Winter Storm – Lessons Learned

Findings and Recommendations

By

ERCOT and SPP
ERCOT – Winter Storm Uri

- Systemwide failure
  - Four consecutive days
  - 200-700 lives lost
  - Significant economic consequences

- Natural Gas prices reached $19,000/MMbtu

- Over the past 5 years, ERCOT has closed 13 baseload power plants
  - 6 Coal & 7 Natural Gas

- These 13 power plants generate 9,300 MW of electricity = sufficient capacity to power 6 million homes
The Bullet Hit Texas This Time: Feb. 15 – 19

Demand High – Wind Low: Margin Disappears, Prices Soar, System Disruption Triggered

Demand Low – Wind High: Gas & Coal Pushed off Grid due to Negative Pricing

White space = Shortages

Forecast Demand

Source: Energy Information Administration Hourly Grid Monitor
For more information, visit lifepowered.org.
SPP – Winter Storm Uri

- For the first time experienced regionwide blackouts
  - Estimated $12.3 billion in cost to consumers
  - SPP’s market price reached an all-time high of $4,274.96/MWh in the day-ahead market. By comparison, the average price of energy in SPP’s day-ahead market for the entire year of 2020 was $17.69/MWh.

- Over the past 5 years, SPP has closed 15 baseload power plants
  - 7 Coal
  - 7 Natural Gas
  - 1 Nuclear

- These 15 power plants generate 4,850 Megawatts = 3.1 million homes
Winter Storm
Resource Performance

Installed Capacity vs. Performance: ERCOT

Installed Capacity vs. Performance: SPP

<table>
<thead>
<tr>
<th></th>
<th>Nuclear</th>
<th>Coal</th>
<th>Gas</th>
<th>Wind</th>
<th>Solar</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity</td>
<td>4.90%</td>
<td>13.40%</td>
<td>51.00%</td>
<td>24.80%</td>
<td>3.80%</td>
<td>1.90%</td>
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<tr>
<td>Generation During Uri</td>
<td>9.31%</td>
<td>18.72%</td>
<td>61.38%</td>
<td>9.06%</td>
<td>1.29%</td>
<td>0.24%</td>
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<tr>
<td>Installed Capacity</td>
<td>2.20%</td>
<td>24.30%</td>
<td>38.9%</td>
<td>29.0%</td>
<td>0.20%</td>
<td>3.70%</td>
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<tr>
<td>Generation During Uri</td>
<td>5.79%</td>
<td>47.21%</td>
<td>36.53%</td>
<td>8.98%</td>
<td>0.08%</td>
<td>3.32%</td>
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</table>
Baseload Power is Critical to SPP During Extreme Weather

Baseload represents 60% of the capacity but provided 91% of the electricity.
Danger Ahead

- The future generation build for SPP is **91 percent** intermittent generation (2030)

- The future generation build for ERCOT is **99 percent** intermittent generation by 2030 and 100% for 2031.
SPP Winter Storm Study - Analysis and Recommendations

- Outage caused the first ever Region-wide Blackouts
  - Lost large portion of Wind and 13,000MW of natural gas generation
  - “analysis includes running contingency analysis studies with both the monitored and contingent facilities removed from service to look for cascade type situations. During Feb. 15-19, real-time contingency analysis (RTCA) identified several constraints loaded over 115% post-contingent. The specific regions captured Figure 31 were particularly subject to severe loading.
  - All of KS, Eastern NE and East TX are in danger of further blackouts if scheduled power plants are closed

- Recommendations for fixing the problem include
  - Preform ongoing assessment of minimum reliability attributes needed for SPP’s resource mix
  - Adding a market incentive to allow dispatchable power plants to compete with intermittent generation (Wind & Solar)
  - Requiring a backup firming requirement for intermittent power sources
  - Develop a more reliable electric and natural gas transmission system
What Has Texas Leadership Said they Learned & What are they Doing About it?

TEXAS LEGISLATURE:

• Legislature Passes Omnibus Grid & market Reform Bills
  • **SB3, Sections 13 & 16:** Weatherize power plants and natural gas supply
  • **SB3, Section 14:** Modification of ancillary service market
  • **SB3, Section 18:** Reliability standard and incentives for generation
  • **SB 1281:** Transmission reform – designed to reinstall citing discipline and consumer test for new transmission projects (also studies congestion)
  • Also Allowed Property Tax Subsidy for Renewable Energy Allowed to Expire
ROADMAP THE TEXAS LEGISLATIVE RESPONSE TO THE POWER OUTAGES

Consumer Protection

GRID RELIABILITY
(so the public knows this will NEVER happen again)

Securitization

Coops & REP's
Financing of Uri electric utility costs.
HB 4492 (Paddie)
Co-op securitization.
SB 1580 (Hancock)

