The Future of Demand Response in ERCOT

Bouncing Back in America's Most Resilient Market

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Webinar: July 23, 2020

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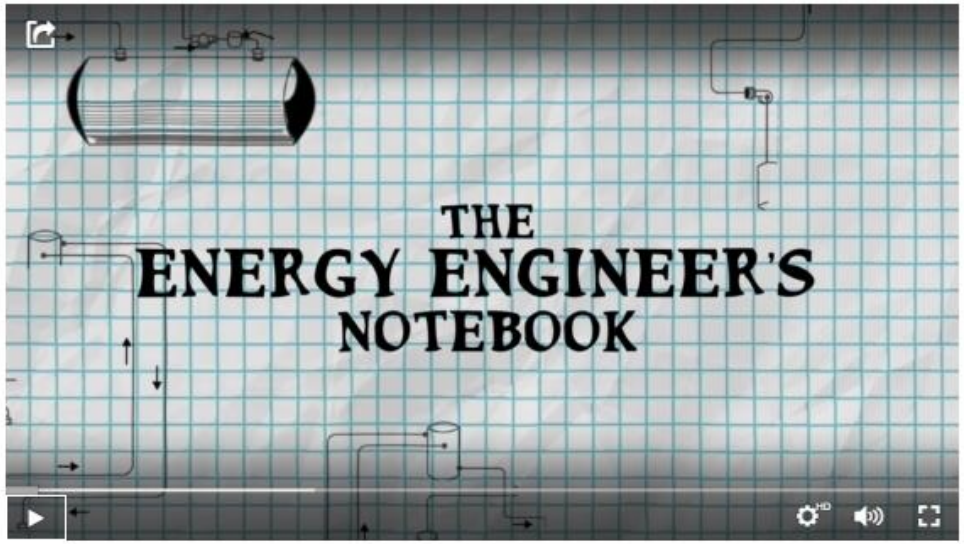
ERCOT ESTABLISHES THE COVID-19 ELECTRICITY RELIEF PROGRAM – MARKET MINUTE (VIDEO)

April 16, 2020

On March 26, 2020, the Public Utility Commission of Texas (PUCT) established **the COVID-19 Electricity Relief Program**, providing eligible residential ratepayers in the state with a temporary exemption from disconnections due to non-payment of electricity bills.

According to the PUCT's draft of the Order, the program is to be funded by a rider implemented by Transmission and Distribution Utilities (TDUs).



Submit your question to the Energy Engineer's Notebook:

Fill out the form below and your question may be the subject of an *Energy Engineer's Notebook* episode.

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Topics for the Webinar

- ERCOT Market Overview
- Key Trends in ERCOT
- Reserve Margins, Grid Reliability, and Renewable Drivers
- Demand Response Program Overviews
- Scarcity Pricing and Load Resources Program
- Case Study
- ERCOT’s Road Map

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Presenters

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What is ERCOT?

- Electric Reliability Council of Texas, Est. 1999
- 90% of the electrical load; 25 million customers
- 46,500 miles of transmission; 650+ generation units
- Overseen by the Public Utilities Council (PUC) and Texas Legislature, not FERC
- Made up of a diverse group of participants
- ERCOT is an energy market – not a forward capacity market
- Wind has recently surpassed coal as the #1 energy source for the market.

Energy Markets vs. Capacity Markets

Capacity Markets

- Procure energy years in advance based on current and expected demand needs
- Participants bid into the market in advance to participate

Energy Markets

- Procure energy in a day-ahead market
- Utilizes a capacity reserve to maintain the required capacity to support the market in near real time
- Pricing adjustments occur to entice participants to stay in the market

So … Which is Better?

