Summary of Brattle’s Study on “ERCOT Investment Incentives and Resource Adequacy”

Prepared for:
The Public Utility Commission of Texas
Workshop on Project No. 40480, Commission Proceeding
Regarding the Recommendations Included in the Brattle Group Report.

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Agenda

Study Motivation

Primary Findings

Recommendations
Study Motivation

Investment stalled, and reserve margins are declining below target

Reserve Margin Outlook

Source: May 2012 CDR

♦ Challenging fundamentals with low gas prices and low market heat rates
♦ Little visible investment in the face of high load growth
♦ Concern that prices may not attract enough investment to meet the target reserve margin
Findings
Key Investment Factors

♦ Investors are cautious after a history of losses

♦ Slightly higher cost of capital for generation investment in ERCOT
  • Lack of long-term PPAs in a retail choice environment
  • Volatile energy-only spot prices (but less volatile forwards)

♦ Needs vary by type of player:

- **Lenders**
  Must be confident that the borrower will have stable net revenues covering the total amount borrowed

- **Larger, more diversified borrowers**
  Can diversify some of the project-specific volatility and borrow efficiently against larger balance sheet

- **Small, undiversified borrowers**
  Rely primarily on project-specific non-recourse debt financing with little equity, which is difficult absent a long-term contract
Findings

This market will not support enough investment to meet the target reserve margin

- Scarcity pricing is needed to support investment, but scarcity is rare (except in extreme weather) at the target reserve margin

- Under current market conditions and rules, the reserve margin would have to fall to 8% for prices to be high enough often enough to support investment

- Substantial uncertainties about market conditions, weather, and regulatory risk result in uncertain reserve margins

Note: Margins shown based on ‘Mid’ price cap scenario, with a $4,500 HCAP, $262,500 PNM threshold, and $2,000 LCAP. The assumed PNM threshold and LCAP are higher than current levels.
Recommendations
Determine objectives, then design a market to meet those objectives

Resolve the Threshold Question:
Should the markets or regulators determine the reserve margin?

STEP 1

STEP 2
- Reliability implications?
- Ways to further safeguard critical loads?
- Optimal & minimum reserve margin?
- Best market construct?

The decision depends on the trade-offs among **reliability**, **economic efficiency**, and **complexity**.
Recommendations

Reliability implications are greatest in extreme weather

Estimated Customer Outage Minutes Due to Resource Adequacy

Note: Average minutes per customer based on Expected Unserved Energy from ERCOT’s LOLE model, divided by a 65,000 MW system size.
Recommendations

But resource adequacy outages are a fraction of distribution outages

Resource Adequacy (at 10% RM) vs. Distribution-Level Outages

Notes: Distribution outage SAIDI data aggregated by ERCOT from utilities’ Annual Service Quality Reports, 2008-2011. Distribution outages “with major storms” refers to 2008.
## Recommendations

### Pros and Cons of Various Policy Options

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<th>Alternative Market Constructs</th>
<th>Market or Regulator-Determined Target</th>
<th>Market or Regulator-Directed Meeting of Target</th>
<th>Risk of Partial Involuntary Curtailment</th>
<th>Risks to Investors (affects cost of capital)</th>
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<td>1. Pure Energy-Only with Market-Based Reserve Margin</td>
<td>Market</td>
<td>Market</td>
<td>Relatively High in short-run; Lower in long-run</td>
<td>High</td>
<td>May be highest in long-run</td>
<td>Easy</td>
<td>• Viability depends on lots of demand-response helping to set prices at willingness-to-pay; ERCOT market is not there yet</td>
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<tr>
<td>2. Energy-Only with Adders to Support Target Reserve Margin</td>
<td>Regulator</td>
<td>Market</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Easy</td>
<td>• Not a reliable way to meet target after “low-hanging fruit” exhausted; adders are administrative</td>
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<tr>
<td>3. Energy-Only with Backstop Procurement at Minimum Level</td>
<td>Regulator</td>
<td>Regulator</td>
<td>Low</td>
<td>High</td>
<td>Lower</td>
<td>Easy</td>
<td>• Attractive as an infrequent last resort, but long-term reliance is inefficient, non-market-based, slippery slope</td>
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<tr>
<td>4. Mandatory Resource Adequacy Requirements for LSEs</td>
<td>Regulator</td>
<td>Market</td>
<td>Low if sufficient penalty for non-compliance</td>
<td>Med-high</td>
<td>Medium due to regulator determinations</td>
<td>Significant</td>
<td>• Well-defined system/local requirements and resource qualification support bilateral trading of fungible credits, competition • Can’t be a forward requirement. • Flexibility: DR is like opting out non-firm load; and for controllable customers’ “firm” load, LSEs could offer differentiated levels of reserves</td>
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<td>5. Resource Adequacy Requirement with Centralized Forward Capacity Market</td>
<td>Regulator</td>
<td>Market</td>
<td>Low</td>
<td>Med-high (slightly less than #4)</td>
<td>Medium due to regulator determinations</td>
<td>Major</td>
<td>• Working well in PJM • Forward construct can efficiently respond to potential retirements and meet needs w/sufficient lead time • Transparency valuable to market participants and market monitor • Many administrative determinations</td>
</tr>
</tbody>
</table>
Recommendations

Other Recommendations

Regardless of the long-term policy path, we recommend:

♦ More fully enable and support DR
  • Allow high prices to occur, but at a variety of levels with a more gradual scarcity pricing function, e.g., from $500 initially to VOLL when actually shedding load
  • Implement indicative price forecasts (done)
  • Implement “Load in SCED” so some load can set prices
  • Account for price-responsive demand in load forecasts

♦ Continue to refine energy pricing provisions
  • Increase SWOC, LCAP, and the Peaker Net Margin threshold
  • Ensure locational scarcity pricing signals when appropriate
  • Avoid mechanisms that trigger scarcity prices during non-scarcity conditions
  • Address pricing inefficiencies related to unit commitment
Regardless of the long-term policy path, we recommend:

- Revisit provisions to ensure that retail electric providers (REPs) can cover their positions as reserve margins tighten and price caps increase.

- Continue to demonstrate regulatory stability:
  - Develop and articulate a complete roadmap
  - Continue to demonstrate tolerance for high-priced events