

Are Capacity Markets Necessary to Ensure Adequate Generating Reserves?

Panel Introduction

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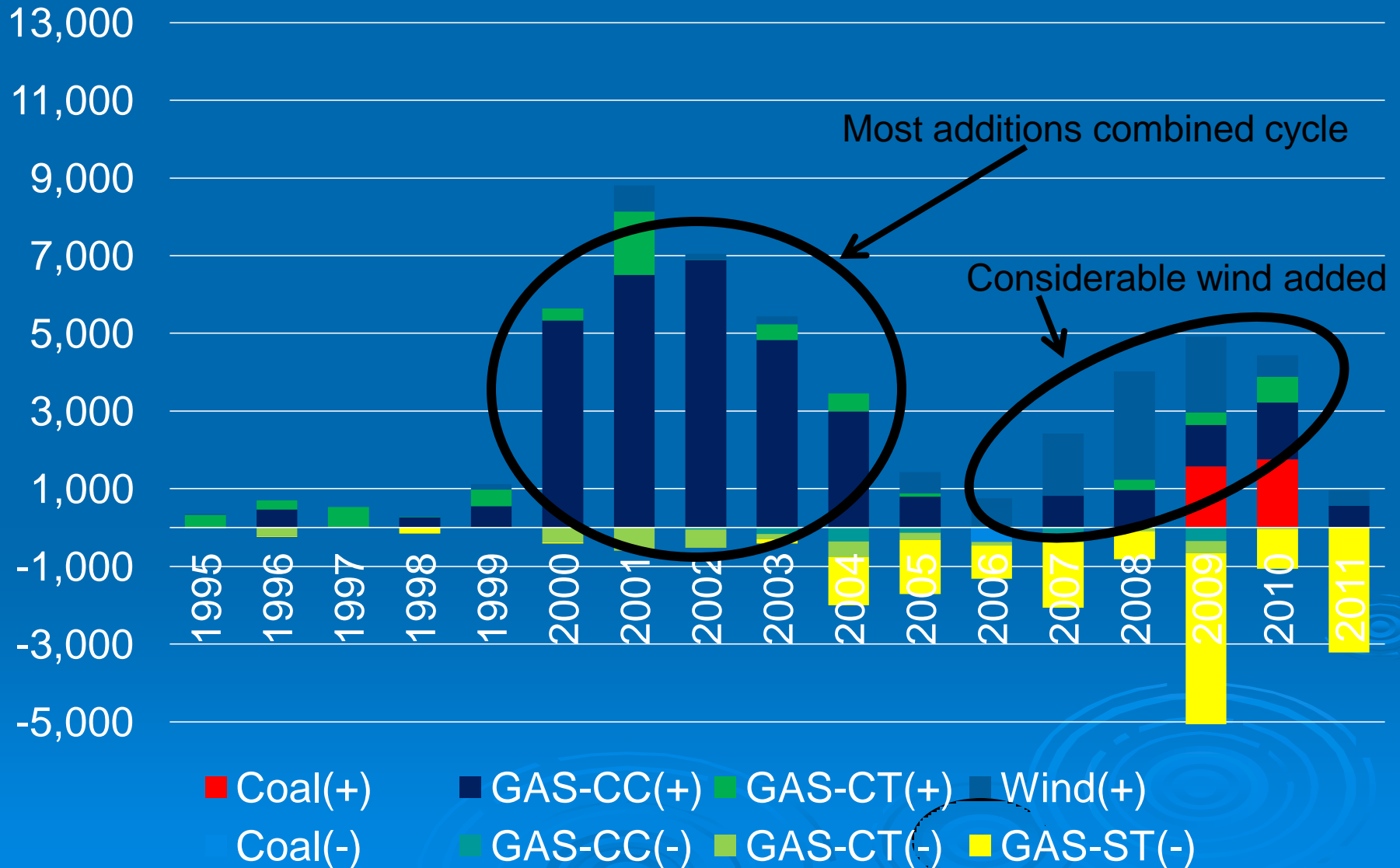
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ERCOT energy-only market

- ERCOT has been an energy-only market since the opening of the wholesale market in 1996.
- In practice, the ERCOT market has been building new capacity ever since:
 - Levels of additions and types of generation capacity have varied over time,
 - As would be expected from changes in load growth, changes in fuel and technology costs, and other exogenous influences.