Gas Utilities
Financing of Uri fuel costs.
HB 1520 (Paddie)

Non-ERCOT
Financing of non-ERCOT Uri electric utility costs.
HB 1510 (Metcalf)

Resiliency

Weatherization & Market Reform

Electric Generation: SB 3, Secs. 7, 12, 13, 16, 23, 24, 39
Oil & Gas: SB 3, Secs. 5, 6, 7, 21, 22, 25, 38
Water: SB 3, Secs. 26, 27, 28, 29, 31, 32, 36
AS & Firming: SB 3, Secs. 14, 18, 35 (Schwertner)
EV Charging: SB 1202 (Hancock)

Market Refinement

Transmission: SB 3, Secs. 15, 16, 19 (Schwertner)
ERCO transmission reliability assessment.
SB 1281 (Hancock)
Dispatchable: SB 3, Sec. 18
Distributed: SB 3, Sec. 19 (Schwertner)
HB 2483 (King)
SB 398 (Menendez)

Reliability

ERCOT & PUC

ERCOT: Annual independent audit of ERCOT.
HB 2586 (Thiery)
Independent ERCOT board.
SB 2 (Hancock)

PUC: PUC Chair must be Texas resident.
SB 2 (Hancock)
Suspension of public info law during disaster.
SB 1220 (Huffman)
PUC expanded from 3 to 5 members.
SB 2154 (Schwertner)

PUC/RRC/TCEQ Coordination.
SB 3, Sec. 33 (Schwertner)

Designation & Mapping

Mapping: Designation of gas and electric critical infrastructure
HB 3648 (Gerren)
Critical infrastructure designation & creation of Mapping Committee.
SB 3, Secs. 4, 8, 16, 17, 37, 81 (Schwertner)

TERC: Expansion of Texas Energy Reliability Council.
SB 3, Sec. 3 (Schwertner)

Coordination

ERCOT:

Electric Generation:
SB 3, Secs. 7, 12, 13, 16, 23, 24, 39

Load Shed Procedures:
SB 3, Secs. 9, 10, 11, 16, 39 (Schwertner)

Oil & Gas:
SB 3, Secs. 5, 6, 7, 21, 22, 25, 38

Water:
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HB 2483 (King)

SB 398 (Menendez)

Emergency Alerts, Homeowner Backup & Rate Plans

Alerts & Backup
Ban on restricting source of backup: HB 17 (Deshotel)
Backup generation options:
SB 398 (Menendez)
HB 2483 (King)

Power outage alert system.
SB 3, Secs. 9, 10, 11, 20, 30 (Schwertner)

Rate Plans & Relief
Ban on wholesale indexed products.
HB 16 (Hernandez)

Wholesale Pricing:
SB 3, Sec. 18

Residential protections.
SB 3, Secs. 6, 9, 10, 11, 20, 30 (Schwertner)

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Texas Governor’s Response: All New PUCT Commissioners & Clear Directive to Reform Market


July 13, 2021: Newly Appointed PUCT Chairman Peter Lake assures Texas Senate Business & Commerce Committee that:

I want to reassure you that we are not tweaking on the edges or making marginal changes. We are taking a blank slate approach for a full overhaul and redesign of this market to drive reliability. Full Stop.
Governor’s July 6 Legislative Implementation Directive: Preserve & Expand Thermal Generation (gas, coal, & nuclear)

Streamline incentives within the ERCOT market to foster the development and maintenance of adequate and reliable sources of power, like natural gas, coal, and nuclear power. The PUC has the ability to redesign segments of the market to incentivize and maintain the reliable electric generating plants our state needs. Those incentives must be directed toward the types of electric generators we need for reliability purposes. The goal of this strategy is to ensure that Texas has additional and more reliable power generation capacity.
Allocate reliability costs to generation resources that cannot guarantee their own availability, such as wind or solar power. Electric generators are expected to provide enough power to meet the needs of all Texans. When they fail to do so, those generators should shoulder the costs of that failure. Failing to do so creates an uneven playing field between non-renewable and renewable energy generators and creates uncertainty of available generation in ERCOT. To maintain sufficient power generation—especially during times of high demand—we must ensure that all power generators can provide a minimum amount of power at any given time.
Governor’s July 6 Legislative Implementation Directive: Coordination of Thermal Generation Maintenance

Order ERCOT to accelerate the development of transmission projects that increase connectivity between existing or new dispatchable generation plants and areas of need. Dispatchable generation, such as natural gas, coal, and nuclear power plants, are essential for the reliability and stability of the electric grid because they can be scheduled to provide power to the grid at any time. We must ensure that, at any point in time, ERCOT is utilizing non-renewable electricity in sufficient amounts to maintain reliable power throughout our state.
Questions?