

# Comparative Review: SolarEdge Nexis 3ph vs. Sigenergy SigenStor

## A residential PV and battery storage comparative study

In a modern PV + storage system, low-power efficiency is no longer a footnote. With self-consumption now driving system economics across Europe, inverters spend most of their operating hours at a small fraction of nameplate, charging the battery slowly, discharging at low power through the evening and night, or idling. Efficiency curves that look almost identical at nameplate can diverge meaningfully under those conditions, and the differences, compounded with standby consumption, materially affect the energy delivered at the meter and the long-term return on the system (pv magazine, "Rethinking solar and storage ROI: Beyond old efficiency assumptions," 20 February 2026).

A simulated residential property in Berlin was chosen for a side-by-side review of a SolarEdge Nexis 3ph PV and battery system against a well-regarded competitor system, the Sigenergy SigenStor. The comparison is by simulation rather than by field trial, as deploying two real-world installations side by side is never sterile: shading, dusting and other factors may vary from module to module even within a single site, and a year-round comparison would take a full year to record. Product efficiencies were measured in the laboratory, with the remaining simulation inputs drawn from established public databases.

Three aspects were examined: **energy yield**, **system efficiency**, and the **financial saving** under a German import and export tariff.

## The two systems

Both systems were specified around a 10 kWp PV array and a 10 kW inverter. The SolarEdge Nexis system pairs that array with a stack of 7 kW/10 kWh SolarEdge Nexis Battery; the Sigenergy system uses a comparable stack of 8 kW/16 kWh Sigenergy SigenStor Battery. The Sigenergy battery is the larger of the two, which works in its favor in this comparison. To keep the picture honest, we therefore also report the result normalized to battery capacity.

Parameter	SolarEdge Nexis	Sigenergy SigenStor
<b>PV array</b>	10 kWp	10 kWp
<b>PV architecture</b>	Module-level MPPT (Power Optimizers)	String inverter
<b>Inverter Nameplate</b>	10 kW	10 kW
<b>Battery nameplate power</b>	7 kW	8 kW
<b>Battery nameplate capacity</b>	10 kWh	16 kWh
<b>Battery usable capacity</b>	9.3 kWh	15.6 kWh

## Method and inputs

Performance and efficiency of both systems (including inverter efficiency, Power Optimizer efficiency, battery converter efficiency, nighttime self-consumption, etc.) were measured in the laboratory. Those measured values were then fed into a simulation, together with input profiles for PV generation, household load and

import/export tariffs. Every input not measured in the lab is publicly available and drawn from accepted databases; the sources are listed at the end of this report.

### Import and export tariffs

Import is charged on a dynamic time-of-use basis, with the daily rates taken from the German Federal Network Agency (SMARD.de, UTC+1, 2025)<sup>1</sup>. Export is credited at a flat 0.0778 €/kWh<sup>2</sup>

### Site energy demand

The household demand profile represents an average of residential properties in Berlin<sup>3</sup>. The same profile was applied to both systems.

### Solar energy

The irradiance profile was identical for both systems. The irradiance data was taken from the PVGIS Typical Meteorological Year dataset (PVGIS-SARAH2), provided by the European Commission Joint Research Centre, reference year 2020<sup>4</sup>

### Power Optimizer performance

The SolarEdge system places a Power Optimizer at each module, so every module tracks its own maximum power point. A verified report<sup>5</sup> found that this arrangement harvested, on average, between 4% and 10.5% more energy per year than an equivalent string system, even where the string system used several MPPT inputs (VDE, 2025). On straightforward sites – a single roof facet, no shading – the average gain was about 4%. On more complex sites, with shading or several roof facets, it rose to about 10.5%. This is a gain in PV energy captured at the DC side; it is separate from, and adds to, the conversion and standby efficiencies discussed below.

## Findings

For this simulated site, over a year, **the SolarEdge Nexis system saves the homeowner about €204 extra annually** on the electricity bill than the Sigenergy system. That figure is for a complex site, where the Power Optimizer gain is around 10.5%. On a simple, unshaded single-facet site, where the gain is nearer 4%, the advantage is about €142 per year. **Across 15-year** and excluding any inflation on import or export prices, **the saving is more than €3,000 extra** on the figures as they stand ( $€204 \times 15 \approx €3,060$ ). Normalised to battery capacity – recognising that the Sigenergy battery is rated 60% larger – **the advantage is more than €5,000 extra** (a factor of about 1.67 after accounting for usable capacity, giving  $\approx €5,134$ ).

