

# CASE STUDY

## Retrofit: 20% Energy Yield Increase with SolarEdge Technology

Munich, Germany

**Site Description:** Multi-directional facets; partial dormer shading on each surface; varying module types

**Installer:**

Nell Solar GmbH / regioX GmbH (www.nell-solar.com)

**Initial Installation Date / Retrofit Date:**

12.2011 / 4.2013

**Location:** Munich, Germany

**Installed Capacity:** 4,6 kWp

**Modules:** 24 x Trina TSM 185DC01A/TSM190DC01A

**String Layout:**

**Initial String Layout Before:** 3 strings = 8 modules east + (2 modules east + 5 modules south + 1 module west) + 9 modules west

**Retrofit String Layout After:** 1 string = 25 modules using one SolarEdge inverter (SE4000) and 25 x SolarEdge optimizers (OP250-LV)

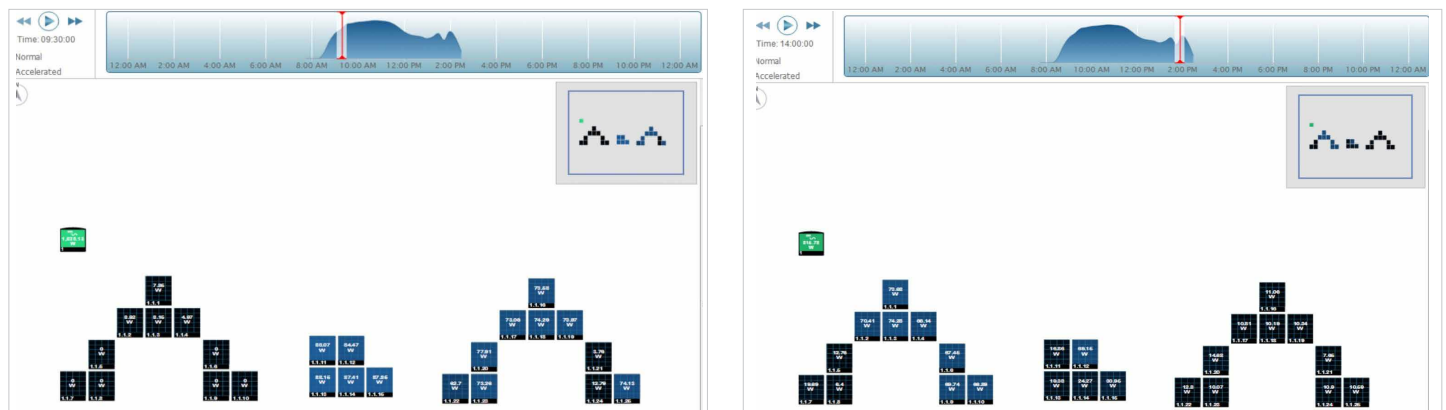


## INITIAL INSTALLATION

In 2011, the Stern family, hoping to receive a good ROI, invested in a PV system for its home. However, after nearly a year, the Stern family realized that its PV system was “lagging far behind the forecasted output expectations.” Wanting to increase the energy output, the Stern family contacted an energy consultant, Solarinitiative München (SIM) GmbH & Co KG, in March 2013 for advice. Thanks to its expertise as a PV solutions consultant, SIM quickly identified the origins of the decreased energy output after analyzing the site.

1. With string level MPP, partial shading on individual modules throughout the entire day substantially decreased the output level of entire strings.
2. Designed using varying orientations and traditional string inverters, the site needed multiple inverters which considerably increased BoS costs.
3. The existing string inverters (SMA 4000TL) could have been overextended.

Based on this diagnosis, SIM knew that the system’s total energy output could be substantially increased using module-level optimization, which could be both financially and technically achieved using SolarEdge technology.



Screenshots: Module-level monitoring shows noticeable mismatch between modules throughout the day. Even though the modules installed on different-facing roof facets have varying MPPs, with SolarEdge power optimizers they still generate the maximum energy possible while connected in a single string

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### SOLUTION

SIM contacted Nell Solar, an installer with multiple positive field results using SolarEdge technology, to install a SolarEdge power optimizer on each module. Module-level MPP tracking performed by SolarEdge power optimizers allow every module to generate maximum energy. Even though the modules are installed on different-facing roof facets which causes varying MPPs, each module still generates its maximum possible energy.

