Expanded Markets Training: Day-Ahead Markets

March 11-12, 2026
Bozeman, MT

AC Marriott Hotel, Ross Room

As electricity markets become regionalized across the WECC, policymakers and regulators increasingly need to understand how these markets work, even if their own state or province does not yet have a formal market. In this game-based, in-person workshop, participants will have the chance to put into practice the concepts they explored with Stanford PESD's e-learning modules by playing the roles of generating companies offering into wholesale electricity markets. Given the planned expansion of regional day-ahead markets in the West, the games will focus in particular on how day-ahead markets work. We also examine the role fixed-price forward contracts for energy, which function analogously to day-ahead markets but on a longer timescale, can play in ensuring long-term resource adequacy.

Day 1

9:00 am **Welcome and Introductions**

- Dr. Mark Thurber, Stanford University

Uniform-Price Auctions and Unilateral Market Power
In this first session, we cover the basics of how generating companies offer into wholesale electricity markets with uniform-price auctions (i.e. the market-clearing price is paid to all generating units that are dispatched). Workshop participants, playing gencos, also explore how and when they are able to exercise unilateral market power through their offers.

10:30 am **Break**

10:45 am **The Unit Commitment Problem with Startup Costs**
As electricity markets become more dynamic due to increasing shares of intermittent renewable energy and other factors, generators face challenging financial calculations around whether it is profitable to turn on units with high startup costs and make them available to generate electricity in the real-time market. The market operator, in turn, may struggle to ensure sufficient unit commitments. After a warm-up game

reviewing the basic operation of wholesale electricity markets, we explore a scenario in which generators have to decide whether to turn on a high-startup-cost, long-start unit in advance of a real-time market with high shares of wind and solar.

12:15 pm **Lunch Break**

1:45 pm **The Day-Ahead Market and Unit Commitments**
The day-ahead market is a powerful mechanism for ensuring that sufficient energy is produced in real time to meet demand. We play a game where generating units can experience scheduled and unscheduled outages to explore how the purely financial obligation of the day-ahead schedule provides a strong incentive for generators to be available in real time if needed. We also consider how this market-based incentive has cost and flexibility advantages over a hypothetical mandate that generators operate exactly as scheduled.

3:15 pm **Break**

3:30 pm **Financial Commitments for Short- and Long-Term Resource Adequacy**
Day-ahead markets and long-term, fixed-price forward contracts for energy (not capacity) function through an identical mechanism, but they provide different benefits because of the different timescales on which they operate. Namely, day-ahead markets are ideal for optimizing the generation mix on a short-term basis, while long-term forward contracts incentivize generating companies to build and hold cost-effective portfolios of units that also satisfy environmental rules. We play a game with long-term forward contracts to show how financial obligations for long-term resource adequacy work in an analogous way to day-ahead markets, but on a different timescale.

5:00 pm **End of Day 1**

Day 2

8:30 am **Day-Ahead Markets with Wind and Solar**
Day-ahead markets offer particular benefits when there are high shares of intermittent renewable energy. They reward generators with the flexibility to adjust their output in response to renewable variation in real time, and they create strong incentives for accurate forecasting of wind and solar output. We play a game with large quantities of wind and solar generation to show how day-ahead markets create a business model for improved forecasting of wind and solar output, reducing costs of electricity supply in the process.

10:30 am **Break**

10:45 am **Regional Day-Ahead Market with Transmission Constraints (and Convergence Bidding?)**
Regionalization of the day-ahead market can further reduce the cost of electricity supply in the presence of significant shares of wind and solar. We play a game in which the day-ahead market is regionalized across two different regions connected by a transmission line, and we examine what happens when the day-ahead market doesn't reflect the physical configuration of the transmission network. Then we explore how this and other scenarios (such as renewables forecasting error) in which the day-ahead market might diverge from real-time market outcomes can be improved by convergence ("virtual") bidding, saving money for ratepayers in the process.

12:30 pm **Adjourn Workshop**
(Mark will be available for Q&A afterwards)