

# Winter Storm – Lessons Learned

Findings and Recommendations

By

ERCOT and SPP

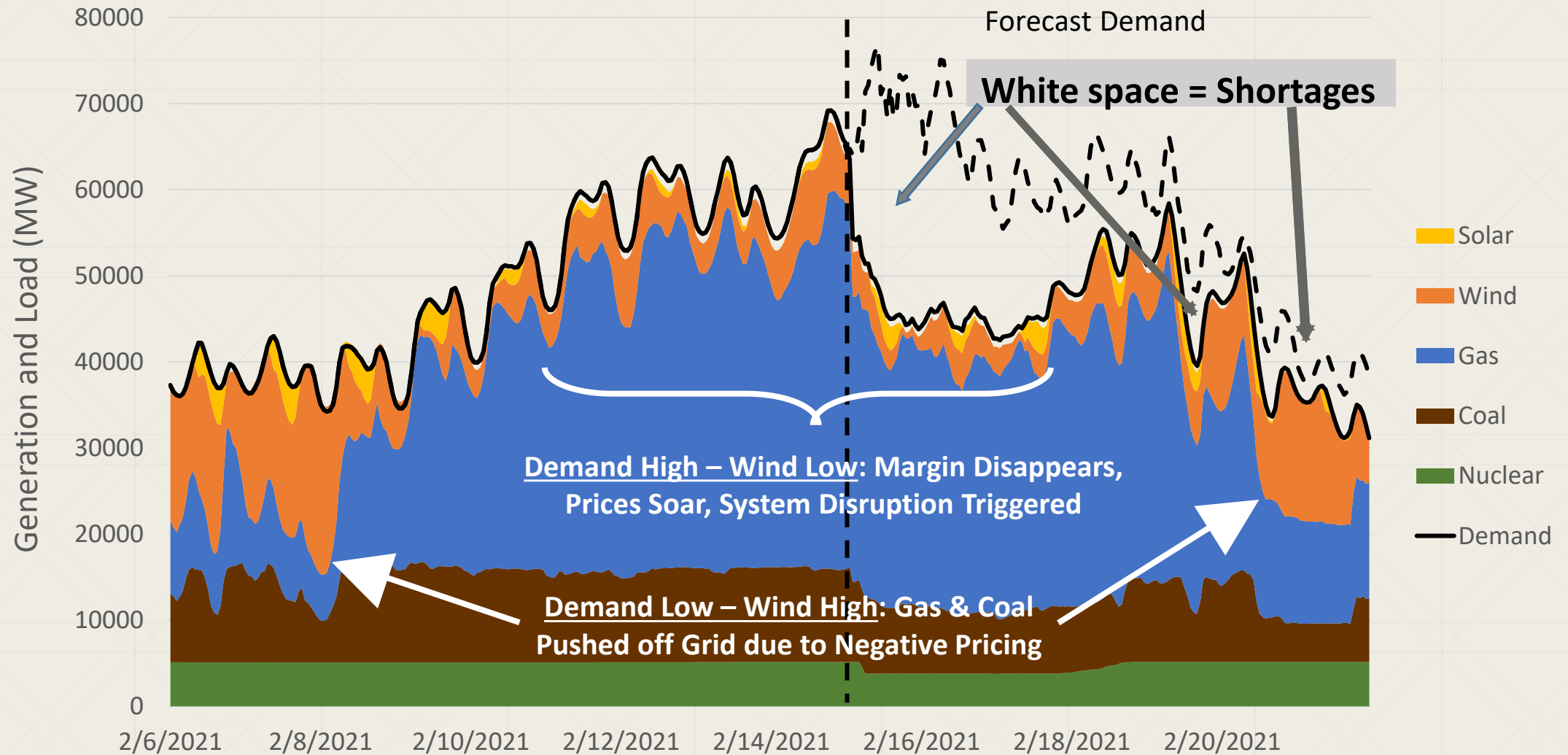


# ERCOT – Winter Storm Uri

- 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



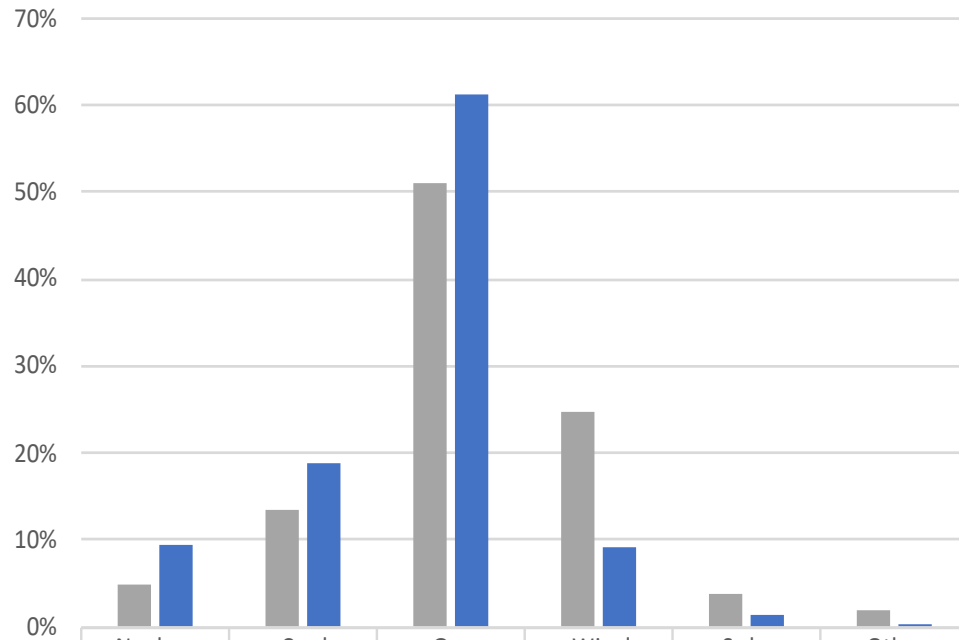