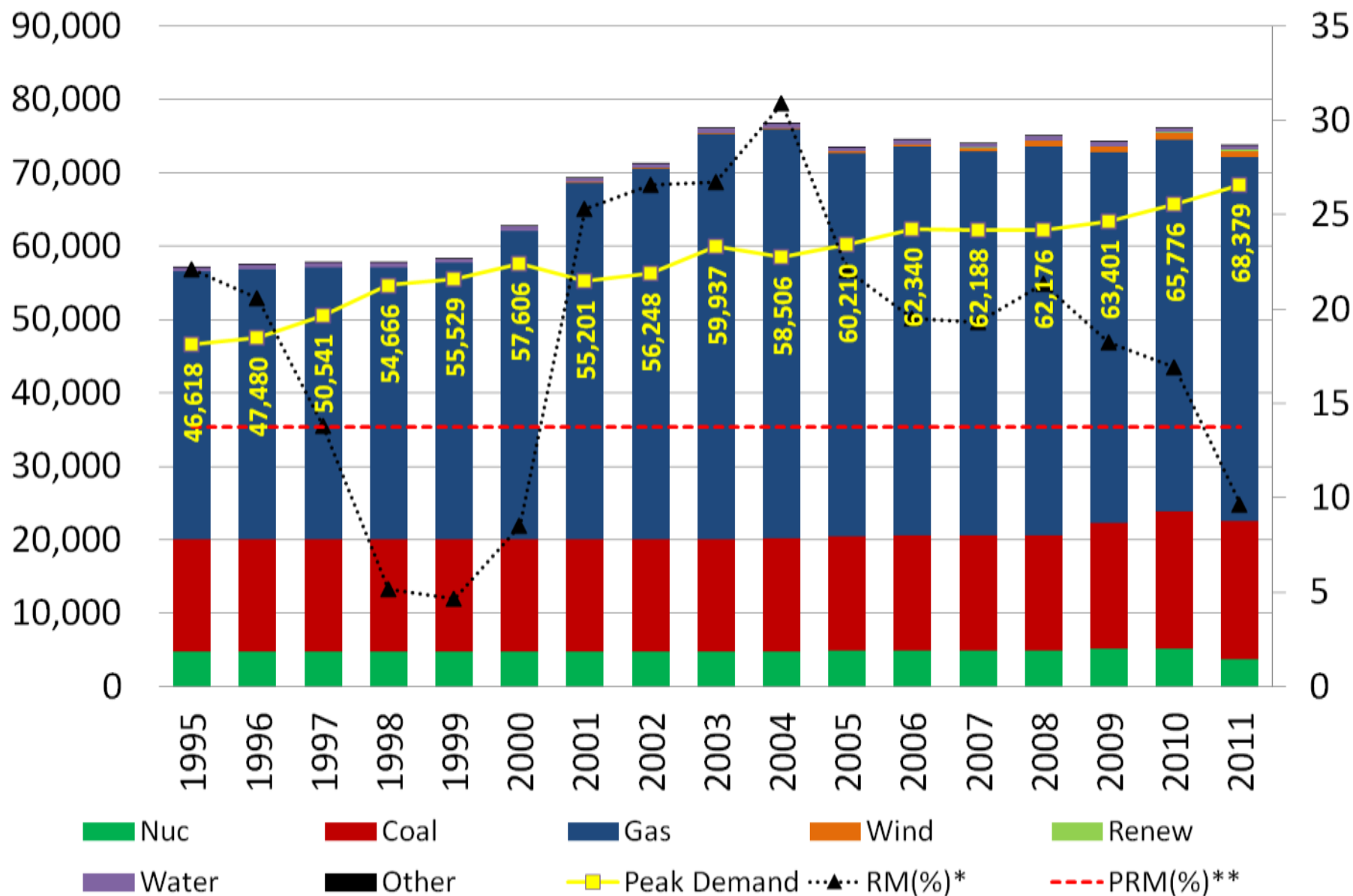
ERCOT Capacity Expansion (+) and Retirement (-) by Fuel Type [MW]



Is there a capacity adequacy problem in ERCOT?

