

Siemens Switzerland Ltd
Infrastructure & Cities Sector
Building Technologies Division
International Headquarters
Gubelstrasse 22
6301 Zug
Switzerland
Tel +41 41 724 24 24

The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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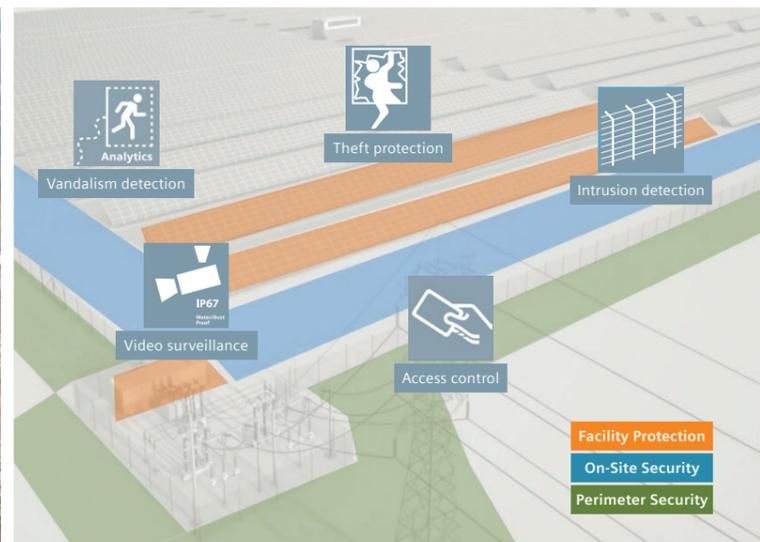
Protection of solar farms

Solution blueprint for Power Utilities

Answers for infrastructure.

Our world is undergoing changes that force us to think in new ways: demographic change, urbanization, global warming and resource shortages. Maximum efficiency has top priority – and not only where energy is concerned. In addition, we need to increase comfort for the well-being of users. Also, our need for safety and security is constantly growing. For our customers, success is defined by how well they manage these challenges. Siemens has the answers.

“We are the trusted technology partner for energy-efficient, safe and secure buildings and infrastructure.”



With solar energy playing an increasing role in power supply, it is ever more important to secure these critical infrastructure sites effectively.

Securing solar energy supply

Soaring electricity demand, scarcity of fossil fuels, the increased pressure to reduce CO₂ emissions, and the ever present concern for climate change are some of the most pressing challenges facing the planet and underline the rising importance of solar energy.

Solar farm locations are typically determined by meteorological conditions and space requirements. As a consequence, utility-grade ground-mounted solar farms are installed in remote, sparsely populated regions or even in deserts.

With solar energy playing an increasing role in power supply, it is ever more important to secure these critical infrastructure sites effectively. Prevention of unauthorized access, vandalism and theft are key concerns in safeguarding costly investments in photovoltaic technology.

Solar farms are often isolated, unmanned sites dispersed over large geographical areas, making remote supervision the most suitable option. Installations vary widely in size and a security solution and the related services should be easily scalable in order to accommodate future demands. A key requirement is the flexibility to integrate various sensor types and detection methods to suit a range of geographical landscapes. This helps to minimize false alarms and avoid costs incurred through unnecessary resource dispatching.

The Solution from Siemens

Security solutions for photovoltaic power plants must meet highest performance requirements while allowing the integration of multiple security technologies. Best-in-class solutions combine intrusion detection systems with video surveillance and access control together with bespoke services for optimum protection of the site.

The Siveillance™ portfolio from Siemens addresses security concerns of solar farms and other decentralized power plants. The open concept allows for easy customization according to customer and site-specific needs.

Perimeter security is a key pillar of solar farm security. Siemens supports a wide range of technologies including fiber-optic fence sensors, microphonic sensor cables, radar wide-area detection and microwave motion detection to secure photovoltaic installations against perimeter breaches and unauthorized access.

Depending on site-specific requirements, multiple technology sensors can be combined to afford the most effective detection

and immunity to false alarms, ensuring earliest incident response.

Video surveillance solutions facilitate remote alarm verification, ensure immediate and accurate identification of threats and enable operators to take appropriate actions while continuously supervising all activities. Using intelligent video analytics algorithms, security policy zones and virtual barriers can be dynamically defined to monitor sites. With Siveillance video solutions from Siemens, any unwanted object or person approaching the solar plant is immediately identified and appropriate measures can be taken by qualified security personnel.

A combination of fixed and pan-tilt-zoom (PTZ) cameras with infrared illumination capability allows for a manual verification of any situation and remote inspection of the site as part of a routine procedure. In an alarm situation, these cameras pan directly to and zoom into the affected area, offering unparalleled live viewing of an event as well as more detailed recordings of all events for post-incident use.

Thermal imaging cameras can be integrated to offer additional protection and improved situational awareness. These cameras do not require natural or artificial illumination to capture images and work effectively even in smoke, rain, fog or complete darkness.

Due to the nature of solar farms, equipment on-site needs to operate under harsh environmental conditions, such as high-intensity exposure to sunlight, dust, rain, storm or snow. The security solution portfolio from Siemens embraces hardened equipment rated to IP65 or above, ensuring resilience to service outages and downtimes as a result of hardware failures of equipment not suited to harsh conditions.

Solar farms require high investment in valuable photovoltaic technology. Damaged or stolen equipment will greatly diminish overall performance of the site or even threaten a complete operational shutdown. For strictly regulated access to critical sites, latest access control systems can be seamlessly integrated into the Siveillance suite ensuring effective, efficient and convenient access for authorized personnel at all appropriate times.

To complement feature-rich technical solutions, a comprehensive range of services is available. Siemens offers risk assessments, design and engineering services together with technical system maintenance to support power utilities in securing their distributed solar plants. Advanced service offerings from Siemens include the complete hosting and management of safety and security applications or comprehensive outsourcing models. With remote management 24/7 or limited to out of office hours, services can be tailored to specific customer requirements.

Customer benefits

- Protection of investment**
 Solar farms require significant financial investment. Security solutions from Siemens prevent unauthorized site access, minimize costs of damaged or stolen equipment and avoid costly interruptions of operation.
- Reliable early detection**
 Real-time identification and reliable early detection ensure immediate and correct incident response by security and operating staff.
- Continuity of supply**
 Remote monitoring of isolated, unmanned solar farms ensures continuous power supply, maximizes operational security and saves costs.
- Improved situational awareness of assets and staff conditions from control center**
 Suspicious anomalies and patterns indicating a potential threat can easily be identified.