

Electrical Subgroup Kickoff Meeting

26 March 2015

Washington DC

25 in-person

13 virtual

Electrical Subgroup Virtual Meeting

“Rare Earth Magnets”

29 April 2015

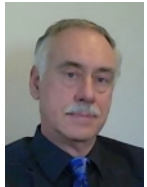
~22 attendees



Electrical Subgroup Leads



Dr. Ruth Douglas Miller
Kansas State University



Dr. Rob Wills
Intergrid



Dr. Eduard Muljadi
NREL



Dr. Greg Mowry
University of St Thomas, School of Engineering

Electrical Subgroup Opportunities

Inverters

- Options
 - Off-the-shelf (ABB/Power One, Princeton Power Systems)
 - Custom, in-house (e.g. Bergey, Pika, NPS, Dakota)
- Need Si-C inverters: more efficient, reduced weight, less complex, reliable, less \$ system cost
- Inverter cost breakdown
 - 1/3 cost in passive
 - 1/3 cost switching
 - 1/3 cost metal works
- Rob Wills awarded Competitiveness Improvement Project (CIP) subcontract from US Department of Energy (DOE) to develop a 20-40 kW single phase inverter to work with VFDs



More on this in August

Electrical Subgroup Opportunities

Power Electronics

- Variable-frequency Drives
 - disconnect between wind industry and semiconductor industry in terms of what is commercially available
- What have other industries done to standardize their product offerings?
- Most turbine companies focus on blades first and then electronics



Dr. John Muth



POWERAMERICA

NC STATE UNIVERSITY

Wide Band Gap Semiconductors for Power Electronics

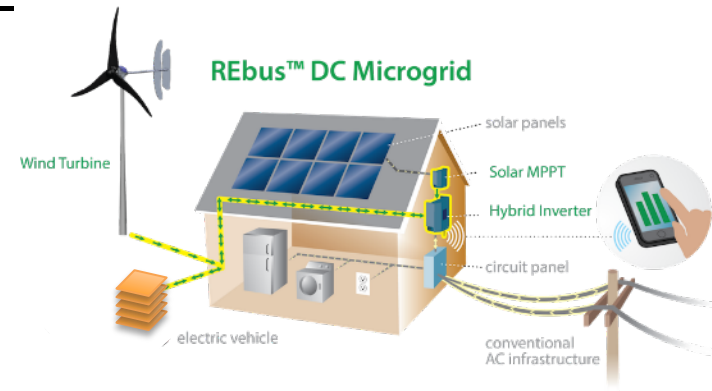
Silicon Carbide Diodes and MOSFETS

Gallium Nitride

Electrical Subgroup Opportunities

Other

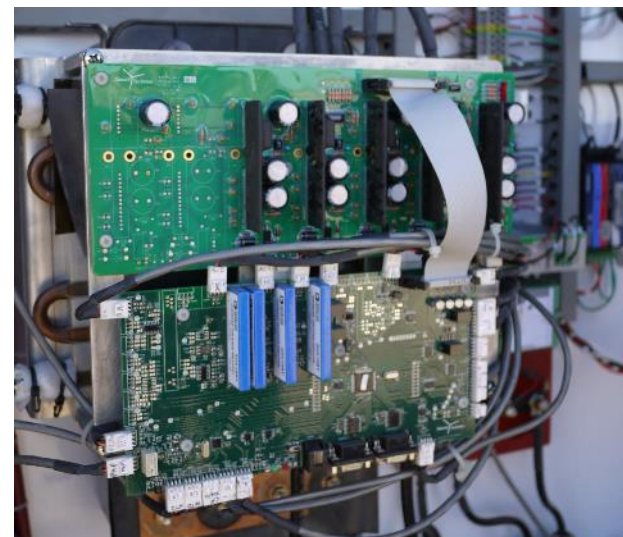
- How can we link with other industries?
 - **Collaborate w/ electric vehicle** generator/motor development and power electronics
 - A generator is a motor, demands are the same for small turbines
- Keeping an eye on changing **IEEE 1547** requirements
- Standardize grid interconnections, make web-enabled w/ performance-based software
- Integrate all RE, tie systems together



