

# **Integrating Variable Renewable Energy into the Grid: Key Issues and Emerging Solutions**

29 July 2015

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# Agenda

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**Welcome &  
Introductory  
Remarks**

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**Overview of the  
Clean Energy  
Solutions Center**

- **Tim Reber**, National Renewable Energy Laboratory

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**Presentations**

- **Dr. Michael Milligan**, Principal Analyst, NREL
- **Jessica Katz**, Analyst, NREL
- **Jennifer Leisch**, Climate Change Mitigation Specialist, USAID Office of Global Climate Change

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**Question and  
Answer  
Session**

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**Attendee  
Survey**

# Solutions Center Background and Vision

CleanEnergySolutions.org

**The Clean Energy Ministerial (CEM) launched the Clean Energy Solutions Center in April 2011. The Solutions Center:**

- Is one of 13 CEM Initiatives, which include:
  - Global Superior Energy Performance Partnership
  - Super-Efficient Equipment and Appliance Deployment initiative
  - Global Lighting and Energy Access Partnership
- Helps governments design and adopt policies and programs that support the deployment of clean energy technologies
- Has more than 35 partners, including IRENA, IEA, IPEEC, Sustainable Energy for All, Bloomberg New Energy Finance and Leonardo Energy
- Is co-chaired by the U.S. Department of Energy and the Australian Department of Industry.



Australia



Denmark



India



Indonesia



Italy



Japan



Mexico



South Africa



Sweden



United Arab Emirates



United States

# Clean Energy Solutions Center

CleanEnergySolutions.org

## Goals

- **Serve** as the primary resource for clean energy policy information, assistance and peer learning for governments and government-affiliated practitioners.
- **Share** policy best practices, data, and analysis tools across countries.
- **Deliver** dynamic services that enable expert assistance, learning, and peer-to-peer sharing of experiences.
- **Foster** dialogue on emerging policy issues and innovation across the globe.

## Primary

- Government Policy Makers
- Advisors

## Secondary

- Private Sector Companies
- Energy Entrepreneurs and Investors
- Non-Governmental Organizations
- Civil Society
- Others Engaged in Clean Energy

## Target Audiences

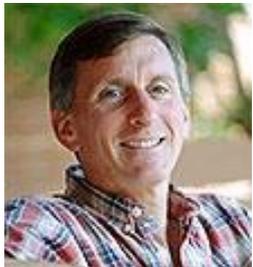
# Ask-an-Expert: Our Experts in Action

CleanEnergySolutions.org

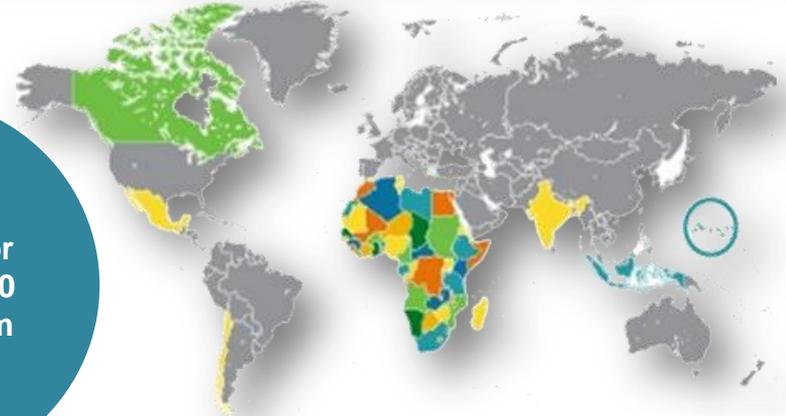


Connects policymakers to a global network of more than 30 energy experts for quick-response technical assistance on policies and programs relating to:

- Renewable Energy
- Energy Access
- Energy Efficiency
- Smart Grid
- Transportation
- Utilities



Delivered no-cost assistance for more than 120 requests from over 60 countries.

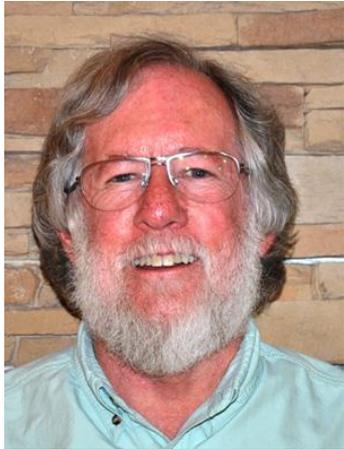


Please submit a question directly at  
[cleanenergysolutions.org/expert](https://cleanenergysolutions.org/expert)

Or contact me directly to find out how the Ask-an-Expert program can benefit your work:

[Sean.Esterly@nrel.gov](mailto:Sean.Esterly@nrel.gov) | 303-384-7436

# Dr. Michael Milligan, Principal Analyst, NREL



**Dr. Michael Milligan** came to the National Renewable Energy Laboratory's National Wind Technology Center in 1992, and he is now with the Transmission and Grid Integration Group at NREL. His research focuses on large-scale integration of wind and solar energy on the bulk power system, on which he has authored or coauthored more than 200 journal articles, conference papers, technical reports and book chapters. Michael has provided expert testimony in numerous public utility commission proceedings and workshops, and he advises power system planners and operators on wind and solar integration issues. He leads and participates in various task forces for the North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers (IEEE) Power and Energy Society and the Western Electricity Coordinating Council (WECC). His sustained participation on the International Energy Agency Task 25 for large-scale wind integration helped launch a continuing series of international technical papers on integration issues. He was an invited panelist in 2012 to the Royal Irish Academy in Dublin and an invited keynote speaker at the 2011 Power System Computation Conference in Stockholm. He has hosted visiting researchers from Germany, Ireland, Spain, Australia, China and Italy.

# Jessica Katz, Analyst, NREL



**Jessica Katz** is an analyst at the U.S. National Renewable Energy Laboratory (NREL) in Golden, Colorado. Her work focuses on coordinating and implementing technical assistance in support of the U.S. government's Enhancing Capacity for Low Emission Development Strategies program, which works with partner countries to accelerate sustainable economic growth while minimizing greenhouse gas (GHG) emissions trajectories. In this role, she has developed tools and trainings related to clean energy development topics such as renewable energy resource assessment and the integration of large-scale renewable energy systems to the grid. While at NREL, she has also supported the development and implementation of the Federal Greenhouse Gas Accounting and Reporting Guidance and has assisted federal agencies in completing GHG inventories in compliance with President Obama's Executive Order 13514. Jessica holds a BSE in civil and environmental engineering from Arizona State University.

# Jennifer Leisch, Climate Change Mitigation Specialist, USAID



**Jennifer Leisch** is a Climate Change Mitigation Specialist in the USAID Office of Global Climate Change, where she supports the U.S. Enhancing Capacity for Low Emission Development Strategies program. Jennifer manages the USAID Greening the Grid partnership, and also directs Agency work to account for greenhouse gas emissions reductions as a result of USAID Clean Energy programs. She holds a Ph.D. focused on renewable energy science, and has previously worked in the research and development of advanced solar energy and fuel cell technologies.

# Question and Answer Session

Please submit any questions through the “Question Pane” of the GoToWebinar panel

## Questions



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## THANK YOU!

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- For more information on the “Ask-an-Expert” program please email me directly:
  - [Sean.Esterly@nrel.gov](mailto:Sean.Esterly@nrel.gov) or 303-384-7436