Optimizing BIPV in Apartment Buildings

▸ Helsingør, Denmark

▸ 56.4 kWp

▸ Installation Date:
   July 2015

VIDA A/S
BYGGER PÅ LIV

The design flexibility of the SolarEdge DC optimized inverters allowed modules to be installed in a single string on roofs with varying tilts, orientations, and sun exposures, while still maximizing power generation. This allowed a 5% increase in system size versus a traditional inverter.

"We selected the SolarEdge DC optimized inverter because it was able to increase the site's energy production while also simplifying the site design and reducing BoS costs by nearly 10%. With the maximum design simplicity, we were able to increase system size by 5%."

> Andrea Isidori, CTO of the Energy Department,
   Vida A/S

Boliggården, the largest housing association of Helsingør municipality, has decided to install a PV system on one of its residential apartment complexes in order to meet the new building energy regulation, BR10, and reduce energy bills. The original PV system was designed to be integrated into the roofs of 75 top-floor balconies on 10 different apartment blocks with a total of 225 apartments and covering 7000 square meters. During the planning process, Vida A/S, the EPC, recommended the SolarEdge DC optimized inverter solution as it could increase the system size by 2.8 kWP[1] while simplifying the site design.

Increased Energy Yield

The SolarEdge DC optimized inverter system increased energy production thanks to its maximum power point tracking (MPPT) per module which enables each module to generate at its maximum potential. This eliminates power losses due to module mismatch caused by a variety of sources, including tolerance and thermal mismatch, soiling, uneven aging, module orientation, and partial shading. A PV*SOL Premium report showed a 10% annual yield increase in energy with the SolarEdge DC optimized inverter system compared to a typical string inverter.

By eliminating future power losses from module mismatch, the system owner protects the system against potential risks that could negatively impact energy production. Based on the EPC's estimates, the energy produced by the SolarEdge PV system will enable approximately €12,300 of annual electricity savings for the entire complex.

The hierarchical layout in the SolarEdge cloud-based monitoring platform shows that modules in the same string have varying module-level MPPT. This screenshot shows the production of one of the apartment blocks at 11:30 AM.
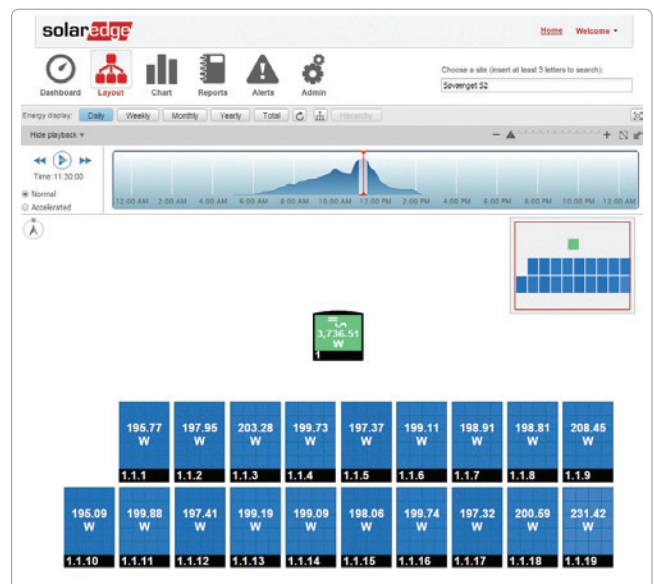

The hierarchical layout in the SolarEdge cloud-based monitoring platform shows that modules in the same string have varying module-level MPPT. This screenshot shows the production of one of the apartment blocks at 11:30 AM.

Maximum Design Flexibility for Decreased BoS

The SolarEdge DC optimized inverter system provides superior design flexibility through significantly longer strings. SolarEdge technology capabilities of increasing string lengths to a maximum of 64 modules or 12.5 kWp (compared to a maximum of only 24 modules per string with a typical string inverter), enabled each apartment building block to require only one string.

