



Sandia National Laboratories



**U.S. DEPARTMENT OF
ENERGY**

DERlab and SIRFN members Sandia National Laboratories and AIT teaming up on automating Smart Inverter Testing using Hardware-In-The-Loop

With the rapidly changing landscape of grid codes and interconnection standards, manufacturers of DER components are under increasing pressure to reliably update and validate the interoperability and performance of their equipment for different regional requirements and grid conditions. To help vendors meet these standards, AIT and Sandia have teamed up and introduced an approach for the rapid, concurrent development of controls and application software through a controller hardware-in-the-loop (CHIL) testbed integrated with an automated testing platform.

This methodology provides key benefits over traditional power laboratory testing:

- Validating smart inverter grid-support functions without expensive power laboratory equipment, but instead, using benchtop equipment
- Executing certification tests to verify controller operation prior to hardware integration
- Allowing quick design iterations of the communication system to provide interoperability to a range of equipment and standards.

Using the SunSpec System Validation Platform with the AIT Smart Grid Converter (a universal DER converter platform for R&D applications featuring an integrated SunSpec-compliant server), the novel CHIL pre-certification testing methodology has successfully been demonstrated for active power curtailment, fixed power factor, volt-var, frequency-watt, and reactive power control.

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