# SPP – Winter Storm Uri

- 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



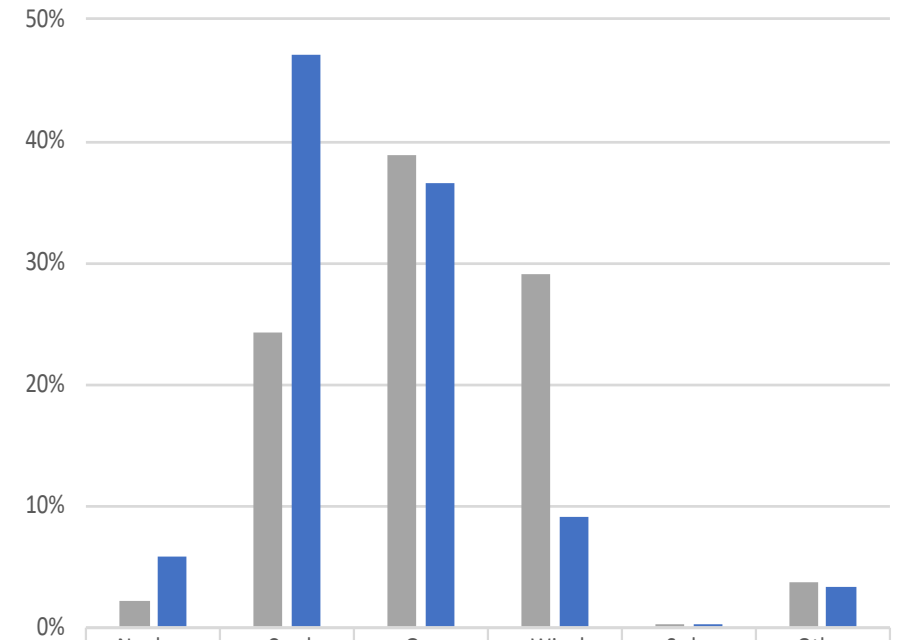
# Winter Storm Resource Performance

## Installed Capacity vs. Performance: ERCOT



■ Installed Capacity	4.90%	13.40%	51.00%	24.80%	3.80%	1.90%
■ Generation During Uri	9.31%	18.72%	61.38%	9.06%	1.29%	0.24%