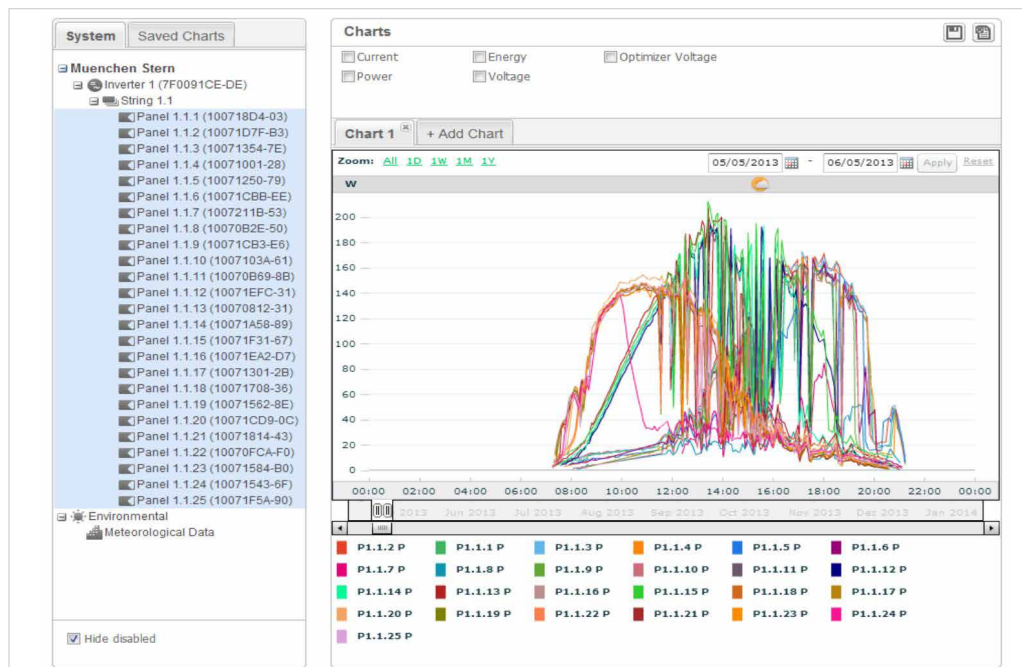
In addition to retrofitting each module with a SolarEdge power optimizer, the three existing inverters were replaced with one single-phase SolarEdge inverter. The SolarEdge PV inverter combines sophisticated digital control technology with efficient power conversion architecture to achieve more than 97% efficiency and best-in-class reliability.

With a unique built-in safety feature, the SolarEdge technology guarantees ultimate safety for installers, maintenance personnel, firefighters, and other emergency forces. A DC disconnect automatically removes DC current as well as voltage from all string wires.

### RESULT

Retrofitting the system with SolarEdge technology allowed the Stern family's system to achieve an increased energy yield of more than 20%. In addition, SolarEdge technology provides the Stern family with performance monitoring at the module level that allows for accurate troubleshooting pinpointed on a virtual site map for enhanced maintenance, improved transparency into system performance, and increased system uptime. The Stern family opted for a SolarEdge inverter warranty extension in order to "have the next 20 years under control".

"In urban areas, we are frequently confronted with roof configurations that require module-level power optimizers and individual module control in order to maximize energy yield and make systems financially viable. However, seemingly "ideal" PV surfaces can also profit from module-level optimization and monitoring. Clouds, dirt, uneven snow melt, aging, and other factors create module mismatch over a system's lifetime, all of which need to be taken into account during a solid PV system planning process", explains Dr. Harald Will, CEO of SIM.



Screenshot: MPP mismatch typically results in decreased system energy yield. SolarEdge power optimizers allow each module to generate its maximum possible energy while connected in a single string

### CUSTOMER CARE

"The advice and implementation was competent and comprehensive", says Dr. Stern about the team work between SIM and Nell Solar.