Safety First with SolarEdge Commercial PV Systems

Local governmental incentives combined with an increased awareness of renewable solar energy as a viable alternative to carbon-based grid power are leading more companies to deploy PV systems. They are long-term investments that offer energy resiliency and can provide significant electricity cost savings over the system lifetime.

The widespread adoption of solar power has only reinforced the need for industry stakeholders to make PV safety their top priority.

Be Smart. Be Safe.

You can't turn off the sun

Millions of PV systems are installed worldwide, with the fire risk posed by these systems considered to be extremely low. For conventional PV systems, as long as the sun is up, high DC voltages continue to energize the PV modules and wires even during grid outages.

To maximize protection of people and property in the unlikely event of a fire or other emergency, PV systems should therefore be equipped with safety mechanisms that start at the module level.

Understanding fire risks to PV systems

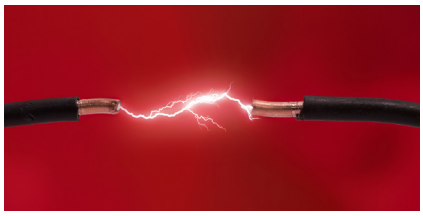
Research has shown that commercial infrastructure fires where PV systems are installed generally do not originate from the PV system itself. For example, electrical malfunctions due to domestic heating systems, hospital cooking equipment, factory machinery, flammable materials in warehouses or even lightning, all pose much higher fire risks.

In the unlikely event of a PV system related fire, a potential source of such fires are electrical arcs. They can be caused by faulty or improperly connected cables or connectors, corrosion, animals chewing wires, failed DC isolators, or overheating of PV system components.

Potential sources of PV system fires:

Flammable material storage

Lightning strikes



Electric arcs

At the Forefront of PV Safety

SolarEdge is a global solar industry leader providing smart energy products featuring comprehensive safety solutions. We strive to minimize fire and electrification risks for all types of SolarEdge PV installations through our built-in PV safety technology. The SolarEdge safety suite complies with the most stringent international safety standards, going beyond existing industry requirements, and has been validated by prominent energy research lab TNO following independent testing.*

Favored by global solar insurance companies for added financial security:

- Meets leading property insurance company FM Global's DS 1-15 engineering requirements
- PV systems that use power optimizers, such as SolarEdge's, were recommended by Zurich Insurance Group for helping to reduce the likelihood or severity of a loss due to fire

Safety begins at the module level

SolarEdge developed DC optimization technology connects power optimizers to every two PV modules, converting them into smart modules. In addition to maximizing system safety, power optimizers increase system production, provide module-level performance monitoring and enable remote maintenance capabilities.
Leading authorities such as SolarPower Europe have also recognized the module-level PV topology used by SolarEdge as the best approach to mitigating potential Agri-PV site electric shocks and fires.

* The AFCI, Sense Connect and SafeDC™ features of the S440 Power Optimizers and SE3680H inverter (without battery) for operation were tested, representing the residential S-Series Power Optimizer and SolarEdge Home Wave Inverters - Single Phase products

A Holistic Approach to Safe Solar

SolarEdge delivers a comprehensive safety solution built on three main foundations addressing various safety requirements, from the installation stage and throughout the system lifetime.**

Prevention

SafeStart

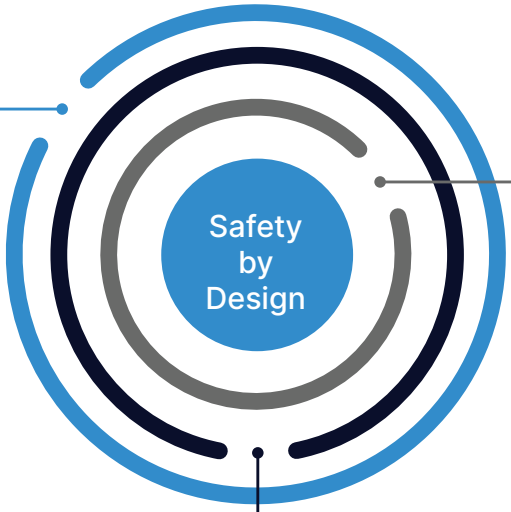
A series of safety checks conducted during inverter production start-up, helping to ensure system readiness and compliance with relevant safety standards

SolarEdge Sense Connect

Monitors Power Optimizer connectors for temperature fluctuations that could indicate improper connections or possible malfunctions, for early detection and mitigation of arc risks.