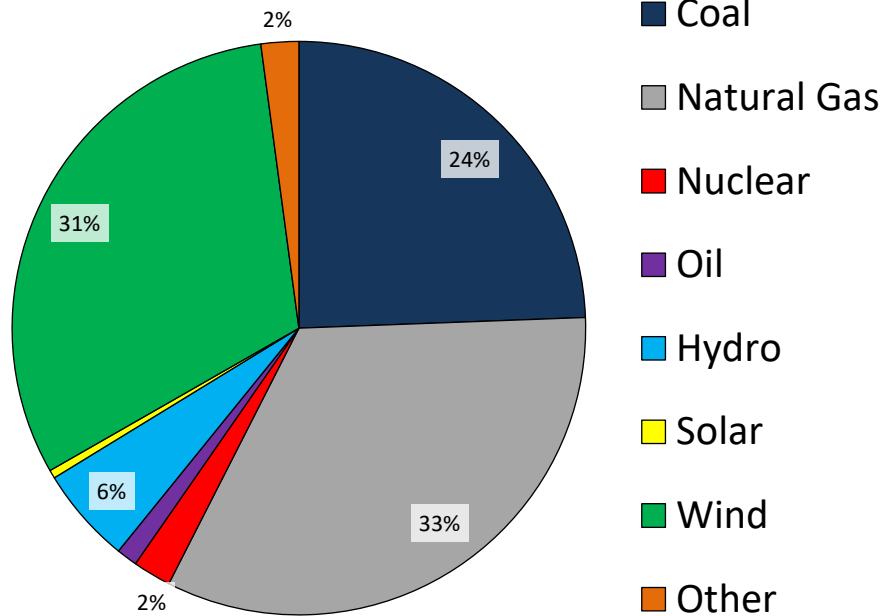
## Installed Capacity vs. Performance: SPP



■ Installed Capacity	2.20%	24.30%	38.9%	29.0%	0.20%	3.70%
■ Generation During Uri	5.79%	47.21%	36.53%	8.98%	0.08%	3.32%

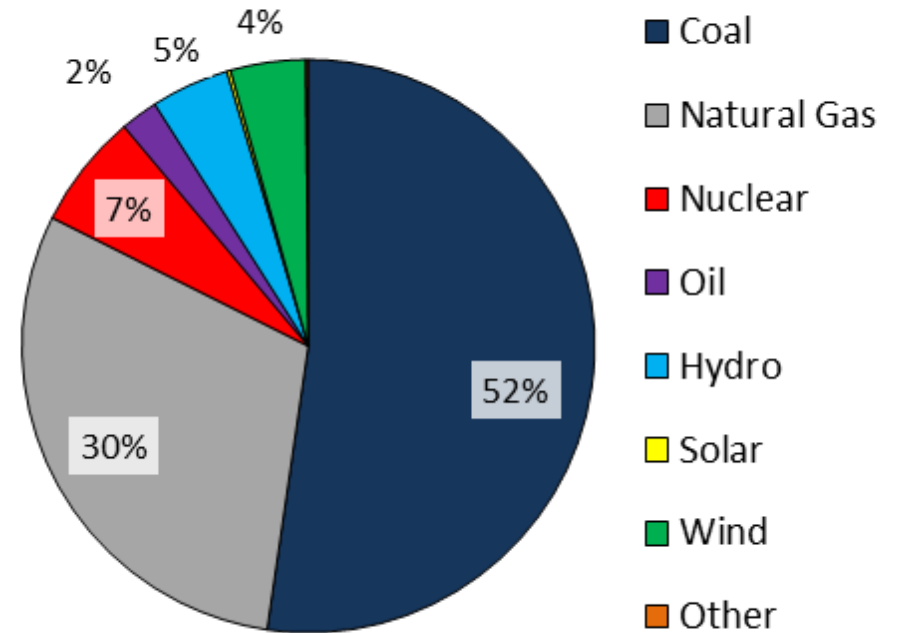
# Baseload Power is Critical to SPP During Extreme Weather

SPP **capacity** mix on Feb 17, 2021



Source: Southwest Power Pool

SPP **generation** mix on Feb 17, 2021



Source: Southwest Power Pool

Baseload represents 60% of the **capacity** but provided 91% of the **Electricity**

