



## NREL + ADVANCED ENERGY

Solar inverter manufacturer Advanced Energy Industries is using the ESIF's Power Systems Integration Laboratory (PSIL) to test its advanced photovoltaic (PV) inverter technology with the ESIF's power hardware-in-the-loop system and megawatt-scale grid simulators. Solar inverters are responsible for a number of critical functions within a solar PV system, including converting the direct current output into alternating current for the grid. Advanced Energy's inverter will help support a smarter grid that can handle two-way flows of power and communication while reducing hardware costs.

### R&D STRATEGY

The ESIF's utility-scale power hardware-in-the-loop capability allows Advanced Energy to loop its inverter into a real-world simulation environment so researchers can see the impact of the inverter's advanced features on power reliability and quality. This testing capability at the ESIF allows manufacturers like Advanced Energy to partner with electric utilities to "bring their own circuit" to NREL to demonstrate and test new, potentially game-changing innovations in a controlled laboratory environment—revealing the effects of these technologies on the distribution system while posing no risk to the utilities or their customers.

### IMPACT

By adding advanced grid support features to solar inverters, Advanced Energy aims to ultimately increase PV saturation without negatively impacting the distribution grid.



The ESIF's unique power hardware-in-the-loop capability allows Advanced Energy to evaluate its inverter's advanced grid support features and their impact on an electric distribution system prior to field deployment. *Still from DOE video*

### Partner with NREL at the ESIF

User facility access to the ESIF is awarded through the review and approval of user proposals, depending on the scientific merit, suitability of the user facilities, and the appropriateness of the work to DOE objectives, and includes a signed user agreement for the facility.

For more information, please visit:

[www.nrel.gov/esif/working\\_with.html](http://www.nrel.gov/esif/working_with.html)

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The Energy Systems Integration Facility (ESIF) at the National Renewable Energy Laboratory (NREL) provides the R&D capabilities needed for private industry, academia, government, and public entities to collaborate on utility-scale solutions for integrating renewable energy and other efficiency technologies into our energy systems.

To learn more about the ESIF, visit: [www.nrel.gov/esif](http://www.nrel.gov/esif).

**National Renewable Energy Laboratory**

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