CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

21st CENTURY POWER PARTNERSHIP
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

21st Century Power Partnership (21CPP)

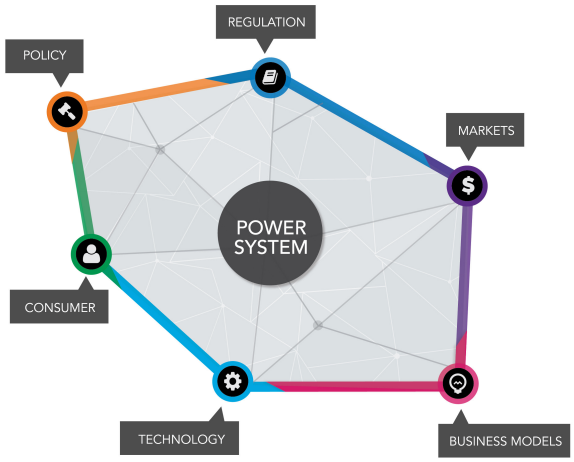
Accelerating the transition to efficient, reliable, clean, and cost-effective power systems

Goals

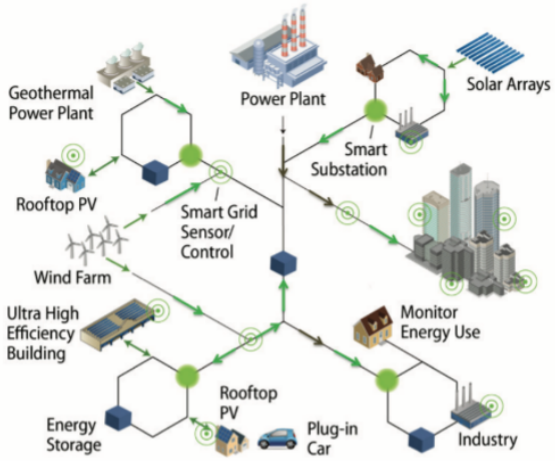
21CPP advances power system transformation by facilitating collaborative research, information-sharing, and capacity-building among power system practitioners to promote integrated policy, regulatory, financial, and technical solutions for the deployment of clean energy in combination with large-scale energy efficiency and smart grid deployment.

Rationale for being included in the CEM

Over the next two decades, **power systems around the world will incorporate larger amounts of various generation technologies and new services.** Power system flexibility and integration of renewables could facilitate a transition to clean energy. It is estimated that by 2035, $16.9 trillion (USD) of power system investment will be required to achieve the goals of energy sustainability, security and access. Ensuring that these investments happen at the required scale demands integrated policy approaches reflecting state-of-the-art knowledge across many domains.



Evolutionary landscape of power system transformation.
Source: NREL



Power system transformation requires a holistic, integrated approach.
Source: NREL

Key accomplishments

- **Enabled Mexico's comprehensive electricity sector reform** agenda to proceed quickly and efficiently through four years of deep collaboration with the Secretary of Energy (SENER) on policy, market, and technical issues.
- **Built confidence and ambition in India's 175 GW renewable energy target** by conducting a detailed grid integration study in collaboration with the Greening the Grid program.
- Assisted **Chinese** partners in planning and producing the China Renewable Energy Outlook in 2016, 2017 and 2018 cementing ambitious power system transformation.
- Published over a dozen thought leadership reports to inform stakeholders of best practices and innovative thinking in power system transformation.

Energy supply and systems integration

Lead CEM Member(s)

India, Mexico*, United States*

CEM Member Participant(s)

Brazil**, China, Denmark, Finland, South Africa, Spain

*Participation and leadership are under review.
**Brazil expressed its interest in co-leadership at CEM10.

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Key actions

- **Thought leadership studies** that highlight global cutting edge power system transformation topics.
- **In-country technical cooperation,** focusing on policy, regulatory, and technological progress, and grid integration studies and recommendations for 21CPP members.
- **Knowledge transfer** through information exchange, capacity building, fellowship programs, and other exercises to share lessons learned among 21CPP members.

Energy supply and systems integration

Highlights and deliverables since CEM9

Thought leadership publications:

- **Principles of Power System Transformation and Innovative Utility Offerings: Case Studies from Around the World.** Released at CEM10.
- **Status of Power Systems Transformation: System Integration and Local Grids (2019).** 21st Century Power Partnership and International Energy Agency.

In-country technical cooperation:

- **Brazil**: Brazil is a relatively new member of 21CPP. The objective is to help Brazilian stakeholders with a clearer understanding of international best practices in integrating variable renewable electricity sources into the grid while minimising cost and ensuring reliability. 21CPP contributed three presentations and two session moderations at the Energy Research Office's (EPE) ***CEM Days*** workshop in November 2018 in Rio de Janeiro. Held webinar on distributed energy planing with EPE. Co-developed a work plan to focus on collaborative research on power system transformation in Brazil.
- **China**: 21CPP helped to improve understanding of the challenges both decision-makers and modelers face in planning and operating power grids based on advanced quantitative tools. 21CPP co-convened Power Sector Modelling Workshop in Suzhou with the *CEM Long-Term Energy Scenarios Campaign* during China International Energy Transition Forum; and assisted China in publishing ***China Renewable Energy Outlook 2018***.
- **India**: 21CPP continued collaboration on power system transformation with key stakeholders. It partners with *Greening the Grid* and works with India Central Electricity Authority (CEA) on an open source version of a high-fidelity capacity expansion model. 21CPP helped India to develop capability to simulate changes to the electricity grid, and improved confidence among stakeholders that the grid can be operated while achieving reliability, economic and sustainability metrics.
- **Mexico**: 21CPP worked closely with outgoing/incoming administration officials on energy issues, and helped smooth the transition. It assisted Mexico's leadership role in the *CEM Distributed Generation Campaign*. 21CPP published **The Status and Outlook of Distributed Generation Public Policy in Mexico**, **Baja California Sur Renewable Integration Study**, and **Opportunities for Battery Storage in Mexico**; and developed a presentation of the High Renewable Energy Zones in Mexico (AZEL 2.0).
- **South Africa**: 21CPP assisted South Africa and CEM Secretariat in developing the concept of a ***CEM Clean Power Week***, which is envisaged for 2019, and would catalyse the discussions and implementation of South Africa electricity market reform in the context of Integrated Resource Planning.

21CPP closely interacts with other power system initiatives and campaigns, and also reaching out to demand side initiatives for potential collaboration on the topic of power system and transport sector coupling.

Operating Agent(s) / Coordinator(s)	NREL NATIONAL RENEWABLE ENERGY LABORATORY — National Renewable Energy Laboratory
Funding Government(s)/ Organisation(s)	Children's Investment Fund Foundation (CIFF), the William and Flora Hewlett Foundation, United States Department of Energy (DOE).
Global and In-Country Technical Partner(s)	Danish Energy Agency (DEA), Edison Electric Institute (EEI), International Energy Agency (IEA), International Renewable Energy Agency (IRENA), Regulatory Assistance Project (RAP), United States Agency of International Development (USAID), the World Bank Energy Sector Management Assistance (ESMAP). China National Renewable Energy Center (CNREC) in China, Power System Operation Corporation (POSOCO)in India, National Center for Energy Control (CENACE) and Energy Regulatory Commission (CRE) in Mexico, Council for Scientific and Industrial Research (CSIR) and the ESKOM in South Africa, and Energy Research Office (EPE) in Brazil.