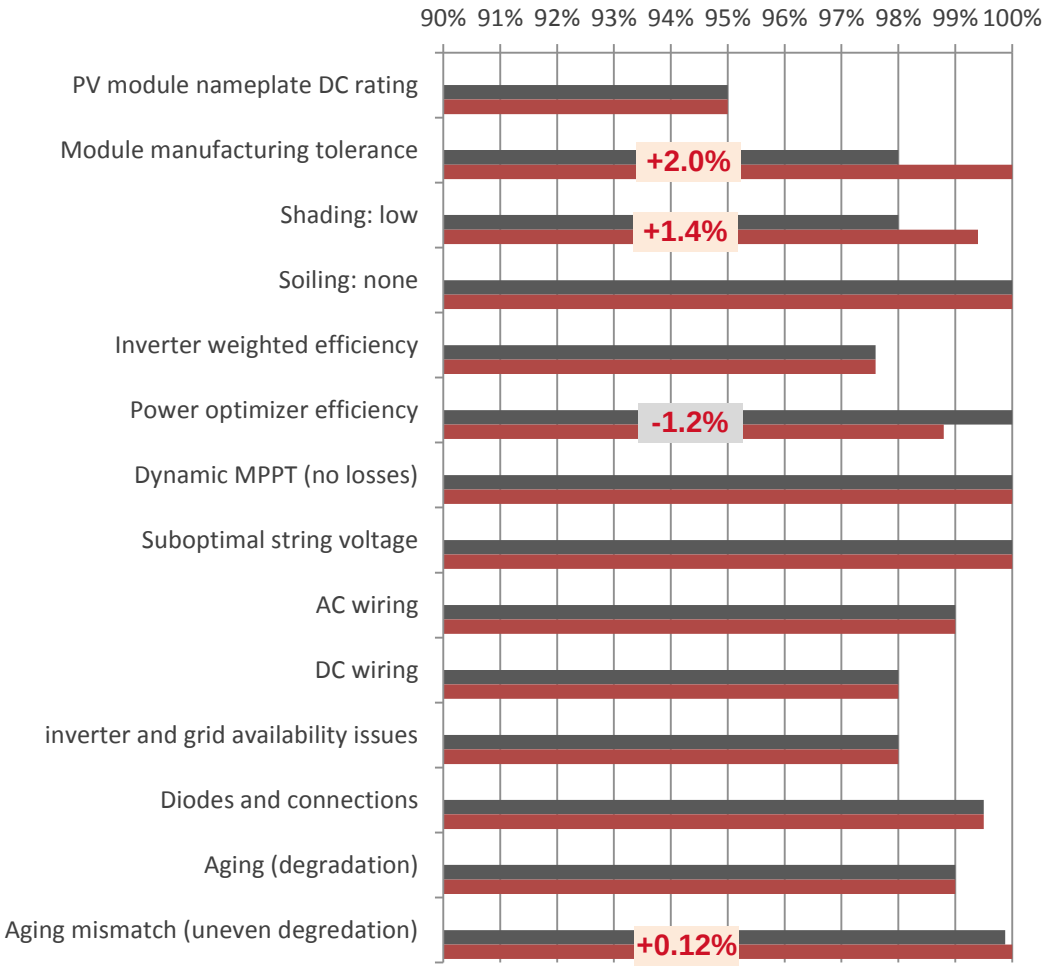
~10% less O&M annually with SolarEdge due to Module-level monitoring

Lifetime Energy Produced
50kW System

System Performance Ratio

Comparison of SolarEdge and Traditional inverter performance ratio:

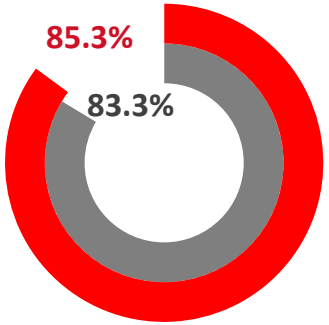
Derating Factors (EOY 1)