The EPC stated that compared to a traditional inverter, the SolarEdge system decreased the amount of strings by approximately 20% and provided a 10% reduction in switches, mounting, and inverter costs.
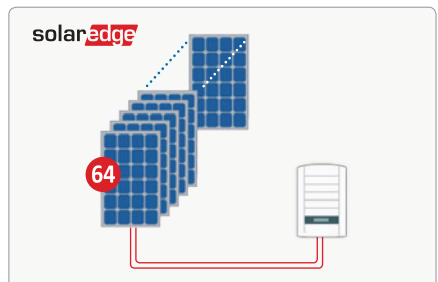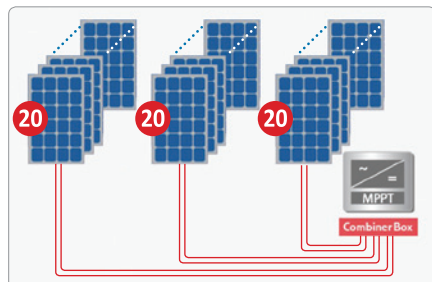

*4 panels lost due to string extending to different roof orientation

solaredge

More Modules on the Roof

The SolarEdge DC optimized inverter solution's module-level MPPT combined with its design flexibility, which allows modules in multiple orientations and different roof facets to be installed in a single string, enabled more modules to be installed on the roof. In this site, the number of PV panels on the south-west face was not sufficient to be supported by a standard inverter with 2 MPPTs. However, by using the SolarEdge solution, the EPC was able to install panels on the south-west facing side in the same string as panels on the west face. The SolarEdge solution allowed for the installation of 14 additional panels, amounting to a 5% increase in the overall system size. The additional panels translated to a total increase of 10% in energy savings per year (5% from the additional panels installed and 5% due to mitigation of power losses from high trees).


Multiple orientations in a single string
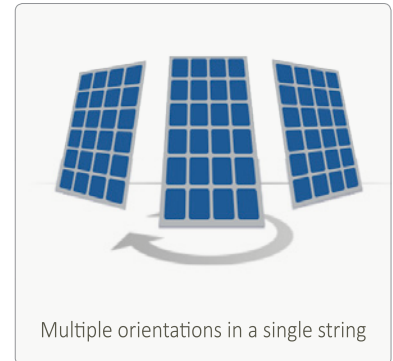
> **The flexibility of the SolarEdge DC optimized solution allowed a 5% increase in system size compared to a traditional string inverter.**

PV Asset Management

The SolarEdge DC optimized inverter system with real-time remote monitoring at the module, string, and system levels acts as a strategic solar asset management tool to help reduce operation and maintenance (O&M) expenses. The SolarEdge cloud-based monitoring platform provides clear tracking of the system's performance through a variety of features:

• Comprehensive analytics tracking and reports of energy yield, system uptime, and financial performance;

• Pinpointed and automatic alerts for immediate fault detection, accurate maintenance, and rapid response;

• Remote troubleshooting for fast and efficient resolution with minimal onsite visits.
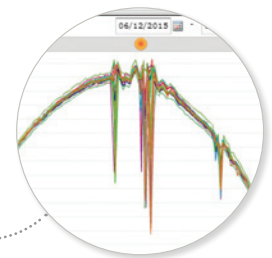
The dips show varying degree of shading, possibly caused by passing clouds.

The chart view from the SolarEdge monitoring portal shows the performance of individual modules. This graph illustrates the power of each module. To perform remote troubleshooting, installers can use additional module parameters, such as voltage, to detect reason for underperformance.

Best-in-Class Safety

As part of its solar asset management plan and wanting to protect its property, the system owner required that its PV system meet the most advanced safety standards. With a built-in safety feature called SafeDC™, the SolarEdge DC optimized inverter system is designed to protect installers, maintenance personnel, firefighters, and assets. The certified DC disconnect is designed to decrease DC current, as well as voltage from all string wires such that whenever inverter or grid power is shutdown; the voltage of each module is reduced to 1V.

The SolarEdge DC optimized inverters are certified to IEC 60947 as a disconnection means between a PV inverter and a PV generator, and to VDE 2100-712 for safety in cases of firefighting or maintenance.