Key Observations for Summer 2020

• Peak demand occurred on Aug. 13, reaching 74,328 MW* between 4 and 5 p.m. This was lower than the all-time peak demand record set in August 2019.
  – Seventh hottest summer statewide since 1895, based on mean temperature, but relatively milder in North Central region (only 9 days above 100° in DFW area).
  – Set new July peak demand record on July 13, reaching 74,311 MW* between 4 and 5 p.m.
  – No significant impacts to peak demand due to COVID-19.

• There were several days with tight conditions, but no Energy Emergency Alerts (EEAs) were declared.

• Hurricane Hanna made landfall on July 25 in southern Texas. There were no system reliability issues, but damage to 138-kV and 69-kV transmission lines caused significant congestion in the South Load Zone and high Congestion Revenue Right (CRR) values the following two weeks.

• Overall, market outcomes supported reliability needs.

• There were no Mass Transitions or short pays to Market Participants (MPs). There was one non-financial default from a MP who did not represent generation or load.

*Preliminary operating data
Daily Peak Hour Demands

Higher demands and net load in July and August
Peak demand impacts were the largest in April 2020. They have declined significantly since late June. By the end of the summer, there were no discernable impacts due to COVID-19.
ERCOT had approximately 4,000 MWs of additional installed wind capacity going into summer 2020 compared to summer 2019.

Wind Output
Daily Average Wind Generation

- Although wind generation was generally higher in summer 2020 than in summer 2019 (due to an increase in installed capacity), there were times when the average wind generation at hour ending 3 p.m. was lower than summer 2019.

For hour ending 15

Lower wind generation in 2020 than 2019
ERCOT had approximately 2,100 MWs of additional installed solar capacity going into summer 2020 compared to summer 2019.
## The Summer 2020 Seasonal Assessment of Resource Adequacy (SARA) Values vs. Actuals at Peak Demand

<table>
<thead>
<tr>
<th></th>
<th>2020 Actual Peak Demand (8/13/20)</th>
<th>Final 2020 Summer SARA*</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Resources, MW</td>
<td>83,809</td>
<td>82,199</td>
<td>1,610</td>
</tr>
<tr>
<td>Thermal and Hydro</td>
<td>65,531</td>
<td>65,797</td>
<td>(267)</td>
</tr>
<tr>
<td>Private Use Networks, Net to Grid</td>
<td>3,011</td>
<td>3,176</td>
<td>(165)</td>
</tr>
<tr>
<td>Switchable Generation Resources</td>
<td>3,027</td>
<td>2,756</td>
<td>271</td>
</tr>
<tr>
<td>Wind Capacity Contribution</td>
<td>8,055</td>
<td>6,641</td>
<td>1,414</td>
</tr>
<tr>
<td>Solar Capacity Contribution</td>
<td>3,620</td>
<td>2,979</td>
<td>641</td>
</tr>
<tr>
<td>Non-Synchronous Ties</td>
<td>565</td>
<td>850</td>
<td>(285)</td>
</tr>
<tr>
<td>Peak Demand, MW</td>
<td>74,328</td>
<td>75,200</td>
<td>(872)</td>
</tr>
<tr>
<td>Reserve Capacity, MW</td>
<td>9,481</td>
<td>6,999</td>
<td>2,482</td>
</tr>
<tr>
<td>Total Outages, MW</td>
<td>3,546**</td>
<td>4,069</td>
<td>(523)</td>
</tr>
<tr>
<td>Capacity Available for Operating Reserves, MW</td>
<td>5,935</td>
<td>2,930</td>
<td>3,005</td>
</tr>
</tbody>
</table>

Source: [Final 2020 Summer SARA](#)

*The totals for the final 2020 summer SARA column combine multiple rows into a single row in some cases. (E.g., already in-service thermal and hydro resources with planned thermal and hydro resources)

**The outage information in this table was extracted on Sept. 15, 2020.

Not as tight as expected due to more wind and solar, lower demand and fewer outages
Instantaneous Load, Wind, Solar and Outages at Peak

<table>
<thead>
<tr>
<th>Year</th>
<th>Instantaneous Load</th>
<th>Wind</th>
<th>Solar</th>
<th>Outages (excludes IRRs, PUNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019 Peak</td>
<td>74,679</td>
<td>7,468</td>
<td>1,518</td>
<td></td>
</tr>
<tr>
<td>New July Peak</td>
<td>74,098</td>
<td>10,476</td>
<td>3,567</td>
<td></td>
</tr>
<tr>
<td>2020 Peak</td>
<td>74,291</td>
<td>8,016</td>
<td>3,043</td>
<td></td>
</tr>
<tr>
<td>Tightest Day</td>
<td>72,800</td>
<td>7,642</td>
<td>2,092</td>
<td></td>
</tr>
</tbody>
</table>