Performance ratio

System performance ratio is the product of all derating factors

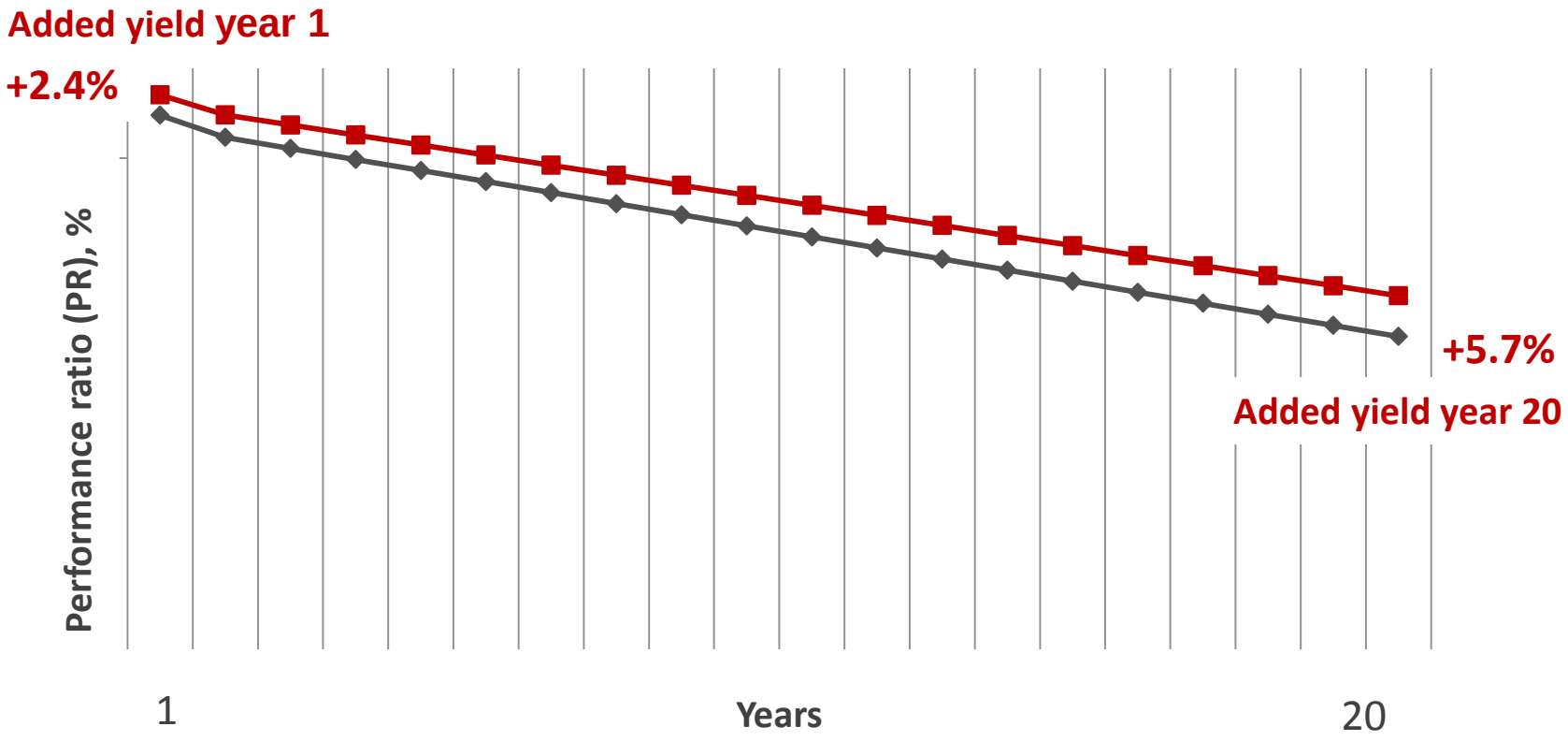
Module-level MPPT improves mismatch-related derating factors



SolarEdge advantage: 2.4%

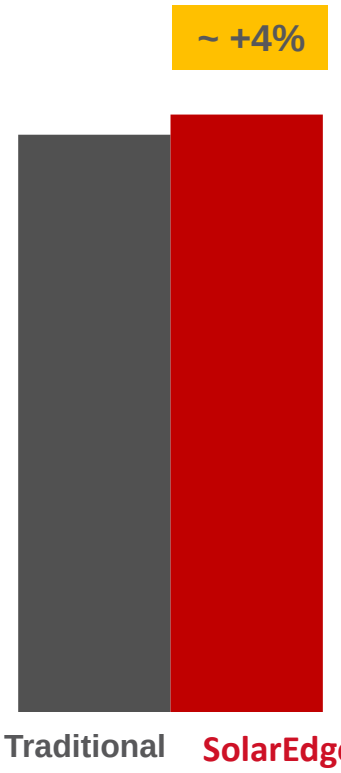
System Performance Over Time

- Annual aging degradation of system: 1%
- Growing degradation mismatch: 0.12% per year for traditional system
- SolarEdge total added energy over lifetime: +4%



