

## Tutorial: Distribution Grid Codes for High Penetration DER

*Date:* Monday, December 6, 2010

*Time:* Track 4 — 8:00 am to 12:00 pm

*Cost:* \$100/ person thru the end-October, \$125/ person after October

*Tutorial Registration Limit:* None

*Description:* As the penetration of distributed energy resources (DER) increases its participation in grid operations, so too will the grid's dependence on DER capacity and energy support increase. Similar to wind in the transmission grid, deliberative steps are likely to be taken to develop grid codes that will enable DER on distribution feeders. Traditional utility planning, design, operation and related interconnect rules will need to change to enable higher future DER deployment. This tutorial will address grid support opportunities for DER, grid code specifications and requirements that can allow for interactive and dynamic support, and related R&D needs for increasing DER grid penetration. Issues to be addressed include:

- Approaches for ensuring fault-ride-through/ low voltage ride through;
- Methods for providing voltage support via reactive power output management; and
- Techniques for supporting utility monitoring, information exchange, and control.

Tutorial participants will learn about the limitations with existing one-way energy delivery operating philosophies, changes needed in grid interfaces and controls, and plans for related utility practices and integration standards. In addition, they will have the opportunity to interact with experts from both the United States and Europe.

### Agenda:

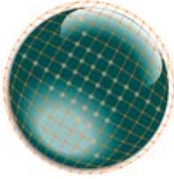
Time	Speakers	Topic
8:00 - 8:10 am	Registration	
8:10 - 9:05 am	Tom Key, EPRI Aidan Tuohy, EPRI Ward Bower, Sandia National Laboratories	<u>Background and Experience</u> <ul style="list-style-type: none"> <li>• History of grid codes and standards</li> <li>• Grid code evolution in Europe</li> <li>• Goals, processes, and impacts of the SEGIS program</li> </ul>
9:05 - 10:00 am	David Bassett, PPL Electric Utilities Miguel de la Torre, REE Dora Nakafuji, HECO	<u>The Utility Perspective</u> <ul style="list-style-type: none"> <li>• IEEE 1547.8 recommended practice for establishing methods and procedures that provide supplemental support for implementation</li> <li>• Operational procedures for solar PV in Spain</li> <li>• HECO's experiences on high penetration PV</li> </ul>
10:00 - 10:15 am	Coffee Break	
10:15 - 11:30 am	Hannes Knopf, SMA Germany Colin Schauder, SatCon Johan Enslin, Petra Solar	<u>Inverter Readiness</u> <ul style="list-style-type: none"> <li>• The German BDEW guideline for generating plants connected to the MV grid -- its technical background and application into SMA inverters</li> <li>• Advanced grid support features of SatCon inverters</li> <li>• Smart distributed solar PV: A novel approach to integrating grid reliability and solar PV technology</li> </ul>
11:30 - 12:00 pm	Ben Kroposki, NREL	<u>R&amp;D Opportunities</u> <ul style="list-style-type: none"> <li>• Future R&amp;D Needs – Moving Towards High Penetrations</li> </ul>
12:00 pm	Adjourn and Lunch	

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4th International Conference on

**Integration of  
Renewable and Distributed  
Energy Resources**

December 6–10, 2010  
Albuquerque, NM USA

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*To register for this tutorial:* <http://www.4thintegrationconference.com/register.asp>