# Danger Ahead

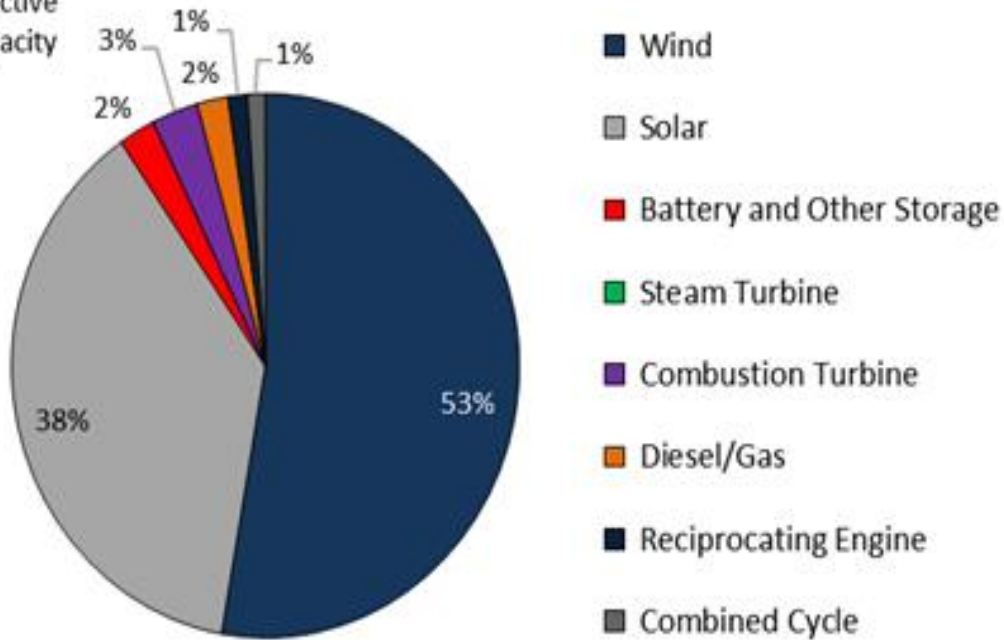


- The future generation build for **SPP** is 91 percent intermittent generation (2030)

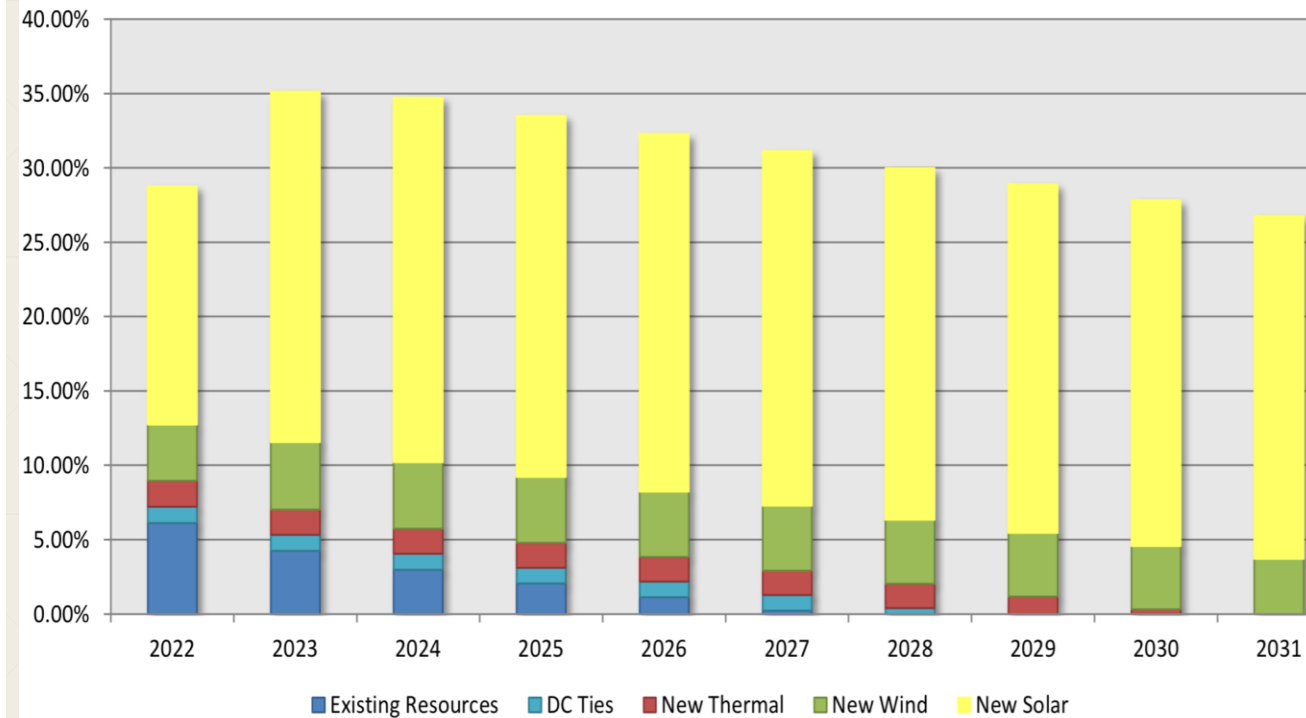
- The future generation build for **ERCOT** is 99 percent intermittent generation by 2030 and 100% for 2031.