Lifetime Energy Yield

Best-case system
Inherent mismatch only
(no shading, no soiling)



Good system design
Inherent mismatch and low
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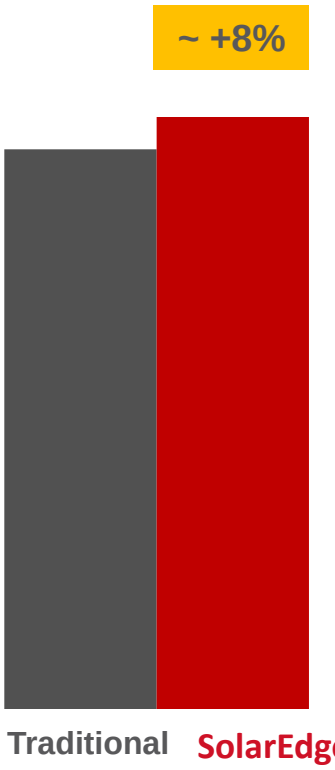

Typical system
Additional minor
environmental mismatch

Lifetime Profit

- **Profit = Total lifetime revenue - Total lifetime expenses**
  - Profits are provided in their net present value (discount rate: 2%)

Best-case system
Inherent mismatch only (no shading, no soiling)

Good system design
Inherent mismatch and low shading level

Typical system
Additional minor environmental mismatch

SolarEdge Commercial Product Offering

SolarEdge System Overview

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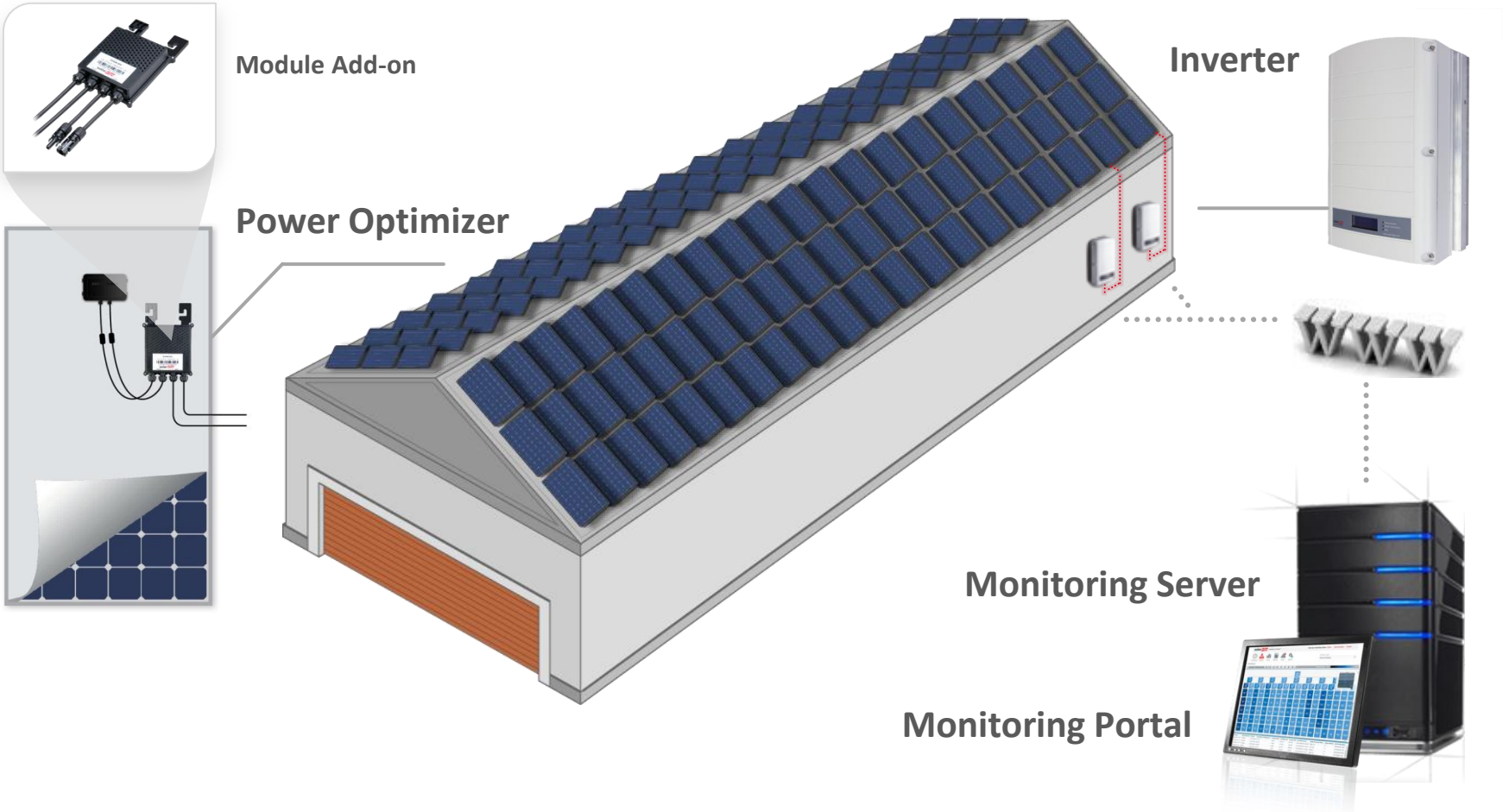
- Fixed voltage – flexible design
- Module level monitoring
- Enhanced safety solution



