Innovative solar autarky

There has been an influx of hybrid solar inverters hitting the market recently, but few deliver the power, flexibility, and customer-pleasing visuals of Studer's latest innovation, the next3 rack.

As more energy users seek to reduce their costs and carbon emissions, the concept of solar autarky, complete self-sufficiency from sunlight, has become incredibly appealing. However, achieving year-round autonomy comes with unique challenges, intensified by the rapid electrification of heating, cooling, and transport. Grid stability and energy security have also become hot topics in many areas of the world, driving the demand for more intelligent, future-proof hardware.

The solar retail market is also continually evolving. In years gone by, most customers were satisfied with reducing their energy bills while doing their bit for the environment. Today, consumers are far more discerning: they want an energy solution that can completely eliminate their costs and emissions, but it also needs to look good.

One company addressing these challenges head-on is Switzerland's Studer Innotec. Its new cabinet-based hybrid inverter, the next3 rack, provides an off-grid experience for on-grid properties, and a large step towards sun-powered autonomy for homes and businesses.

The dawn of solar autarky

The next3 rack is a streamlined version of Studer's flagship hybrid inverter, the next3. Dubbed 'the Swiss army knife of energy,' the three-phase smart inverter-charger is a complete solution for on-grid, off-grid, and hybrid solar and battery systems. With a perfect balance of performance and flexibility, its dual MPPTs deliver up to 16 kW of continuous power and 30 kW of peak power, unlocking complete solar autarky for homes and businesses.

The inverter features a unique 'AC flex' interface that can be configured as a secondary input or controlled load, and a 'Smart Boost 2' function that supports energy independence through phase balancing and peak load shaving. For simple connectivity, there is a plug-and-play CAN BMS communication system and the 'nextOS' interface developed by Studer's in-house software team. For complete peace of mind, the inverter carries a ten-year factory warranty which customers can extend to 15 years through the 'Studer Care+' program.

Rack-packed power

Either indoors or outdoors, the next3 rack can be mounted in custom-built cabinets along with batteries, mechanical protection,

thermal controls, and other hardware. Its all-in-one design unifies the incohesive nature of traditional solar installations, combining up to six pieces of hardware into a central energy hub. Users with higher power demands can combine up to three next3 racks in parallel or build interconnected clusters in larger commercial environments. It is compatible with most types of 48 V batteries, including lead acid and lithium, allowing energy users to scale their storage capacity to suit their needs.

Studer recently showcased the innovation at Intersolar 23 in Munich, garnering positive reviews from installers and retailers from around the world. 'The next3 rack is the culmination of Studer's 35 years of excellence in power electronics design, engineering, and manufacturing,' said CEO, Loïc Viret. 'Solar professionals have been extremely impressed with the number of features we've combined into one compact box, which delivers flexible energy independence for many different customers and applications.' The company is also developing a single-phase version of the inverter, the next1 rack, which it plans to launch in 2024.

Studer's landmark AutarCity project

Switzerland is accelerating toward a 2050 net zero goal, with a growing focus on solar PV and energy storage. To support this progress, its national platform for energy efficiency and renewables, SwissEnergy, has launched a 'Smart City Innovation Project.' Through a tender process, it awards funding to innovative municipal projects that reduce carbon emissions and can showcase emerging clean technologies.

Among the five successful applications was Studer's AutarCity project at its global headquarters in Sion. The initiative is a joint partnership between the city of Sion, OIKEN, and Studer's spinoff solar engineering consulting company, Smartsuna. The AutarCity project will be the first in the country to upgrade a multifunction municipal building, featuring Studer's factory on one side and a childcare facility on the other, into a 100% solar autarkic facility.

Building a self-sufficient factory

Smartsuna began the project with a 12-month electrical analysis of the building's power flows and electrical demands. Studer then designed a hybrid solar PV system capable of providing self-sufficiency throughout the year, retaining the grid purely as a backup. It will feature 3,000 m² of rooftop solar panels, lithium-ion battery storage, and ten next3 hybrid inverters, including the rack model.

Once completed, the site will run on solar power during daylight hours while automatically storing excess to cover shortfalls between production and demand. Studer will also install 40 EV charging stations in its parking lot. They will provide free, zero-carbon vehicle charging for staff and customers during sunlight hours.

In addition to reducing costs and emissions, the AutarCity project will provide energy security for the entire building. It will use the next3 inverters to provide instant backup power during grid interruptions, maintaining Studer's production line even without mains power. Ten of the next3 inverters will be distributed to strategic locations around the factory, creating individual backup 'hotspots.' They will be controlled by a global energy management system but will also retain the ability to work independently. This individualized approach will ensure a faster and more efficient response to grid failures and load-shedding events, which have become more common in Switzerland in recent years.

A blueprint for commercial solar autarky

With Studer's next3 inverters at the helm, the AutarCity project will showcase that achieving solar autarky is no longer a far-off concept; it is possible here and now. The system will serve as a live demonstration of how commercial and municipal buildings can harness clean energy to reduce operational costs, secure their energy supply, and progress toward a net-zero future.

Using the lessons learned during the project's planning, installation, and operation, the company aims to create a scalable template that SMEs can replicate worldwide. 'The AutarCity initiative will allow us to decarbonize our factory, but it goes far beyond that. We will also be able to meet market expectations by moving from the proven model of the self-sufficient solar house to that of the self-sufficient factory,' said Loïc Viret.

The next3 hybrid inverter is an advanced, all-in-one energy solution for the new generation of solar customers. Whether it is a homeowner seeking grid independence or a business looking for cleaner, more reliable electricity, the next3 delivers the perfect balance of intelligence, power, and reliability. And with the new rack version, energy users can enjoy all the unique benefits of solar autarky, wrapped in pleasing aesthetics that complement their surroundings.

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