

# “CEM Days”

## Grid Integration of Variable Renewables: Challenges and Approaches for Power System Planning

November 21



Main trends and implications for energy planning and procurement

morning

November 22



Transitioning to a capacity-constraint system in Brazil: Challenges for planning and auction



Empresa de Pesquisa Energética

Capacity x Flexibility: conceptual approach  
Distributed Generation: adjusting projections



Modelling Grid integration and Natural Gas-Renewable complementarity

afternoon

November 23



Integration of Variable Renewables in the Brazilian Mix: Preliminary results

Wrap up and closing  
Networking

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## Grid Integration of Variable Renewables: Challenges and Approaches for Power System Planning

**21-23 November 2018**  
**Rio de Janeiro**



International  
Energy Agency



**CLEAN ENERGY**  
MINISTERIAL  
Advancing Clean Energy Together

21st Century  
**POWER PARTNERSHIP**  
Accelerating the transformation  
of power systems



Joint Institute for  
Strategic Energy Analysis



Per mão da  
**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

**Organization:**



Empresa de Pesquisa Energética

## **Background Info**

Many countries around the world have seen a rapid growth in the share of solar PV and wind power, referred to as variable renewable energy (VRE). These technologies have become increasingly competitive, compared to traditional resources, i.e. large-scale thermal power plants, and contribute to the reduction of GHG emissions and local air pollution.

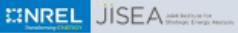
This shift requires new approaches, methodologies and tools for power system planning. While some countries have taken the lead in the integration of VRE and have valuable lessons learnt to share, there is no singular approach able to tackle the wide variety of country-specific and regional conditions. Globally power systems vary in terms of their resource availability, transmission and distribution grids, the existing electricity mix, stable or fast growing loads, and market and regulatory framework, etc. Therefore, permanent efforts are needed to promote constructive dialogue and experience sharing between countries and institutions.

Taking advantage of the framework enabled by the Clean Energy Ministerial (CEM), and its aim to empower energy decision makers around the world with the up-to-date information and tools, as means to accelerate transition to low carbon energy, Rio de Janeiro will host a 3-day event to bring together experts and policy makers to discuss strategies to support a secure and cost-effective integration of higher shares of VRE.

The first day holds a workshop covering both supply and demand-side issues and innovative approaches to system planning and modelling. The second day holds a morning session on renewable distributed generation (DG) forecasting and an afternoon session covering NREL's experience in modelling VRE. A breakout session in the morning will discuss adaptation of procurement mechanisms. Finally, the highlight of the third day is a presentation of a comprehensive study carried out to model integration of VRE in the Brazilian power system, known for its transmission grid of continental size and high shares of hydropower with reservoirs. The detailed agenda is available at the link below.

Open discussion will be encouraged after the presentations. The targeted public are professionals of the power sector, including energy planning and modelling professionals, policy makers, regulators, power system operators and others.

The “CEM Days – Grid Integration of Variable Renewables: Challenges and Approaches for Power System Planning” are being organized by the Energy Research Office of Brazil (EPE), with support of the International Energy Agency (IEA) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). This event is taking place in the framework of the CEM’s Power System Flexibility Campaign, as this topic is key to integration of VRE. It also seeks synergies with 21st Century Power Partnership (21CPP), with its goal of strengthening and disseminating technical tools to accelerate the transition to a more modern electricity sector.

<b>"CEM Days"</b> <b>Grid Integration of Variable Renewables:</b> <b>Challenges and Approaches for Power System Planning</b>				
	November 21	November 22	November 23	
morning	 International Energy Agency  Main trends and implications for energy planning and procurement	 International Energy Agency  Transitioning to a capacity-constraint system in Brazil: Challenges for planning and auction	 Empresa de Pesquisa Energética  Capacity x Flexibility: conceptual approach Distributed Generation: adjusting projections	 Operadora Nacional de Sistemas Elétricos  Integration of Variable Renewables in the Brazilian Mix: Preliminary results
		 Modelling Grid integration and Natural Gas-Renewable complementarity		Wrap up and closing Networking
	  		Organized by 	

For those who would like to contribute with a presentation, we still have some flexibility to include it in the programme. If so, please contact Mr. Thiago Barral ([thiago.ferreira@epe.gov.br](mailto:thiago.ferreira@epe.gov.br)) before October 26<sup>th</sup>.

### Venue:

Hotel Windsor Guanabara (400 meters from EPE's office)  
Avenida Presidente Vargas, 392 – Centro  
Rio de Janeiro - Brazil



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*Organized by:*



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