

CEM Days - Grid Integration of Variable Renewables: Challenges and Approaches for Energy Planning

Closing Remarks

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The first day was useful for assessing what the dominant trends, gaps and innovative approaches are, concerning the planning of power systems with increasing shares of variable renewables, with different international perspectives that allows us to benchmark and identify the common challenges, ongoing efforts and best practices.

We were able to identify many challenges to adapt the energy planning methodologies and tools, related to emerging technologies that redefine the profile of power generation and the use of transmission and distribution assets, as well as business models, market and regulatory framework, consumer behaviour and electricity demand profile, all that transforming the industry, the energy mix and its associated infrastructure.

With valuable inputs by various institutions, companies and experts, some topics were frequently raised during the day:

- The increasing importance of flexibility in the power system, and that various strategies are available to deliver that, be it in the supply-side, be it in the demand-side. Adjusting the regulatory framework is vital to enable these flexible resources.
- The need for more space and time granularity when modelling the system, as relevant events that affect the security of supply may occur in shorter periods than in the past, and within the local distribution grid level.
- The need to improve the way future demand is projected, with more granularity and decomposition of relevant profiles, with enhanced data collection infrastructure and governance, and the representation of DER, especially DG.
- The need for working towards more systemic approach and integrated modelling, as resources are more diverse in their attributes and more distributed, and investment decisions are more decentralized.
- The need for new metrics for resource adequacy and security of supply, as well as adjustments to the market design, pricing and tariff design and regulatory framework, to accelerate private and systemic economic gains from new technologies and services, such as DER aggregators.

The second day was time to investigate two relevant topics in more depth. First, a presentation to help understand how to use two different concepts: capacity and flexibility. These are key concepts to support a better understanding of the needs of the power system, so that procurement processes are efficiently designed. Then we discussed about some of the possible

methodological approaches to project growth of DG, with more detail about the one developed and used by EPE.

In the afternoon, we could explore a comprehensive study of the implications of massive integration of variable renewables in the specific case of Brazil. We could see interesting international benchmark of codes for the grid and why Brazilian codes differ in some aspects. Finally, we had a promising perspective of new capacity additions largely led by renewables, with adequate security of supply and competitiveness.

Finally, this last day, we could learn from NREL's experience in modelling renewables in power systems in the US and other countries and regions, with a great set of innovative and flexible approaches and tools to face the emerging challenges brought by an industry in transformation towards renewables.

With this, I'm confident that we accomplished the goals of the CEM Days. Bringing together experts with different backgrounds and create an environment for sharing knowledge and increasing confidence in the potential of renewables to provide competitive, reliable and sustainable energy.

On behalf of EPE, I'd like to thank GIZ and IEA for supporting EPE in the provision of infrastructure for this event. I'd like to thank the team involved in the design and organization: from EPE and the institutions involved.

I'd to thank all panelists and moderators, from NREL, IEA, Tractebel, Ministry of Energy of Chile, ADME of Uruguay, GE, PSR, and EPE as well.

I'd like to thank the translation team, the audio and equipment assistants.

Finally I'd like to highlight the support provided by the Clean Energy Ministerial – CEM Secretariat, and its strong commitment and openness to initiatives like this event, providing access to a network of experts worldwide working on accelerating the results towards a cleaner and more renewable future.

With this, I'd like to invite Ellina Levina for some remarks by CEM Secretariat.