SPP interconnection queue capacity by listed type

% of total active project capacity



Source: SPP Interconnection Queue



# 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*
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# 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 & REPs

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)

## 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. 1, 2](#) (Schwertner)

### Rate Plans & Relief

Ban on wholesale indexed products.  
[HB 16](#) (Hernandez)

Wholesale Pricing:  
[SB 3, Sec. 18](#)  
 Residential protections.  
[SB 3, Secs. 8, 9, 10, 11, 20, 30](#) (Schwertner)

## Resiliency

## Weatherization & Market Reform

## Reliability

### Weatherization & Load Shed

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:  
[SB 3, Secs. 26, 27, 28, 29, 31, 32, 36](#) (Schwertner)

AS & Firming:  
[SB 3, Secs. 14, 18, 35](#) (Schwertner)  
 EV Charging:  
[SB 1202](#) (Hancock)

Transmission:  
[SB 3, Secs. 15, 16, 19](#) (Schwertner)  
 ERCOT transmission reliability assessment.  
[SB 1281](#) (Hancock)

Dispatchable:  
[SB 3, Sec. 18](#)  
 Distributed:  
[SB 3, Sec. 19](#) (Schwertner)  
[HB 2483](#) (King)  
[SB 398](#) (Menendez)

## ERCOT & PUC

### Governance

ERCOT:  
 Annual independent audit of ERCOT.  
[HB 2586](#) (Thierry)  
 Independent ERCOT board.  
[SB 2](#) (Hancock)

PUC:  
 PUC Chair must be Texas resident.  
[SB 2](#) (Hancock)  
 Suspension of public info law during disaster.  
[SB 1225](#) (Huffman)  
 PUC expanded from 3 to 5 members.  
[SB 2154](#) (Schwertner)

## Accountability & Coordination

### Designation & Mapping

Mapping:  
 Designation of gas and electric critical infrastructure  
[HB 3648](#) (Geren)  
 Critical infrastructure designation & creation of Mapping Committee.  
[SB 3, Secs. 4, 8, 16, 17, 37, 38](#) (Schwertner)

### Coordination

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

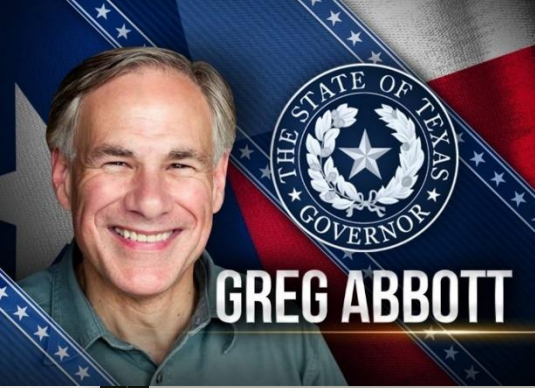
PUC/RRC/TCEQ Coordination.  
[SB 3, Sec. 23, 24, 25, 26, 34, 35, 36, 39, 40](#) (Schwertner)  
 Creation of State Energy Plan Advisory Committee.  
[SB 3, Sec. 33](#)

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

July 6, 2021: Governor Issues Directive Explicitly Stating How Market Reform Legislation Should be Implemented (and why)

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.



GOVERNOR GREG ABBOTT

July 6, 2021

Chairman Peter Lake  
Commissioner Will McAdams  
Commissioner Lori Cobos  
Public Utility Commission of Texas  
P.O. Box 13326  
Austin, Texas 78711-3326

Dear Commissioners:

Maintaining the reliability of the Texas electric grid is essential for all Texans and must remain your top priority as members of the Public Utility Commission. During the recently completed 2021 legislative session, the Texas legislature passed multiple bills that improve electric reliability. Those laws substantially reform the Electric Reliability Council of Texas (ERCOT), mandate weatherizing our electric system; bolster the power grid integrity; and impose greater mandates for the Public Utility Commission, among other items.

While these laws significantly reform Texas' energy and electric power market, more can be done to increase power generation capacity and to ensure the reliability of the Texas power grid. To achieve those goals, I am directing the Public Utility Commission of Texas (PUC) to immediately take the following actions:

- Streamline incentives within the ERCOT market to foster the maintenance of adequate and reliable sources of power, including 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 generators that do not provide enough power to meet the needs of all Texans. When a generator fails, it should shoulder the costs of that failure. Failing to do so creates a barrier between non-renewable and renewable energy generators and creates an unfair advantage for non-renewable energy generators.