Built-in Temperature Monitoring

Thermal sensors designed to detect faulty wiring that can potentially cause electric arcs.



Mitigation

SafeDC™

Reduces the PV system's DC voltage to touch-safe 1V levels during grid failures or when the inverter is shut down, within up to five minutes.

Rapid Shutdown

- Designed to enable fast discharge of conductors to safe voltage levels, within 30 seconds
- Mandatory in the USA in accordance with NEC 2014, 2017 and 2020

Detection

Arc Fault Detection and Prevention

- Provides the ability to detect and terminate an electric arc, through automatic inverter shutdown for string lengths up to 400m.
- Compliant with the North American UL1699B standard as well as the new IEC63027 international standard that focuses on protecting PV circuits against arcs

System alerts

Sends automatic notifications on system issues, preventing potential safety risks.

Get real-time insight into system safety

Benefits of SolarEdge module-level monitoring

- Acts as an early-warning system, providing module to system-level alerts and ability to understand the root cause of any issue
- Alerts automatically notify installers/operators of various performance loss or safety risks, over the system lifetime
- Preventative maintenance can be performed well in advance of any significant event using remote diagnostics

Drawbacks of conventional PV string systems

- No method of either detecting or mitigating module faults
- When using external third-party safety devices, such as a dedicated Rapid Shutdown solution that has no monitoring:
  - If the device is installed incorrectly or fails, there is no indication of the failure and the device does not function as needed
  - Maintenance has to be carried out frequently to verify proper operation, incurring additional costs

** Safety functionalities described below may vary between different inverter models and firmware versions, and are applicable when the inverter is turned on

Make PV Safety Your Top Priority Too

Mercedes-Benz Manufacturing Plant, Turkey

“SolarEdge’s integrated safety feature SafeDC™ was one of the main reasons why we preferred SolarEdge. It is one of the most effective and efficient brands in the market in terms of minimizing occupational safety, fire and similar risks with module-level monitoring on our rooftop solar power plant investment.”

Alaattin Dik, Mercedes-Benz Türk Electricity Operation, Maintenance, and Energy Management Unit Manager

Hampshire Fire Stations, UK

“I believe the SolarEdge DC optimizer solution is the most advanced and reliable solution for the safe installation of solar PV. Our customers especially value the fire safety features and the remote monitoring capability, all of which help protect their assets and investment in solar energy.”

Mike Turner, Managing Director, Solar-Voltaics

Q1 Energie AG, Gas Stations, Germany

“When installing a PV system on a gas station rooftop, it’s no surprise that safety is our #1 priority. Which made SolarEdge and its built-in module-level safety features the obvious choice for us and the customer. The ability to interface to the customer’s own monitoring systems was an important consideration, and using its API SolarEdge could support this too.”

Jens Gockel, General Manager of MBG energy GmbH

Tasmazia Tourist Attraction, Australia

“I arrived at the site at 5:30 in the morning just as the sun was rising, and was pleased to confirm that the SolarEdge power optimizers were doing their job. Despite the system having been damaged by the fire, exposing copper wires, all the cables had automatically de-energized and were touch-safe. When the TechSafe inspector arrived, he was relieved to see it was a SolarEdge installation.”

Adrian Luke, Director of Dynamic Maintenance, DMS Energy

About SolarEdge

SolarEdge Technologies is a global leader in renewable energy technology that applies world-class engineering and innovation to provide solar PV solutions for the residential, commercial and utility segments. SolarEdge brings an optimized approach to generating, storing, managing and consuming energy. The company develops and produces PV inverters and Power Optimizers, energy management and optimization solutions, energy storage and grid services. SolarEdge’s DC-optimized technology is installed in millions of homes in over 140 countries, and more than 50% of Fortune 100 companies have SolarEdge technology on their rooftops. SolarEdge is accelerating the transition towards distributed, sustainable energy networks which will optimize energy everywhere.

Watch our PV safety video!

solaredge

Rv: 01/2025/V01/ROW

Join the SolarEdge conversation

www.solaredge.com