Electrical Subgroup Opportunities

OEM priorities

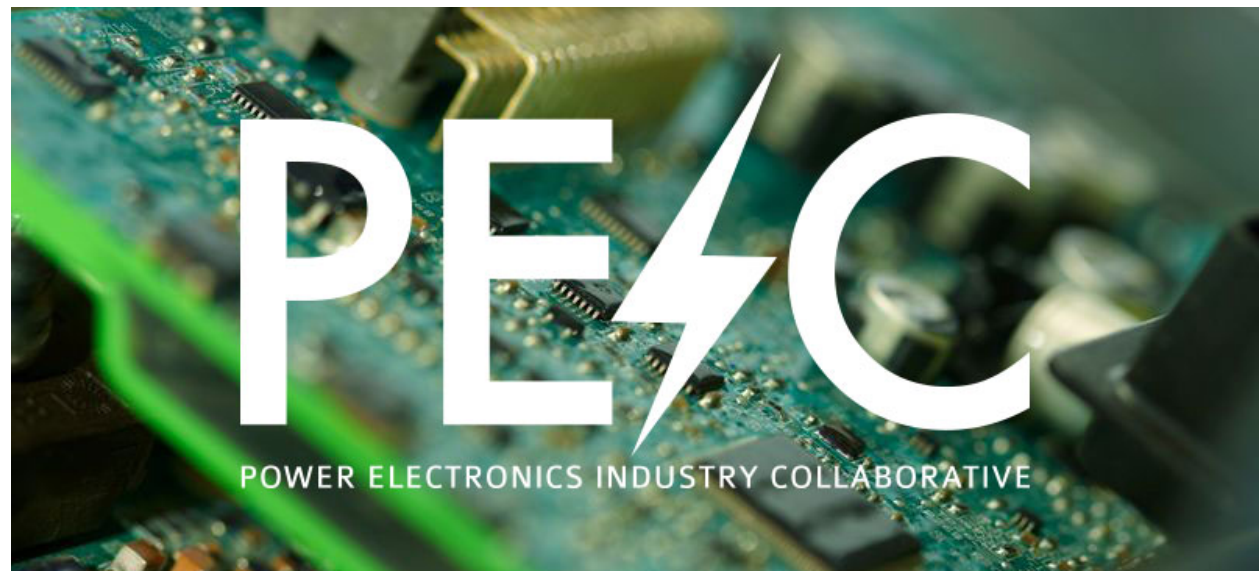
- Inverters are still expensive to build due to low annual volumes
- Reduce system cost w/ inverter development (more impact than alternator improvements)
 - E.g. Ginlong is selling 5-kW inverters for 25 cents/Watt
- Can variable speed drives be made to work with turbines?
- **DW OEMs typically cannot afford the development \$ to start from scratch**
- have to easily integrate storage



Electrical Subgroup Opportunities

Power Electronics Industry Collaborative

- Goal to identify technology gaps in power electronics
- supply chain gap analysis results
- understand areas of research focus



Discussion Notes/Specific Actions

- Swad – Renewables are a good place to collaborate, keep US leadership by working at the system level, maintain design and application leadership, maintain US manufacturing for emerging the (as opposed to bringing manufacturing back to the US)
- **August virtual meeting on VFDs and inverters** – Wednesday, August 26 @ 230pm (tentative); ID some players to invite
- Rob W – on the SiC inverter project, magnetics are the difficult part, BOM of \$2500, \$8-900 is magnetics, source for **magnetic cores** is currently Korea with long lead times
- Keith – Nanofoundry is a new PEIC member that may offer this (early stage)
- Rob – VFDs pretty common in large wind; use the DC bus to motor connection in reverse instead of straight rectification of the PMG, allows active torque control
- Inverters – Dean H, level of US leadership depends on power level; TF – need to work on the whole system, not just the pieces/parts, request info on US team to focus on the inverter;
- Power range is 200 W to 750 kW; for inverter based, 2kW to 100 kW
- Dean – is there a market/business plan/vision for this market? TF noted the report on distributedwind.org
- Rob W is very interested in collaboration in supply chain side, application side (manufacturing and design);
- Rob - in the WBG space, CREE is the leader, prices high, limited competition
- Ruth – emailed SMA (Windy Boy), Sunny Boys can be reprogrammed but may have warranty issues; Rob W – party true, but some limitations on programming power/volt curve, etc (for Tripower), lack of dynamic settings needed for wind turbines;
- Dean – still somewhat a fragmented market; 15-20 companies hearing bits and pieces of the story may not carry water; collective voice may be better heard
- TF – Roadmap should highlight needs in PE, Tom L at NIST thrilled with this intersection of work
- Member meeting in Santa Clara, follow up later



Electrical opportunities June 2015.pptx - PowerPoint

GoToMeeting Viewer

Now viewing HRW laptop's screen

layout Zoom: 85% Webcams

Talking: Phone Caller

Options

Attendees 17

- Brent Summerville (me, organizer)
- Heather Rhoads-Weaver (web, orga...)
- HRW laptop (presenter, organizer)
- Aimee Gardere
- Ashley Hale
- Brian Kuhn
- Dan Bergey
- Frank Abdi
- Henderson Dean (IFNA PMM SMD A...)
- Keith Evans (web)
- Michael Hudon
- Mike Bergey
- Robert Preus
- Ruth (web)
- Ruth Douglas Miller
- Swad (web)
- Trudy Forsyth

Chat

Enter your message

To: Everyone

Stop recording
This session is being recorded.

Meeting ID: 745-311-973



DWEA
DISTRIBUTED WIND ENERGY ASSOCIATION

eFormative options
LLC

Wind Advisors Team

SUMMERVILLE WIND & SUN

OUR WIND OUR POWER OUR FUTURE

Con-sor-tium: *an agreement, combination, or group (as of companies) formed to undertake an enterprise beyond the resources of any one member*








































Image courtesy NIST

DWEA's SMART Wind Consortium is connecting more than 80 collaborators to form consensus on near-term and mid-term plans (applied research and advanced manufacturing opportunities) needed to increase cost competitiveness through the use of advanced manufacturing techniques

www.distributedwind.org/smart-wind-sign-up/

Talking: Phone Caller



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	HTML5 Viewer User 
	Keith Evans (web) 
	Ken Kotalik 
	Michael Hudon 
	Mike Bergey 
	Robert Preus 
	Ruth (web) 
	Ruth Douglas Miller 
	Swad (web) 
	Trudy Forsyth 
All  All 	

Rob Wills