**High Megawatt Power Conditioning System Workshop**

**Technology Roadmap**

**for Increased Power Electronic Grid Applications and Devices**

**NIST**

**Gaithersburg Maryland**

**8:30 am to 5 pm, May 24, 2012**

**Workshop Objectives**

The purpose of this workshop is to gather those with strong interests in achieving higher levels of power electronic penetration in our power grid.  Power grids of the future will have to withstand increasing stresses caused by elements such as large-scale energy trading, and a growing share of fluctuating energy sources, such as wind and solar power. The grids therefore must become more flexible and better controlled. State-of-the-art, and developing, power electronics provide a wide range of solutions. Given this, the intent of the Workshop is to discuss some of the most salient technical, economic, regulatory and political challenges; and to roadmap key solutions.

**Agenda**

8:00am Breakfast

8:30am Introductions and Objectives Al Hefner/Leo Casey/Ron Wolk

8:45am Applications and Drivers for Increasing Grid PCS

Wind PCS Architectures: Madhav Manjrekar (Vestas)

Solar Grid Integration: Bob Reedy (Florida Solar Energy Center)

Grid Storage Integration: Kyle Clark (Dynapower Company)

10:30am Break

10 45 Continue

Fuel Cell Integration: George Berntsen (FuelCell Energy)

TJ Singh (UTC Power)

PCS Connected Microgrids: Shalom Flank (Pareto Energy)

11:15am Advanced HMW PCS Technologies and Approaches

Advanced HMW converters: Dushan Boroyevich (Virginia Tech)

SiC Power Devices/Materials: Dave Grider (Cree Inc.)

SiC Power Devices: David Sheridan (SemiSouth)

12:00noon Lunch

1:00pm Technology Development Programs

Army programs: Skip Scozzie (Army Research)

Navy programs: Sharon Beermann-Curtin (Office of Naval Research)

ARPA-e programs: Pawel Gradzki (Booz Allen Hamilton)

2:00pm Technology Roadmap to Align Expectations

Discussion Leader: Leo Casey (Satcon)

Discussion Topics:

Applications Requirements:

Control of voltage, power-factor and faults through solid-state devices.  Integration and control of renewables and storage. Seamless isolation from grid outages and disturbances through microgrids. Ability to relieve congestion. Achieve improved demand and supply response.

Stakeholders

Power producers, ISOs, grid operators, utilities, power electronic equipment manufacturers, energy and power generation/storage manufacturers.  (related stakeholders also include regulators, safety/standards bodies, rate payers, investors)

System Performance Issues

   a. Cost, efficiency, reliability, overload, fault behavior

b. Advantages and possibilities

Technical barriers/issues

a. Controls, communications, anti-islanding, lvrt, optimization (device, site, system,… )

b. C&P

Hardware Issues –

a. What are the gaps in terms of devices, systems, integration,

Technology Demonstration Issues

1. Technologies, scale, number

5:00pm Adjourn

**LOGISTICAL INFORMATION**

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**May 24, 2012**

***Please be advised that all meeting participants will need to register in advance and provide a photo ID upon arrival at NIST’s main gate at Diamond Avenue and 100 Bureau Drive, Gaithersburg, MD.***There will be no day-of-meeting registrations.  We encourage those who have not yet made a decision to join us in this important endeavor to please contact Al Hefner ([hefner@nist.gov](mailto:hefner@nist.gov)), Colleen Hood ([colleen.hood@nist.gov](mailto:colleen.hood@nist.gov)) or Ron Wolk ([ronwolk@aol.com](mailto:ronwolk@aol.com), 408-996-7811) if you have any questions.

Local ground transportation, maps/directions from the major Washington DC-Baltimore area airports, and more travel information may be found at:   <http://www.nist.gov/public_affairs/visitor/index.cfm>. Maps of the NIST site with building and parking directions, and the areas surrounding NIST are given below.

**Hotel Accommodations**

A room block at the government rate of $139 has been arranged for the nights of May 23 and May 24, 2012 at:

Gaithersburg Hilton

620 Perry Parkway

Gaithersburg, MD 20877

Tel 301-977-8900 Fax 301-869-8597

**Gaithersburg Hilton reservation** for this event (**NIST Power**) includes:

* full hot breakfast each morning in Rooks Corner Restaurant
* Free Transportation to and from NIST site for Workshop (Times to be announced by Hilton and available at check-in)

**To make your hotel reservation,** please contact the hotel directly.  The room block name is:  NIST Power. The room block will be held until May 4, 2012, after which unreserved rooms in block will be released. You may go to:  [Gaithersburg Hilton](http://www1.hilton.com/en_US/hi/hotel/GAIGHHF-Hilton-Washington-DC-North-Gaithersburg-Maryland/index.do) for additional maps/driving directions and other hotel information.

**Food Accommodations**

Breakfast, lunch, coffee, drinks and snacks will be provided on May 24, 2012 during the Workshop. Participants are asked to pay a $30 (cash only) fee to cover the cost of these food services.

