GREENING THE GRID
Advancing Solar, Wind, and Smart Grid Technologies

IMAGE BY RAYMOND DAVID, NREL 19500

Countries around the world are poised to transform the way they power their economies through investments in grid-connected renewable energy and smart grid technologies.

Greening the Grid provides technical assistance to energy system planners, regulators, and grid operators to overcome challenges associated with integrating variable renewable energy into the grid.

THE CHALLENGE: LARGE-SCALE, GRID CONNECTED CLEAN ENERGY

Power grids are complex networks that balance electricity supply and demand around the clock, every day of the year. Renewable energy, such as solar and wind, can significantly reduce greenhouse gas emissions from electricity generation. However, the variability of wind and solar—both hourly and seasonally—creates unique challenges for integrating electricity from these renewable resources into existing power grids. Some of the critical technical and policy questions that must be addressed include:

- How much variable renewable energy can be added to the electricity grid while maintaining reliable operation?
- What policy, market, and regulatory mechanisms are most effective in enabling large-scale renewable energy integration at least cost?
- Can transmission infrastructure upgrades improve the economics of large-scale renewable energy generation?
- To what extent can smart grid technologies increase system flexibility and strengthen the grid?
- What information and safeguards are needed to build confidence among investors, utilities, and other power system stakeholders to motivate participation and engage them in meeting renewable energy targets?
- What is the optimal strategy for sequencing and financing grid-integration investments?

GREENING THE GRID: TECHNICAL ASSISTANCE AND COLLABORATION

Greening the Grid offers a toolkit of information and guidance materials to support countries in developing and implementing grid-integration road maps. Toolkit resources provide 1) concise and comprehensive overviews of emerging practices for addressing grid-integration challenges through policy, market, and regulatory mechanisms and 2) guidance on applying these mechanisms to develop robust grid-integration road maps.

Drawing on this toolkit, Greening the Grid also facilitates direct technical assistance tailored to the unique power system characteristics and priorities in each partner country. Some examples of technical collaboration opportunities include:

- Expert exchange on developing scenarios for large-scale wind and solar generation
- Development or technical review of grid codes
- Training on the use of grid capacity expansion models and the data needed to support these models
- Partnering to develop grid integration road maps.

PARTNER WITH US!

Interested in partnering through Greening the Grid to receive technical assistance on grid integration? Please contact us to learn more and explore opportunities for collaboration.

GREENING THE GRID TOPICS

Greening the Grid provides resources and guidance on the following topics:

- Incentivizing new renewable energy generation
- Planning for smart grid technologies
- Increasing power system flexibility
- Integrating distributed generation
- Leveraging renewable energy and demand response to achieve long-term adequate supply
- Financing and implementing grid integration strategies.

FOR MORE INFORMATION

Jennifer Leisch
USAID Office of Global Climate Change
Tel: +1-202-712-0760
Email: jleisch@usaid.gov

Jaquelin Cochran
National Renewable Energy Laboratory
Tel: +1-303-275-3766
Email: jaquelin.cochran@nrel.gov

Greening the Grid is supported by the U.S. Government's Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) program, which is managed by the U.S. Agency for International Development (USAID) and Department of State with support from the U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Department of Agriculture and U.S. Forest Service.

USAID FROM THE AMERICAN PEOPLE

USDA

greeningthegrid.org | ec-leds.org

NREL/FS-6A20-62401 July 2014
CLEARED