SolarEdge Power Optimizers

- Per-module Maximum Power Point Tracking (MPPT)
- 99.5% maximum efficiency, 98.8% weighted efficiency
- Advanced, real-time performance measurement
- Automatic module shut-down for installer and firefighter safety
- Embedded by module manufacturers, or connected by installers to c-Si and thin-film modules

* Available H2 2013

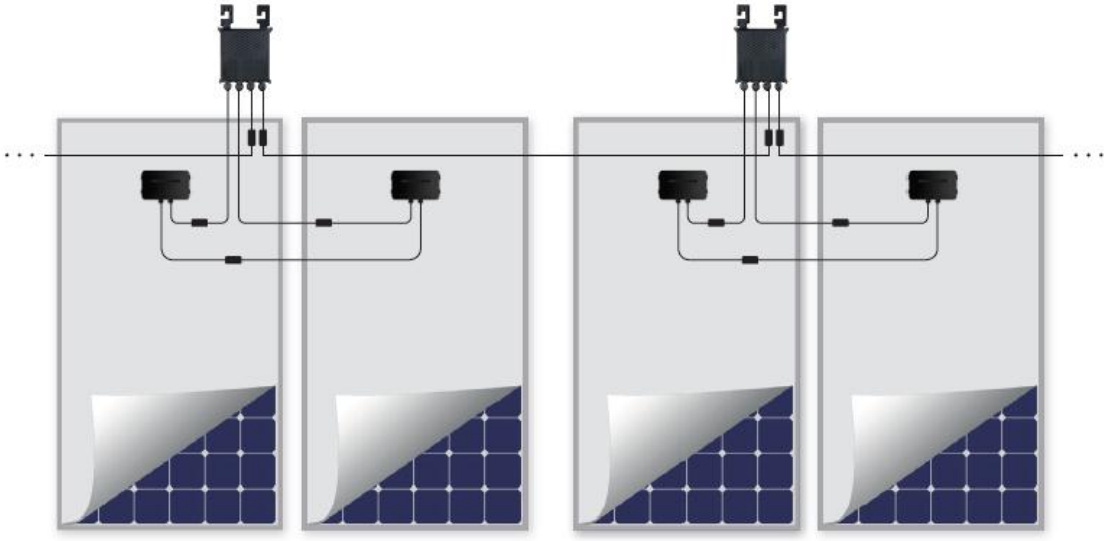
250W-400W
Module add-on

600W Module Add-On
for Commercial Installations

300W
Module embedded

New OP600

- 2 modules per power optimizer connected in series
- Up to 44 modules per string
- Compatible with inverters SE16k and up
- Max DC input power 600W
- Maximum input voltage/current 96V/10A



