Energy Economics and Policy: Courses and Training (4.5)

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PSERC Future Grid Initiative
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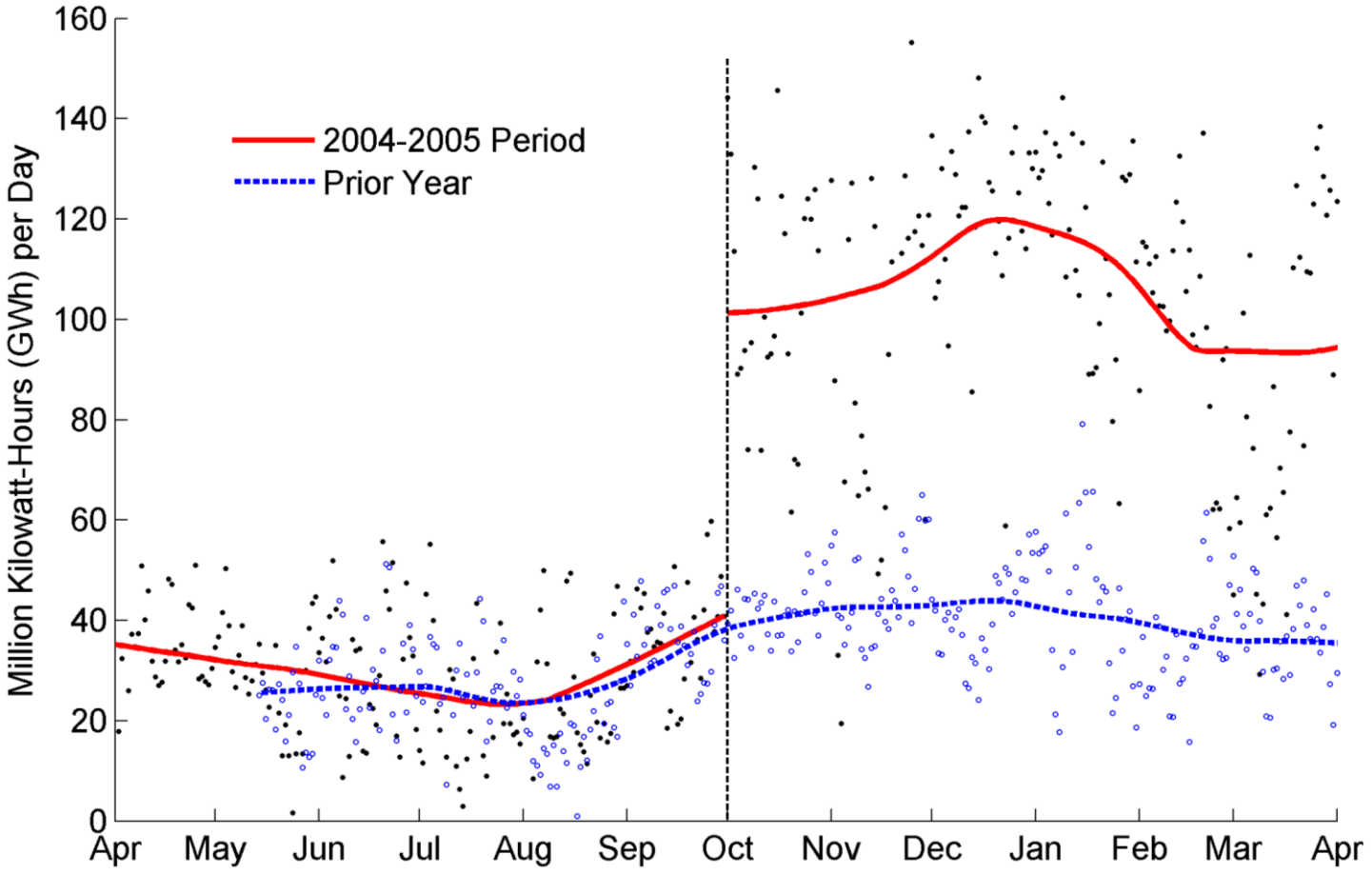
Motivation: Economics Matters
Impact of PJM Expansion on Day-Ahead Net Exports, Midwest → East



Source: Mansur and White, 2012

What does energy economics have to do with smart grids?

