

Synchronous inverters for solar panels

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A U.S.-Israeli consortium is developing synchroinverters - inverters that mimic a synchronous generator and are able to actively respond to the grid's frequency changes while stabilizing the voltage. The new devices are expected to do this simultaneously and provide grid stability services in less than 16.67 milliseconds.

Synchroinverters are a special kind of smart inverter that mimics a synchronous generator and are able to avoid grid voltage frequency fluctuations and faults by responding dynamically and autonomously to changes in the grid by software means, and providing an inertial response in an extremely short time. These devices have been developed mostly at the research level to date and are considered an optimal solution for integrating renewable energy with distributed energy resources such as storage and electric vehicles.

“These new inverters are totally autonomous but can also respond to direct commands from the grid operator, when necessary,” a spokesperson from Rhombus Energy Solutions told pv magazine. “The solution is highly scalable, with the synchroinverter able to control inverters ranging in size from kilowatts to megawatts.”

According to the company, the devices are interoperable among themselves without compromising the expected performance of each of them separately and are able to provide grid stability services in less than 16.67 milliseconds. “The inverter will react to any changes in the grid in the same way a generator would; just much faster, in a cost-effective way, and [they] thereby play an active role in grid stability,” the spokesperson went on to say. “It is important to stress that the provision of frequency and voltage support is done simultaneously.”

The new inverter technology will rely on an agnostic algorithm developed by Synvertec that can be embedded into any three-phase inverter. The algorithm will be integrated into Rhombus Energy Solutions' 125 kW bi-directional inverter, which the manufacturer describes as a device that can support power flow to and from the grid, allowing integration with power storage and non-grid renewable power resources. The device can be used either as a grid-tied, utility-interactive inverter or as a PV inverter.

The 125 kW-inverter is currently used by the company in the RES/DCVC125/480 EV DC Fast Charging unit developed by Rhombus. During grid-tied operation, the inverter's site circuit breaker is closed and, when the battery is in discharge mode, the inverter injects current into the grid and supports critical loads. During standalone operation, the smart communication board is opened and the inverter, along with a battery, maintains power to critical loads.

How is it different to Grid Forming Inverters? GFMI are currently offered by ABB, SMA and Telsa (& more) and have been applied in real-world conditions to great success. Synchroinverters sounds like a marketing

gimmick.

Nothing short of techno-babble. As the other commenter noted: there is no shortage of grid-forming inverters. However, these are, without exception connected to a source of energy - be that a battery or even renewables plus storage. Thus it is functionally impossible for a "Synchroinverters" to mimic a synchronous generator (the clue as to what it does is in the word "generator") without a source of energy sitting behind it.

But later on, it becomes clear that far from a "Synchroinverter" being offered it is "software" bolted on to existing inverters. Well bravo boys. I was talking to Parker Hanfin a few years back, guess what - they had both inverters and grid forming software. Nothing new under the sun and certainly nowt new in this announcement.

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Gamesa Electric's latest white paper explores the advanced functionalities that solar and battery inverters should be able to provide to enable greater integration of renewables into the grid and thus contribute as a key element to enhanced grid reliability and stability.

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