Power Optimizer PV gain	Annual Extra Saving	15-year (un-normalised)	15-year (normalised to capacity)
<b>4% (simple, unshaded site)</b>	€142	€2,130	€3,573
<b>10.5% (complex / shaded site)</b>	€204	€3,060	€5,134

*Annual figures from the simulation; 15-year figures exclude inflation. Normalisation scales the result to equal usable battery capacity (factor  $\approx 1.67$ ).*

The additional savings come from several factors working together: the module-level tracking already described; lower standby (quiescent) consumption; higher conversion efficiency in the inverter, the battery system and the PV path; and the battery's charge and discharge algorithm. For example, when comparing PV → Home efficiency at 200W, meaning low power conditions, SolarEdge Nexis is 1.7 times more

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efficient than Sigenergy SigenStor – **89.0% versus 52.0%**. The study credited no benefit from energy-management-system (EMS) logic.

The efficiency advantage shows up as more energy exported in summer and less energy imported in winter. Over the 15-year period the PV generation of the SolarEdge Nexis system with module-level monitoring is also better equipped to allow for the gradual, uneven degradation of individual modules to be identified and managed rather than dragging down a whole string.

## Energy delivered over the year

The headline energy figure is the AC energy delivered by each system over a year: **Energy Yield** of 12.44 MWh for the SolarEdge Nexis system against 10.19 MWh for the SigenStor system, **a 22% advantage**. The two percentages in this report measure different things: the 10.5% is the extra PV energy captured at the DC side; the 22% is the extra energy delivered as AC across the full year. The gap between them is made up by higher inverter efficiency, lower standby consumption and better battery efficiency. That extra AC energy shows up both as higher self-consumption in the home and as more energy exported to the grid.

Annual energy (kWh)	SolarEdge Nexis	Sigenergy SigenStor	Difference
Household demand	2,840	2,840	0
System AC output	12,440	10,190	2,250
Exported to grid	9,750	7,550	2,200
Imported from grid	159.4	251.9	-92.5

*Difference = SolarEdge Nexis minus Sigenergy SigenStor. For imported energy a negative difference means the SolarEdge Nexis system imports less.*

## About the author

James Hoare CEng FIE FEI is an independent Chartered Electrical and Energy Engineer with 26 years of professional experience in photovoltaic and battery energy storage systems. He is a Fellow of both the Institution of Engineering and Technology (IET) and the Energy Institute – the UK's two principal professional bodies for the energy and electrical-engineering profession – and holds Chartered Engineer status under the Engineering Council UK.

His technical work covers PV and BESS system modelling, power-electronics design, system efficiency characterization, and low-power charge-controller technology, with a particular focus on end-to-end energy yield analysis under real-world operating conditions. In 2010 he designed and commissioned one of the UK's first grid-compliant micro-inverter PV systems, and he has since advised on residential and commercial solar-plus-storage projects across the European market.



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## Data sources

1. Import rates — wholesale price data, German Federal Network Agency, SMARD platform ([smard.de/en/downloadcenter/download-market-data](https://smard.de/en/downloadcenter/download-market-data)), time zone UTC+1, year 2025. License: CC BY 4.0.
2. Export rates — export credited at the German feed-in tariff for rooftop systems up to 10 kWp (surplus feed-in), 0.0778 €/kWh, valid February–July 2026. [Bundesnetzagentur, EEG-Förderung und -Fördersätze](#)
3. Load profile – Schlemminger, M. et al. "Dataset on electrical single-family house and heat pump load profiles in Germany." Scientific Data, Springer Nature, 15 February 2022. © 2022 The Author(s). Distributed under the Creative Commons Attribution 4.0 International Licence (CC BY 4.0)
4. Irradiance — PVGIS v5.2 seriescalc (European Commission JRC, [re.jrc.ec.europa.eu](https://re.jrc.ec.europa.eu)), dataset PVGIS-SARAH2/ERA5, Berlin (52.52°N, 13.405°E), reference year 2020, optimal tilt 43°/azimuth –8°, system loss 14%. Output: 8,760 hourly AC values per 1 kWp installed. Huld et al. (2012), Solar Energy 86, 1803–1815
5. Power Optimizer energy gain – VDE, SolarEdge field report, 2025, [vde.com](https://vde.com) ([SolarEdge report 2025](#)).

All results are derived from publicly available data by the respective manufacturers and simulations and laboratory measurements – actual field performance will vary with site conditions and should not be taken as a performance guarantee. Financial projections are indicative only, based on 2025 German tariff data, and exclude inflation, price changes, and system degradation; independent financial and technical advice should be sought before any purchasing decision. To the fullest extent permitted by law, the author accepts no liability for loss or damage arising from reliance on this report.