APEC Expert Group on New and Renewable Energy Technologies and US Grid/Renewable Energy Research Programs

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Workshop on Addressing Grid-interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Resources

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What is APEC?

• Asia-Pacific Economic Cooperation (APEC) was created in 1989
• Objective: Promote trade liberalization, trade facilitation and technical assistance
• APEC Economies account for more than one third of the world’s population, 60% of world GNP and 50% of world trade
• Implements its activities through 11 working groups including the Energy Working Group

(http://www.apec.org)
APEC Member Economies span the Pacific

- Australia
- Brunei Darussalam
- Canada
- Chile
- People's Republic of China
- Hong Kong China
- Indonesia
- Japan
- Republic of Korea
- Malaysia
- Mexico
- New Zealand
- Papua New Guinea
- Peru
- Republic of the Philippines
- Russia
- Singapore
- Chinese Taipei
- Thailand
- United States
- Vietnam
The eleven APEC working groups support economic and technical cooperation

- Agricultural Technical Cooperation Working Group
- Energy Working Group
- Fisheries Working Group
- Health Working Group
- Human Resources Development Working Group
- Industrial Science and Technology Working Group
- Marine Resource Conservation Working Group
- Small and Medium Enterprises Working Group
- Telecommunications and Information Working Group
- Tourism Working Group
- Transportation Working Group
APEC Energy Working Group (EWG)

The EWG was launched in 1990

The EWG seeks to maximize the energy sector's contribution to the region's economic and social well-being, while mitigating the environmental effects of energy supply and use.

Australia was the EWG Lead Shepherd from its inception until 2009. The United States is the current Lead Shepherd.

The Energy Security Initiative (ESI) is the principal mechanism through which the EWG addresses the short and long term energy security challenges in APEC in a sustainable manner.

The APEC Energy Ministers (EMM9) last met in Fukui, Japan in June 2010 under the theme of “Low Carbon Paths to Energy Security—Cooperative Energy Solutions for a Sustainable APEC”

(www.ewg.apec.org)
The Energy Working Group is supported by 7 sub-fora groups

- Expert Group on Clean Fossil Energy (EGCFE) – Chair: USA (www.egcfe.ewg.apec.org)
- Expert Group on Energy Efficiency & Conservation (EGEEC) – Chair: New Zealand (www.egeec.apec.org)
- Expert Group on Energy Data & Analysis (EGEDA) – Chair: Japan (www.ieej.or.jp/egeda/)
- Expert Group on New and Renewable Energy Technologies (EGNRET) – Chair: USA (www.egnret.ewg.apec.org)
- APEC Biofuels Task Force - Chair: USA (www.biofuels.apec.org)
- Asia Pacific Research Center (APERC) (www.ieej.or.jp/aperc/)
- Energy Business Network - Chair: New Zealand (www.ewg.apec.org)
EGNRET’s Renewable Energy Activities are Diverse and Complementary

- Lead and work with EWG major initiatives
  - APEC 21st Century Renewable Energy Development Initiative
  - EWG led Energy Security Initiative (2001)
  - Ministerial Level Biofuels Initiative (2006)
- Organize workshops
- Conduct research projects
  - 50 have been completed since 1992
  - 2 are being implemented in 2010-2011
EGNRET Renewables/Grid-Integration Projects

- Using Smart Grids to Enhance Use of Energy Efficiency and Renewable Energy Technologies (EWG 01, 2009S) USA
- Addressing Grid Interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Sources (EWG 02/2009) Japan
High Penetration Solar Energy Challenges

For high distributed PV penetration
- Significant fluctuations in electricity output requires other grid assets to compensate for it
- Ramping issues (morning and evening) require other generators to ramp up or down
- Potential issues when feeding electricity back into the grid (circuit breaker protection schemes are designed for uni-directional power flow)

For solar thermal power plants
- Operate on the principal of a steam turbine plant
- No ramping issues because of large thermal storage
- BUT: significant water requirements for cooling the water/steam medium of steam turbine plant
DOE Programs Addressing High Penetration PV Challenges--Office of Electricity Delivery and Energy Reliability (http://www.oe.energy.gov)

Research and Development

- Base programs that support longer-term technology development for grid modernization
- Four R&D focus areas
  - Clean Energy Transmission and Reliability
  - Distributed Generation/Smart grid
  - Energy Storage
  - Cyber security for energy delivery systems
DOE Programs Addressing High Penetration PV Challenges--Office of Energy Efficiency and Renewable Energy (http://www.eere.doe.gov)

Systems Integration
(within Solar Energy Technologies Program)
- Solar Energy Grid Integration systems (SEGIS) to develop inverters/converters with EMS interfaces for integrating solar energy with smart grid applications
- Solar system modeling & benchmarking
- Resource & Safety R&D
US DOE Smart Grid Information Clearinghouse (http://www.sgiclearinghouse.org/)

Goal is to “make data from smart grid demonstration projects and other sources available to the public”

- Competitive award to Virginia Tech (Lead)/EnerNex/IEEE Team to establish Web-based public info clearinghouse
  - Serving as a central repository for smart grid information, including all Recovery Act smart grid projects
  - Sharing and dissemination of information on knowledge gained, lessons learned, and best practices
  - Supporting decision making by both State/Federal Regulators
- Responded to high priority identified by NARUC/FERC Smart Grid Collaborative & Electricity Advisory Committee
- Clearinghouse User Group comprising key stakeholder groups assembled to guide collaborative development
US DOE Outreach grid integration activities

▶ GridWeek 2010
  - Washington, DC, October 18-21, 2010
  - Associated US-EU workshop on Energy Storage

▶ 4th International Conference on Integration of Renewable and Distributed Energy Resources
  - Albuquerque, New Mexico, December 6-10, 2010
  - http://4thintegrationconference.com/
Thank you for your attention!

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