- “An economist is a man who, when he finds something works in practice, wonders if it works in theory.”
 - Walter Heller (1915-1987), economic advisor under Presidents John F. Kennedy and Lyndon B. Johnson.
- Perhaps this panel session is wondering needlessly.
- But *has* the ERCOT market been working in practice recently?

ERCOT Capacity, Peak Demand [MW], and Reserve Margin[%]



Is there a problem?

- Wind capacity has not contributed to peak load carrying capability:
 - Previous slide shows estimate of contribution of wind to meeting on-peak load.
 - Wind blows more off-peak in ERCOT than on-peak.
- Relatively less thermal additions since 2003:
 - Given off-peak production of wind, economically adapted thermal system would involve expansion of peaker and combined cycle capacity, but
 - Recently, relatively little new gas capacity built, together with some new coal generation built.

Perhaps there is a problem

- How do we bring forth the right *amounts* and *mix* of capacity in a market with:
 - Retail restructuring, so load serving entities have shares of customers that vary over time,
 - Significant wind penetration, so need to cope with:
 - On average, more wind energy generated off-peak than on-peak,
 - Occasional wind die-offs, requiring reserves.
 - Low prices for gas,
 - Strong demand growth.

Potential solutions

- Markets such as PJM have established “capacity markets:”
 - Capacity auction procures capacity for forecast peak load and reserves three years into future,
 - How does this fundamentally differ from a rate-of-return obligation on retail customers?
 - Is it just rate-of-return regulation by another name, with more efficient capacity procurement?
 - ISO/RTO is not just operator, but has also taken on role of orchestrating capital formation.

Potential solutions

- Midwest ISO has reserve margin requirements:
 - Many market participants in MISO are rate-of-return regulated and have retail franchise,
 - Can participate in “voluntary capacity auction” for efficient procurement of required capacity,
 - How to apply in a retail restructured ERCOT?
 - Who would have the reserve margin obligations and how would the requirements be set for procuring capacity for customers three years into future?

Potential solutions

- Capacity markets and reserve margin requirements must estimate the *planning* reserve margin so that the actually *operational* capacity is almost always enough to cover the forecast distribution of load plus minimum operating reserves:
 - Adequacy evaluated using generation outage probabilities and load scenarios,
 - Required capacity can be modulated by some *planned* demand response *commitment*.

Potential solutions

- Conventional assessment of generation adequacy focuses on the probability distribution of generator outages:
 - But at current and anticipated planning reserve margins, this is typically not the main contributor to end-use outages,
 - So is *planning* reserve margin even a primary issue for reliability?

Potential solutions

- Alternatives focus on the operational timeframe:
 - Set price so that available capacity meets load plus minimum operating reserve requirements possibly plus additional reserves based on demand curve for reserves,
 - Is there enough price responsive demand?
 - Can it be trusted?

Potential solutions

- A demand curve for reserves considers the operational issues:
 - But still primarily uses probabilities of generator outages to assess probability of curtailment of load,
 - Is that the correct focus?
- Demand response:
 - How do we transition from demand response proxies to actual bid demand setting prices based on willingness-to-pay?

Paul Sotkiewicz

- Chief Economist in the Market Services Division at the PJM Interconnection.
- Analysis of PJM's market design and market performance.

Michael Robinson

- Principal Advisor of Market Design at MISO.
- Design and analysis of MISO markets.
- Lead on Midwest Market Protocols.

Dan Jones

- Vice President at Potomac Economics.
- Director of the Independent Market Monitor for the ERCOT wholesale electricity market since 2006.

William Hogan

- Raymond Plank Professor of Global Energy Policy and Research Director of the Harvard Electricity Policy Group.
- Interaction of energy economics and public policy in restructured electricity industries.