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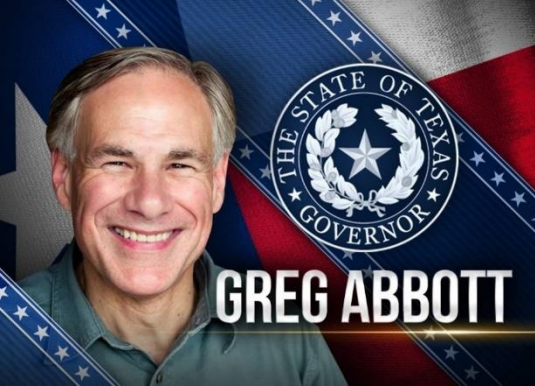
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Greg Abbott  
Governor

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# Governor's July 6 Legislative Implementation Directive: Firming/Cost-Causation Allocation for Intermittence

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.



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While these laws significantly reform Texas' energy and electric power market, more can be done to increase power generation capacity and to ensure the reliability of the Texas power grid. To achieve those goals, I am directing the Public Utility Commission of Texas (PUC) to immediately take the following actions:

- Streamline incentives within the ERCOT market to foster the development and maintenance of adequate and reliable sources of power, like natural gas and nuclear power. The PUC has the ability to redesign segments of the market to incentivize and maintain the reliable electric generating plants that are essential to the reliability of the Texas power grid. Incentives must be directed toward the types of electric power generation that are most needed for the purposes. The goal of this strategy is to ensure that the Texas power grid has sufficient 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.

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Chairman Peter Lake  
Commissioner Will McAdams  
Commissioner Lori Cobas  
July 6, 2021  
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available generation during times of high demand and a minimum amount of power at any given time.

• Instruct ERCOT and other entities to ensure adequate and reliable power for all Texans. Resources should be available at the same time.

• Order ERCOT to ensure sufficient power generation to meet the needs of all Texans. Dispatch essential resources to provide the minimum amount of power through ERCOT.

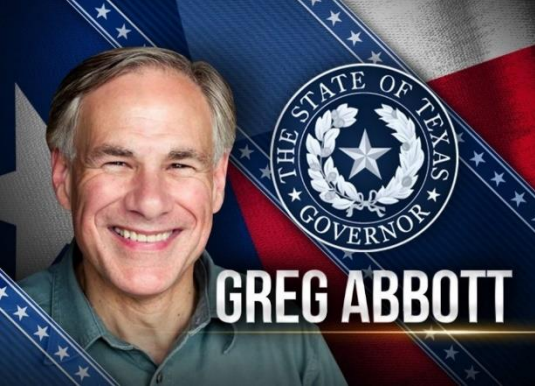
The objective of the directive is to ensure that all power generators can provide a minimum amount of power at any given time. The actions outlined above will ensure that the Texas power grid has sufficient power generation to meet the needs of all Texans during the legislative session.

Through clear communication with the PUC and ERCOT, the actions outlined above will ensure that the Texas power grid has sufficient power generation to meet the needs of all Texans during the legislative session.

Sincerely,

  
Greg Abbott  
Governor

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# 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.



GOVERNOR GREG ABBOTT

July 6, 2021

Chairman  
Commissioner  
Commissioner  
Public Utilities  
P.O. Box  
Austin, Texas

Chairman Peter Lake  
Commissioner Will McAdams  
Commissioner Lori Cobos  
July 6, 2021  
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Dear Commission

Maintaining  
your top priority  
2021 legislative  
reliability, mandate  
mandates

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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.

- **Instruct ERCOT to establish a maintenance schedule for natural gas, coal, nuclear, and other non-renewable electricity generators to ensure that there is always an adequate supply of power on the grid to maintain reliable electric service for all Texans.** Regular maintenance of our natural gas, coal, and nuclear plants must be strategically scheduled to prevent too many generation plants from being offline at the same time. This will help prevent an artificial shortage of power.
- **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.

The objective of these directives is to ensure that all Texans have access to affordable power, and that this task is achieved in the quickest possible time. The actions outlined above will help achieve that goal as well as ensure that there is sufficient generation to meet the needs of the state's growing population and booming economy. Immediate actions are in addition to any proposed changes resulting from the 87<sup>th</sup> regular legislative session, your workgroups, and the forthcoming Texas Energy Reliability Commission.

Through clear communication, transparency, and implementation of these critical changes, the PUC and ERCOT can regain the public's trust, restore ERCOT's status as a leader in innovation and reliability, and ensure Texans have the reliable electric power they expect and deserve.

Sincerely,

Greg Abbott  
Governor

GA:gpk

# Questions?