SolarEdge Commercial Inverters

- Inverters specifically designed for power optimizers fixed string voltage
- 98% maximum efficiency
- Simpler design → Highest reliability at minimal cost
- Built-in communication hardware

Three phase inverters
5kW – 17kW

SolarEdge Commercial Inverters

- Inverters specifically designed for commercial installations with power optimizers
- Small, lightest in its class, and easy to install
- No electrolytic bulk capacitor for highest reliability
- Superior efficiency (>98%)
- Separate connection compartment for simple access
- Field-replaceable boards for easy maintenance
- IP65 – outdoor and indoor installation
- Available H2 2013

Commercial inverters 35kW – 50kW

Module-Level Monitoring

- **Cost effective maintenance and increased system uptime**
  - Module-level and system-wide performance data available in real-time on a web portal
  - Data presented on a virtual site map
  - Automatic, accurate fault detection pinpointed to module location
  - Power-line communication. No added wiring

SolarEdge as Your Partner

Pre Sale

Valuation
- LCOE calculation

Design
- System design consulting

Training
- Technical installation & maintenance training

On-going Service

Monitoring
- Module level performance data
- Remote troubleshooting

Support
- Local expert teams
- Online Service Portal
- Call centers

Maintenance
- On-site repair
- Preventive remote monitoring

Case Studies

50kWp – Maximum Roof Utilization

- **Location:**
  Exeter, UK
- **Installation date:**
  Sep. 2011
- **Inverters:**
  5 x SolarEdge SE10k
- **Power optimizers:**
  OP250-AOB
- **Installed by:**
  SunGift Solar

"The SolarEdge system gives us the peace of mind we need in order to ensure that our customer is reaping all the benefits of their PV installation"

Scott Oldfield, Trade and Sales Manager of SunGift Solar

250kWp – Rooftop Installation

- **Location:**
  Colmar, France
- **Installation date:**
  Nov. 2010
- **Inverters:**
  42 x SE6000
- **Power optimizers:**
  1,063 x PB250-AOB
- **Installed by:**
  Blue Ice

"I use SolarEdge for all of my installations because it ensures maximum energy output, reduced O&M cost and superior safety"

Eric Gatterer, CEO, Blue Ice

30kWp System – DC safety

- **Location:**
  Paris ,France
- **Installation Date:**
  Jul. 2011
- **Inverters:**
  3 x SE10k
- **Power Optimizers:**
  126 x AOB250
- **Installer:**
  Yomatec

"When we spoke to the management of Hopital Privé Nord Parisien we realized how concerned they were about safety and related regulations. We were happy to provide a solution that ensures comprehensive safety for the hospital and its patients."

Michel Ayache, Director of Marketing, Yomatec

55 kWp, Israel

- **Location:**
  Carmiel, Israel
- **Installation date:**
  Sep. 2011
- **Inverters**
  4 x SE12.5k
- **Power optimizers:**
  110 x OP500
  (2 in 1)
- **Installed by:**
  Yarok Natural
  Energy

*„ The SolarEdge system is constantly producing more energy compared to a similar 50kW traditional system installed next to it and **will accelerate the return on investment**“*

Ran Mizrachi, Joint CEO, Yarok Natural Energy

1.63MWp – Largest System in NL

- **Location**:
  The Netherlands
- **Installation date**:
  July 2012
- **Inverters:**
  119 x SE12.5K
- **Power Optimizers:**
  5,712 x OP300-MV
- **Installed by**:
  - AliusEnergy

““By using the SolarEdge system, The VencoGroup achieved their goal for an innovative solution that minimizes the environmental impact of the VencoCampus and provides safe and sustainable energy.”

Ton van de Ven, AliusEnergy

1 MWp, Germany

- **Location:**
  Bavaria, Germany
- **Installation date:**
  Sep. 2012
- **Inverters:**
  6 x SE15k; 19 x SE16k;
  32 x SE17k
- **Power Optimizers:**
  4092 x OP250-LV
- **Installed by:**
  Renew

*„To fulfill its future responsibility, it needs to rely on the most **advanced technology available** today. And that is **module-level power optimization**."*

Thomas Rink, Managing Director, Renew Handelsgesellschaft mbH

Thank you

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