- The effectiveness of new technology depends upon *if* and *how* it is used.
- In Electricity, adoption and use depends upon
  - Regulatory environment
  - Market structure and organization
  - Consumer behavior
  - Incentives!

Objectives

- Instruct future energy industry professionals and researchers on the economics of energy markets.
- Convey real-world experience blending advance micro-economic concepts and energy-industry case-studies and simulations.
- Expand and refine interactive learning tools such as the Electricity Strategy Game.
- Provide exposure to the leading economic research on the organization, regulation, and operation of energy markets

Multiple Target Audiences

- Masters-Level Course aimed at graduate students in economics, engineering, sciences and public policy offered through Haas School of Business
- Research (Ph.D) level material offered through UC Davis Department of Economics
- Practitioner-level material offered through short courses at ISOs and UC campuses
  - Attended by staff from utilities, ISOs, PUC's and other regulatory agencies

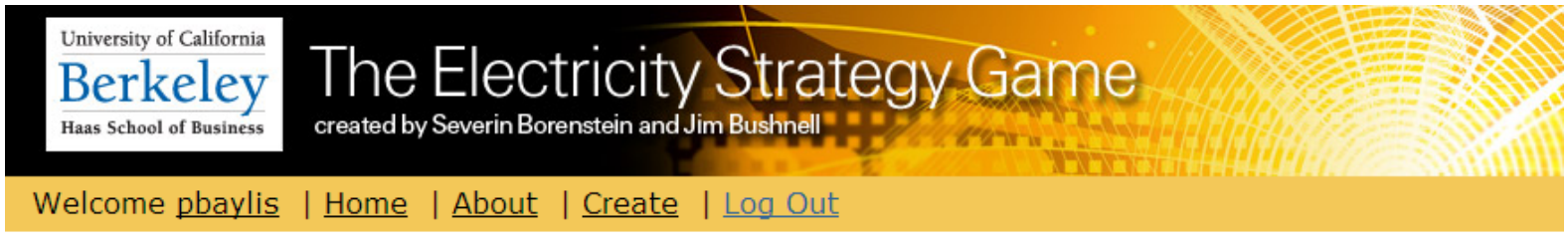
Topics

- Regulating Natural Monopolies
  - Incentives, productivity, consumer prices
- Regulatory retail pricing
  - Dynamic pricing, non-linear tarrifs, consumer behavior
- Market Structure and Competition
  - Oligopoly, Vertical Integration, Transportation
- Environmental Regulations and Energy Markets
  - Cap-and-trade, Clean-air act, alternative energy policy

Electricity Strategy Game

- Teams evaluate and purchase generation portfolios
- Portfolios are bid into daily spot markets
- Teams experience impact of varying market design elements
  - Auction Design, Transmission congestion, forward contracts
- Versions now in use at UC Berkeley, Stanford, Michigan, MIT, Yale, Dartmouth and others.

Electricity Strategy Game: Web-Based Interface



Edit Team Heckman Portfolio Details

Period 7

Plant Name	Hour 1	Hour 2	Hour 3	Hour 4
BIG_CREEK	0.00	0.00	0.00	0.00
MOHAVE_1	0.00	0.00	0.00	0.00
MOHAVE_2	0.00	0.00	0.00	0.00
HIGHGROVE	0.00	0.00	0.00	0.00
SAN_BERNARDINO	0.00	0.00	0.00	0.00

Save

Team Home

Accessing the Materials

- Course Materials
  - Syllabi, Extensive reading lists, Lecture Materials, Thought questions, Exams.
- Electricity Strategy Game
  - Software and documentation for running the game
  - Web-based bidding interface and results (registration required)
- Materials will be made available online for access by instructors at accredited non-profit institutions.