AMETEK ships 1 MVA AC+DC grid simulation system to NREL

New system to be used by government labs for energy system testing

SAN DIEGO – July 30, 2012 – AMETEK Programmable Power (www.programmablepower.com [1]) recently shipped a regenerative 1 MVA AC + DC source system to the Energy Systems Integration Facility (ESIF) on the campus of the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in Golden, Colorado. The system, which is to be used for grid simulation in the test and evaluation of advanced energy systems such as micro-grids and renewable energy inverters, is based on AMETEK's California Instruments RS Series High-Power AC source.

Dubbed the RS1M, the twelve chassis solution consists of four RS270 systems, each system defined as three 90kVA chassis. Each RS270 system is capable of generating 270 kVA of 3 ø power at up to 692 Vac (L-L). Four control chassis allow ESIF engineers to remotely configure the entire solution as a single 1 MVA, two 540 kVA, four separate 270 kVA, or one 810 kVA and one 270 kVA system. This capability will give ESIF the flexibility it needs to size the simulated power grid appropriately for the devices being tested, as well as understand how different renewable energy technologies interact with each other in a distributed generation micro-grid.
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A key feature of the simulation system is the ability to present the device under test (DUT) with anomalous grid conditions. The RS Series source has a built-in capability to generate these grid anomalies, but, to support the ESIF "hardware in the loop" (HIL) simulation requirements, the RS1M was customized to allow ESIF engineers to control it in real time via external drive signals. These modifications bypass the system controller to permit the external signals to directly control the high-power source, thus eliminating any control signal delays.

Hardware-in-the-loop simulation is not a new concept, but adding megawatt-scale power takes research to another level. ESIF's Smart Power Lab will use the HIL simulators for research and development of the power electronics components, circuits, and controls used in clean and sustainable energy integration. This allows researchers and manufacturers to conduct component and system tests at full power and actual load levels in real-time.

RS Series' key features include:
- Power regeneration. The RS Series can re-capture and return to the facility's utility grid up to 85 percent of the inverter's output, or, in other words, up to 85 percent of the energy inputted to the inverter, which is sourced from the facility grid during testing. This reduces costs in two ways:
- Energy costs directly related to driving the DUT

- Heat load on the facility HVAC system and therefore resultant secondary energy use and cost
- Simplified test configuration. This approach eliminates the need for traditional AC source and load combinations with complex controllers.
- Sophisticated signal generation and measurement. The RS Series uses a sophisticated digital signal processor-based arbitrary waveform generator and power analyzer for the generation, measurement and documentation of anomalous grid conditions. This integrated, multi-instrument approach effectively eliminates the need for additional equipment to create a complete AC power test system

The Energy Systems Integration Facility (ESIF) will be the nation's first facility able to conduct integrated megawatt-scale research and development of the components and strategies needed to safely move clean energy technologies onto the electrical grid. While the facility will support R&D efforts that span the entire electric power system, it will focus on electric systems, buildings and facility systems, community power generation and microgrids; utility generation, thermal and hydrogen systems, energy efficient and advanced grid technologies; electricity system architectures, interoperability; and utility generation and grids that incorporate renewable energy (solar, wind, hydrogen, and advanced vehicles). More information about the ESIF can be found on NREL's Web site: http://www.nrel.gov/eis/facilities_esif.html [2].

www.ametek.com [3]

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Links:
[1] http://www.programmablepower.com
[2] http://www.nrel.gov/eis/facilities_esif.html
[3] http://www.ametek.com