Outshining the Shade with Tigo TS4: Mitigating Mismatch, Maximizing Yield

Background

This residential installation is located in Rückholz, a village in southern Bavaria not far from the town of Schwangau, renowned for the fairytale castles of King Ludwig.

Equipped with Tigo optimizers since its inception in the winter of 2017, the system recently underwent an inverter revamp. The original unit was replaced with the new sonnenBatterie 10 hybrid, becoming the first known installation of this hybrid solution with Tigo Flex MLPE and transforming the home into a storage-equipped system designed to increase solar self-consumption.

Challenges

The system is composed of 15 Canadian Solar modules rated at 265Wp each, installed on the south-facing slope of the roof. Given the favourable orientation and the presence of only one MPPT in the original inverter, this system was configured as a single string.

A chimney cast a pronounced shadow over 4 of the 15 modules during the morning hours, noticeably impacting energy production.

Solution

To mitigate the shading issue, Tigo TS4 optimizers were installed to minimize mismatch losses and ensure the highest possible energy yield.

The module-level monitoring and rapid shutdown features provide additional peace of mind, allowing the homeowner to track system performance on a daily basis. With the inverter replacement and the addition of a storage system, every single watt-hour of solar energy has become even more valuable, further underscoring the benefits of module-level power electronics.

The homeowner now enjoys maximum energy availability for powering household loads and charging the batteries.
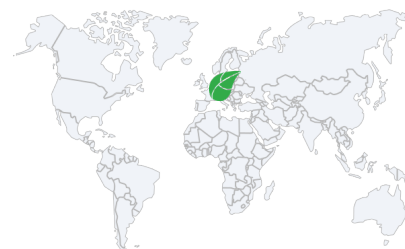
PARTNER COMPANY

sonnen

sonnen

INSTALLATION TYPE

Residential

LOCATION

Germany

FEATURES

Optimization, Rapid Shutdown, Monitoring

TIGO EQUIPMENT

Tigo TS4-A-O

Cloud Connect Advanced (CCA)

Tigo Access Point (TAP)

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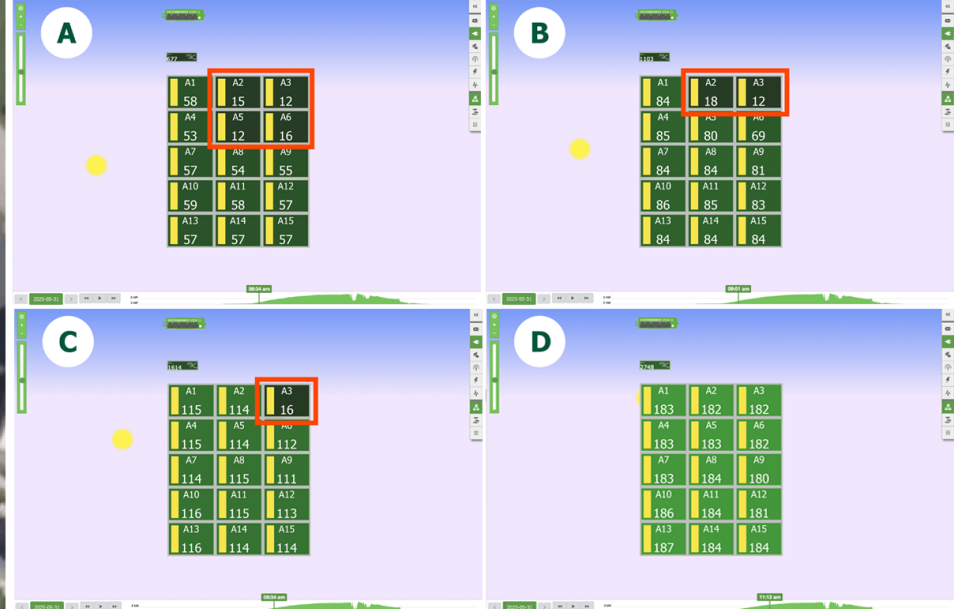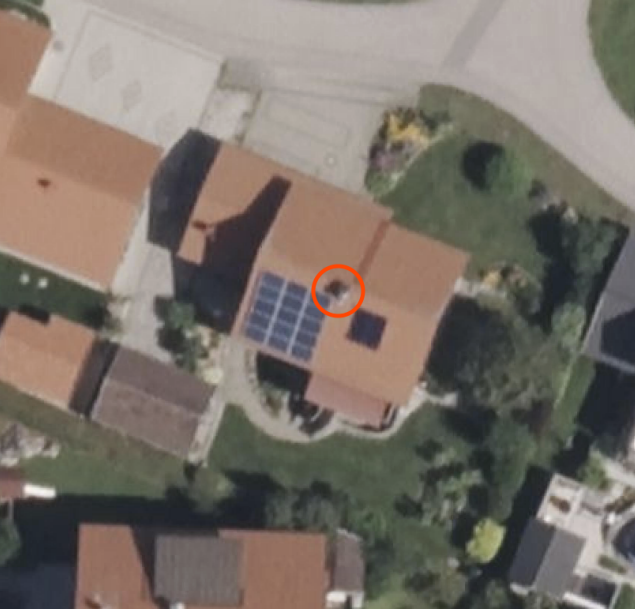
LEFT: Aerial view of the installation site. The 15 PV modules installed in landscape orientation are clearly visible in the center of the image. Inside the red circle, the chimney that casts its shadow on 4 modules during the morning hours.
RIGHT: These four system view pictures illustrate the impact of morning shading caused by a chimney on specific solar modules (A2, A3, A5, and A6, highlighted in the red box). Tigo Energy Intelligence's module-level monitoring makes the shading effect and its influence on the entire array immediately visible, demonstrating the value of optimization in reducing mismatch losses.

Results

Over its seven and a half years of operation, the Tigo optimizers helped the system to achieve an average Reclaimed Energy value of 4,5%. This figure rises to 10-12% during the winter months, likely due to snow accumulation on certain modules. While the average was around 3% in the system's first two years, it began to increase in the third year, in line with the modules' expected linear degradation. This is yet another source of mismatch effectively managed by the Tigo TS4 optimizers.

Thanks to this long-standing optimization strategy, the installation continues to deliver reliable performance and tangible value, providing the homeowner with energy independence and peace of mind, year after year.

Equipment summary

- Residential installation
- System capacity: 4,06kWp
- PV Modules: 15x Canadian Solar CS6P-265M
- Inverter: 1x sonnenInverter 10-3-4
- 15x Tigo TS4-A-O (Optimization)
- 1x Tigo Cloud Connect Advanced (CCA)
- 1x Tigo Access Point (TAP)

For more information on **Tigo TS4** platform of Flex MLPE, visit: tigoenergy.com/ts4

For more information on **Tigo Energy Intelligence** monitoring software, visit: tigoenergy.com/monitoring