

Fraunhofer develops platform to enable transactive energy

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The Fraunhofer Center for Sustainable Energy (CSE) is developing a platform for energy management it hopes will help speed the move to transactive energy solutions to the problems caused by growing penetration of renewables across the world's electric grids, Christian Hoepfner told us in the latest episode of the Smart Grid Today audio program, released today. Hoepfner is executive director of the center, one of seven branches of the not-for-profit Fraunhofer USA, the US offshoot of the German R&D organization.

To develop the transactive energy-management platform, the center is doing a large-scale project on a National Grid distribution feeder in Massachusetts, Hoepfner said, using PV, battery storage, and C&I load management, he added, calling this his group's flagship project.

The SHINES Sundial project is funded by the US DOE, the Massachusetts Clean Energy Center, and the three main partners: Fraunhofer CSE, National Grid, and IPKeys, who all co-fund the project "because we think it's a very important thing to do and we hope to learn very exciting things during the execution of this project," Hoepfner said.

The feeder already had a high penetration of renewables before Fraunhofer and National Grid added a 1.5 MW PV power plant. The partners added a 1 MWH battery system, and, with IPKeys, lined up about 1.5 MW of C&I loads to be controlled through the platform Fraunhofer is developing.

The project has two main goals, he added, with the first being to see how the platform can use C&I load management to help reduce the size of the battery required to manage the high-penetration feeder. Battery technology is still expensive and is likely to stay that way in the big picture for a while, he added.

"Obviously you could solve any high-penetration issues by putting a lot of big batteries next to the PV systems but we believe that that will stay limited simply because of the cost – and so we think that with smart commercial/industrial load management you can downsize the batteries," Hoepfner said.

The second goal is to achieve this not in a campus situation with a single host owning all the resources but by having the system "architected to allow different owners of those different systems – the PV, the battery, and the loads – to cooperate in a specific or special marketplace to solve high-penetration PV issues. So the PV power plant and the battery are owned by different entities than the commercial and industrial loads and we do that by using concepts that come from the demand response business where you do load aggregation for the load response," Hoepfner said.

"We are recruiting participants who do a kind of a demand response but on a much finer granular level both in time and amplitude who can then participate in helping to mitigate the high PV penetration issues on the feeder," he added. "They are being aggregated and that's being used by a central controller who in this case sits actually at the PV power plant to go and make sure that the operating parameters the utility has specified are being kept: voltage backflow and similar things," Hoepfner said.

"We are not trading between the facilities and the PV power plant with energy so it's not transactive energy with regards to that. The facilities take part in the regular ISO markets, of course, for demand response... but the current tariff structure doesn't make it easy for us to monetize these control schemes but we are looking forward to a world where those incentives exist.

"But right now the facilities can take part in the regular demand response and ISO markets whereas the communication between the facilities and the PV and the storage systems is really geared around maintaining the feeder properties and we attach some price to maintaining that but it's an artificial price because there is no real market for that," he added.

Some of the results of the project were made public and can be found on the Fraunhofer website but other findings are yet to be released, Hoepfner said.

Fraunhofer recently opened a new lab to study residential storage to test and quantify storage systems to make sure they deliver the results they promise, he added, and is also working on plug-and-play PV systems that can speed up the deployment of PV on buildings around the globe. Hear the entire conversation for free from all the top podcast sources including iTunes, SoundCloud, Stitcher, and many more – and streaming directly from the [Smart Grid Today website](#).

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