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MARKET DESIGN FOR THE CLEAN ENERGY TRANSITION: ADVANCING LONG-TERM APPROACHES

VIRTUAL WORKSHOP: DAY ONE

Hosted by World Resources Institute and Resources for the Future
December 16, 2020

WELCOME AND INTRODUCTIONS



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TODAY'S AGENDA

- **12:00 PM: Agenda, Logistics, Motivation for the Project, *Karl Hausker, WRI***
Project Overview and Background Paper, *Karen Palmer, RFF*
- **12:20 PM: Plenary Remarks: *Paul Joskow, Massachusetts Institute of Technology***
- **12:35 PM: A PRISM-Based Configuration Market, *Steve Corneli, Strategies for Clean Energy Innovation***
- **1:20 PM: Let's Get Organized! Long-Term Market Design for a High Penetration Grid, *Eric Gimon, Energy Innovation***
- **2:05 PM: Break**
- **2:15 PM: Break Out Group Framing**
- **2:30 PM: Break Out Group Discussions**
- **3:00 PM: Report Outs and Open Discussion**
- **3:30 PM: End of Day**

TECH SUPPORT AND REQUESTS

- **Technical Support:**

- Please change your name to First Name, Last Initial (Organization).
- Use the chat box or raise hand function for questions/comments. Message Joyce Javillonar or Tatsatom Gonçalves directly in Zoom chat box for technical issues.
- Speakers will be given a two-minute time warning with the sound of a bell.

- **Participation Requests:**

- Please share your video and minimize distractions (phone, email, etc.) if your working conditions allow. Please mute yourself when not speaking.
- Please share your insights and questions generously to advance this dialogue.
- **Modified Chatham House Rules:** apply to plenary and breakout discussions but not to author presentations. Participants may use information received during breakout but neither the identity or affiliation of any participant may be revealed.

WHY EXPLORE ORGANIZED LONG-TERM MARKET DESIGNS?

Reaching net-zero emissions economy-wide by mid-century

- Major expansion of zero- and low-carbon generation (along with ramped-up energy efficiency efforts)
- Electrification of various end-uses in transport, buildings, and industry, and enable the production of hydrogen and other zero net carbon fuels.

Three challenges posed for the power sector. Market design should promote/enable:

- **Scale & Pace:** Rapid build-out of wind, solar, storage, and demand-side resources. Continued operation of existing nuclear fleet.
- **Innovation:** Market entry by emerging low- and zero-carbon technologies (e.g., advanced nuclear, gas or bioenergy with carbon capture, adv. geothermal, etc.).
- **Generation Mix:** Finding the best combinations of these existing and new resources.
 - With low-cost but variable wind and solar, complementarities among sources are much more important than with traditional firm and dispatchable generation. Keeping total system costs as low as possible requires more attention than ever before to getting the right mix of generation.

CAN CURRENT MARKET DESIGNS MEET THESE CHALLENGES?

Current market designs have their intellectual roots in the “old world” of thermal plants with a wide range of positive SRMCs.

- Can current designs produce reliable, affordable, decarbonized electricity in systems with high penetration of variable renewable energy (VRE) with near-zero SRMCs?
- Can current designs “deliver” without a price on carbon?
- How do our resource adequacy constructs (including capacity markets) need to evolve in high VRE systems?

Over the past few years, some experts have presented concepts for organized long-term markets that would operate parallel to current day-ahead and real-time (DA/RT) markets as a potential way to meet these challenges.

- Reaction has been mixed. Other experts argue for incremental change to current markets
- What we are aiming for in this workshop, with diverse stakeholders & Chatham House
 - *Important but outside our scope: improvements in the DA/RT markets*

Project Overview

- Invite four authors to develop their ideas for organized long-term markets in new papers
 - Builds on 2018/19 Energy Innovation project on market design
- Produce a background report on actual competitive procurements and innovations in integrated planning
- Prepare summary “matrix” that compares new proposals with cross-cutting questions on selected themes
- Hold workshop for dissemination and feedback
 - And to identify next steps
- Prepare workshop summary for distribution after the fact



Experience with Procurement and Planning

- Centralized competitive procurement with long-term contracting is not without precedent.
- What lessons can we glean from recent experiences?
- Background paper (*Experience with Competitive Procurements and Centralized Resource Planning to Advance Clean Electricity*) describes
 - Long-term *competitive procurements* for zero-carbon resources
 - Innovative *integrated resource plans (IRPs)* addressing decarbonization
- Procurement examples are largely from other countries (Spain, Germany, Denmark, Japan, Mexico, Brazil, So. Africa); some state (NJ, MA, NY) procurements of renewables and off-shore wind included as well
- Review of recent innovations in IRPs focuses on California, Hawaii and Colorado



Lessons from Competitive Procurements

- Product definition and technology specification in procurement influence who bears the performance risk and associated resource diversity.
- Competitive procurements face trade off between increasing competition and reducing contract fulfillment risk.
- Once winning bidders are selected, contract provisions can be used to mitigate risk associated with contract fulfillment and to reduce counterparty risk.
- Some procurements have successfully used bid evaluations focused on minimizing system cost impacts to select winners.



Lessons from New Approaches to Planning

- Planning approaches and models need to adapt to capture future system needs and better measure the resource adequacy and balancing contributions of various resources and how they change as the system evolves.
- Increasingly sophisticated models with greater temporal and geographic granularity are needed to plan for reliable electricity supply with substantial penetration of variable renewable generation.
- Plans need to frequently update technology costs and performance characteristics.
- Market-based IRPs develop plans and award contracts based on all source bidding
- Several states are exploring ways to link transmission planning, distribution planning and optimization of centralized and distributed resources as the system grows more complex.