**Transportation to and from NIST:**

**Gaithersburg Hilton Provided Transportation:** The Hilton shuttle will run before and after the Workshop (stops at the NIST  
 guard gate to pick up visitor badge and then continues to the AML meeting building).

**Individual Traveler to NIST by Car:**   
 **From northbound I-270** take Exit 10, Route 117 West, Clopper Road. Bear right at the first  
 light onto Clopper Road/West Diamond Avenue. At the next light, turn left onto the NIST  
 grounds.

**From southbound I-270** take Exit 11, Route 124, Montgomery Village Avenue/Quince Orchard Road. Bear right at the first light onto Route 124 West, Quince Orchard Road. After you merge onto Rt. 124, Quince Orchard Road, turn left at the second light onto Route 117, West Diamond Avenue. Turn right at the first light onto NIST grounds.

**Upon Arrival at NIST by Car:** When you turn off of Diamond Avenue into the NIST main entrance, proceed to the main gate, staying to the right and enter the Visitor’s Center parking lot. You must go inside the Visitor’s Center and show your picture ID to pick up your visitor pass to enter for May 24. Parking permits are issued to attendees on a first come first served basis with a valid vehicle registration. Once you have your visitor pass and parking permit (if needed), exit the parking lot to the right and pass through the main gate. Turn left onto North Drive. (Road signs for the meeting will guide you to the Building 216 parking lot.) North Drive will bear around to the right. Take the first left (at crossroad) onto East Drive. Continue on East Drive bearing right while following signs into the Building 216 parking lot on the right(see map below). There will be someone at the door of building 216 to let you in and direct you to the meeting room straight down the hall.

**Individual Traveler to NIST by Metro:**

The headquarters site of the National Institute of Standards & Technology is located near Gaithersburg, Maryland, just off Interstate Route 270, about 25 miles (40 kilometers) from the center of Washington, D.C. After arriving at Shady Grove Metro Center, go through turnstiles and turn right through tunnel to the East Kiss and Ride parking lot at 15 and 45 minutes past the hour. After exiting tunnel turn to the right to find the bus stop. NIST shuttle will stop at "Bus Bay C." NIST provides shuttle service for official visitors to and from the Shady Grove Metro Station daily from 6:45 am to 6:10 pm. The last NIST shuttle leaves Shady Grove Metro at 6:10 pm.

The shuttle to Metro departs from the front of the NIST Administration Building (Building 101) at 5 and 35 minutes past the hour. The last shuttle leaves NIST at 6:00 p.m.

For further information on transportation, food/dining, hotels/motels and more, see the [Visitor Information](http://www.nist.gov/public_affairs/visitor/index.cfm) page. Please let us know in advance if you will be taking Metro so we can arrange to have someone transport you from the main gate to the meeting building.

**Other Area Hotels**

Please note that transportation to NIST is only provided for the Gaithersburg Hilton:

[Gaithersburg Hilton](http://www1.hilton.com/en_US/hi/hotel/GAIGHHF-Hilton-Washington-DC-North-Gaithersburg-Maryland/index.do)

(room block name: **Power Electronics or NIST Power)**

620 Perry Parkway

Gaithersburg, MD 20877

Tel 301-977-8900 Fax 301-869-8597

[Wyndham Garden Hotel Gaithersburg](http://www.wyndham.com/hotels/IADWG/main.wnt)  
805 Russell Ave.

Gaithersburg, Md. 20879  
(301) 670-0008 Fax: (301) 948-4538

[Holiday Inn Hotels](http://www.holidayinn.com/hotels/us/en/gaithersburg/wasrv/hoteldetail)2 Montgomery Village Ave.

Gaithersburg, Md.. 20879  
(301) 948-8900 Fax: (301) 258-1940

[Courtyard Gaithersburg Washingtonian Center](http://marriott.com/property/propertypage/WASCG)  
204 Boardwalk Place

Gaithersburg, Md. 20878  
(301) 527-9000 Fax: (301) 527-9001

[SpringHill Suites by Marriott-Gaithersburg](http://www.marriott.com/hotels/travel/wasgt-springhill-suites-gaithersburg/)  
9715 Washingtonian Blvd.

Gaithersburg, Md. 20878  
(301) 987-0900 Fax: (301) 987-0500

[Residence Inn by Marriott-Gaithersburg](http://www.marriott.com/hotels/travel/waswn-residence-inn-gaithersburg-washingtonian-center/)  
9721 Washingtonian Blvd

Gaithersburg, Md. 20878  
(301) 590-3003 Fax: (301) 590-2722

[Gaithersburg Marriott Washingtonian Center](http://marriott.com/property/propertyPage.mi?marshaCode=WASWG)  
9751 Washingtonian Blvd.

Gaithersburg, Md. 20878  
(301) 590-0044 Fax: (301) 212-6155