*Load, wind and solar values based on telemetry at time of instantaneous load peak*

08/12/2019  07/13/2020  08/13/2020  08/31/2020
Hurricanes in Texas Gulf During Summer 2020

Hurricane Hanna (Landfall on July 25, 2020)

- No system reliability issues and no damage to 345-kV lines during the storm.
- Approximately 1,800 MW of wind generation unavailable during periods of high wind speeds.
- Approximately 20 138-kV lines and 10 69-kV lines experienced storm-related damage.
  - A few of the 138-kV outages were significant and played a role in a transmission emergency that occurred on Aug. 4.

Hurricane Laura (Landfall on Aug. 27, 2020)

- No system reliability issues and no damage or outages to ERCOT bulk electric system during the storm.
- Assisted MISO by preparing to provide Block Load Transfers (BLTs) at Crosby and College Station. No BLTs were implemented.
- MISO requested Switchable Generation Resource (SWGR) at Frontier.
Real-Time Hub Price and Peaker Net Margin

**Real-Time Hub Average Price**

**Peaker Net Margin**

$112,807/MW through 8/31/2019

$33,339/MW through 8/31/2020
Daily Unweighted Average DAM and RTM Prices

- Day-Ahead and Real-Time Market price convergence remained within a normal range during summer 2020.
Appendix
Increase in Thermal Shutdown MWs During Sunset

- In 2020, we observed tighter operating conditions and lower operating reserves as solar generation dropped off at sunset and thermal generation began to shut down after load peaked. These tighter conditions were more pronounced on days with lower total renewable generation.
## Transmission Emergencies in the Rio Grande Valley

<table>
<thead>
<tr>
<th>Aug. 4</th>
<th>Sept. 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Multiple 138-kV transmission lines were on forced outage due to Hurricane Hanna.</td>
<td>• Generators were on forced outage when load was highest in the Valley.</td>
</tr>
<tr>
<td>• Severe post-contingency overloads on 138-kV transmission system with mitigation plan ready for several days following Hanna.</td>
<td>• Base case overload of normal rating on a 138-kV transmission line.</td>
</tr>
<tr>
<td>• Received 25 MW of emergency energy from CENACE.</td>
<td>• Deployed 0.5 MW of Load Resources.</td>
</tr>
<tr>
<td></td>
<td>• Shed 18 MW of firm load.</td>
</tr>
<tr>
<td></td>
<td>• Received 160 MW of emergency energy from CENACE.</td>
</tr>
</tbody>
</table>
Number of RUCs in 2020 Increased Primarily Due to Hurricane Hanna

- Damage to transmission equipment from Hurricane Hanna, which made landfall on July 25, caused significant congestion in southern Texas. Most of the RUC hours were associated with this congestion.

- No RUC hours were for capacity.
The increase in Congestion Rent in August 2020 was driven by hurricane-related congestion in the Valley.
Congestion Revenue Rights (CRRs) Cost vs. Value

- **Cost** and **Value** are represented graphically.
- The graphs show the comparison between cost and value for different months from June 2018 to August 2020.
- The cost and value are measured in millions of dollars.

*Source: ERCOT Public*
Congestion Revenue Rights (CRRs) Balancing Account

- CRR settlement payments were under-funded in August. $0.39M of CRR short charges were not refunded, largely due to congestion in the Valley area.
Real-Time Revenue Neutrality

- Real-Time Revenue Neutrality (RTRN) from June to August 2020 averaged $4.9M per month, primarily due to congestion in the Valley area. Average monthly RTRN for the previous two summers was $9.5M.
Cost for Ancillary Services

- Non-Spin
- Regulation Down
- Responsive Reserve
- Regulation Up

$ Millions

Jun 2018
Jul 2018
Aug 2018
Jun 2019
Jul 2019
Aug 2019
Jun 2020
Jul 2020
Aug 2020
Net Allocation to Load

- Net allocation to load decreased relative to prior summers, primarily due to reduced Ancillary Services costs.
Total Potential Exposure, Collateral and Collateral Calls

- In September 2019 and August 2020, increases in Total Potential Exposure and collateral calls were mainly driven by the increase in ERCOT Real-Time and Day-Ahead prices.