2020 Texas Challenges

COVID-19 and Oil and Gas Industry Challenges

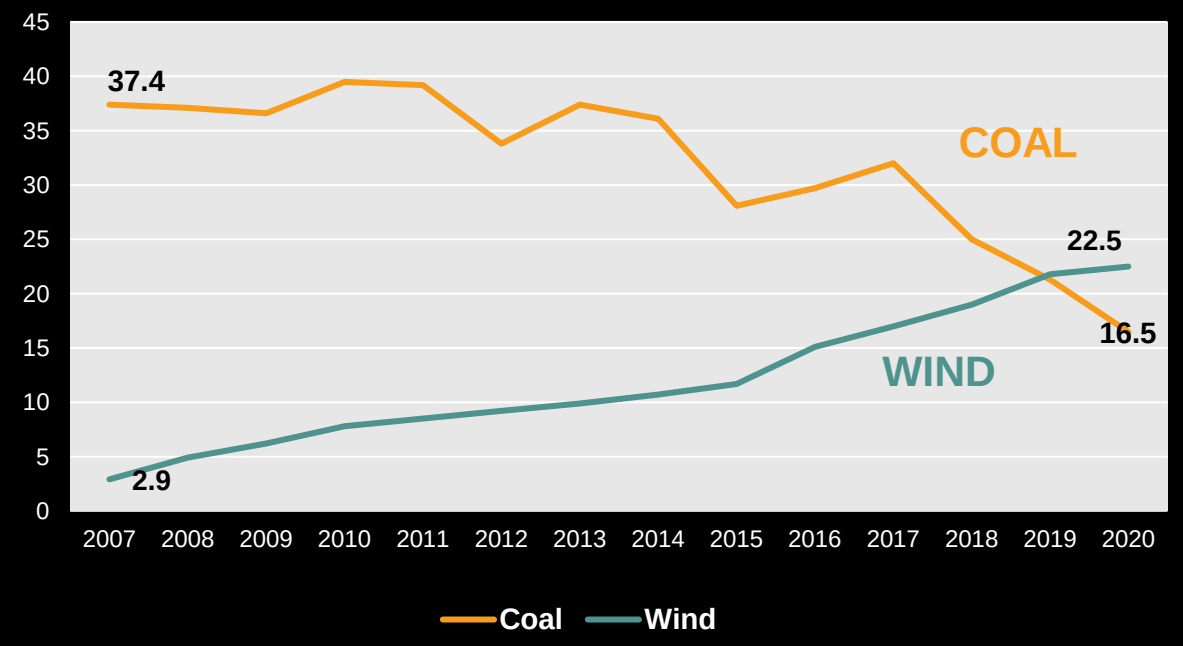
- Oil and Gas Sector significantly impacted by Saudi Arabia/ Russia oil pricing.
  - Record low pricing causes production shutdown and supply overages

- COVID-19 impacts energy usage in the commercial sector
  - PUCT passes Electricity Relief Program
    - Protects residential energy consumers from disconnection
    - Funded through a rider on TDU (transmission and distribution utilities) $0.33 per MWh

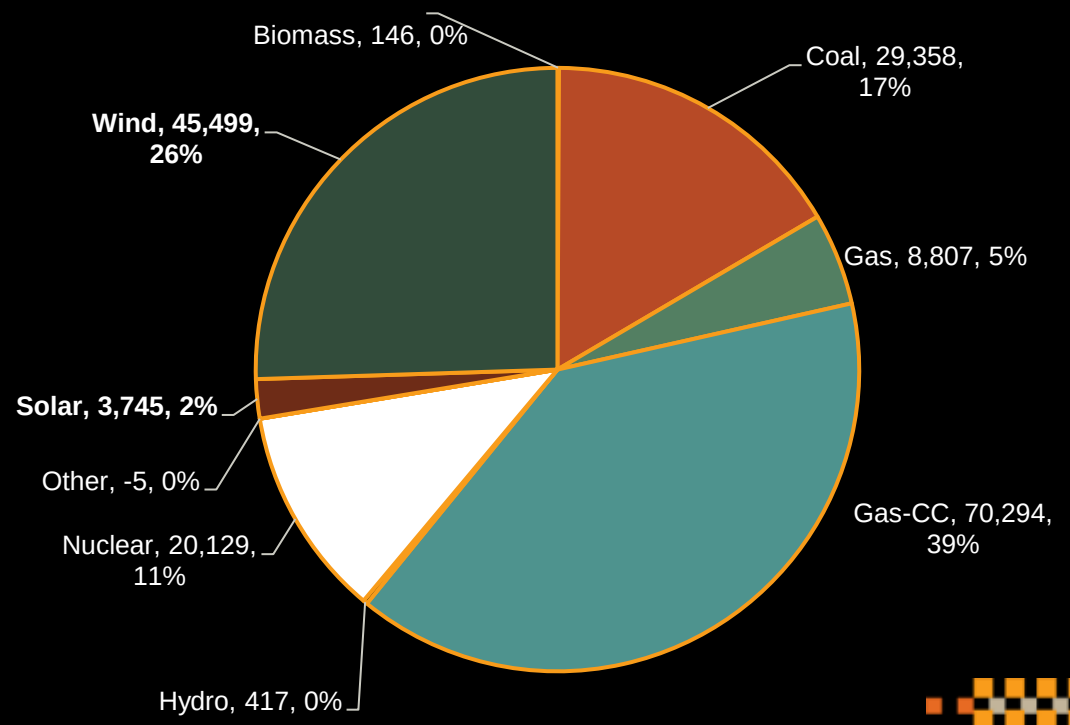
Renewable Transformation

Wind and Solar Continue to Grow as Fuel Sources

2007 – 2020 Wind vs Coal Mix as a % of Total



2020 Fuel Sources as % of Total (Gwh)



*Source: ERCOT, data link

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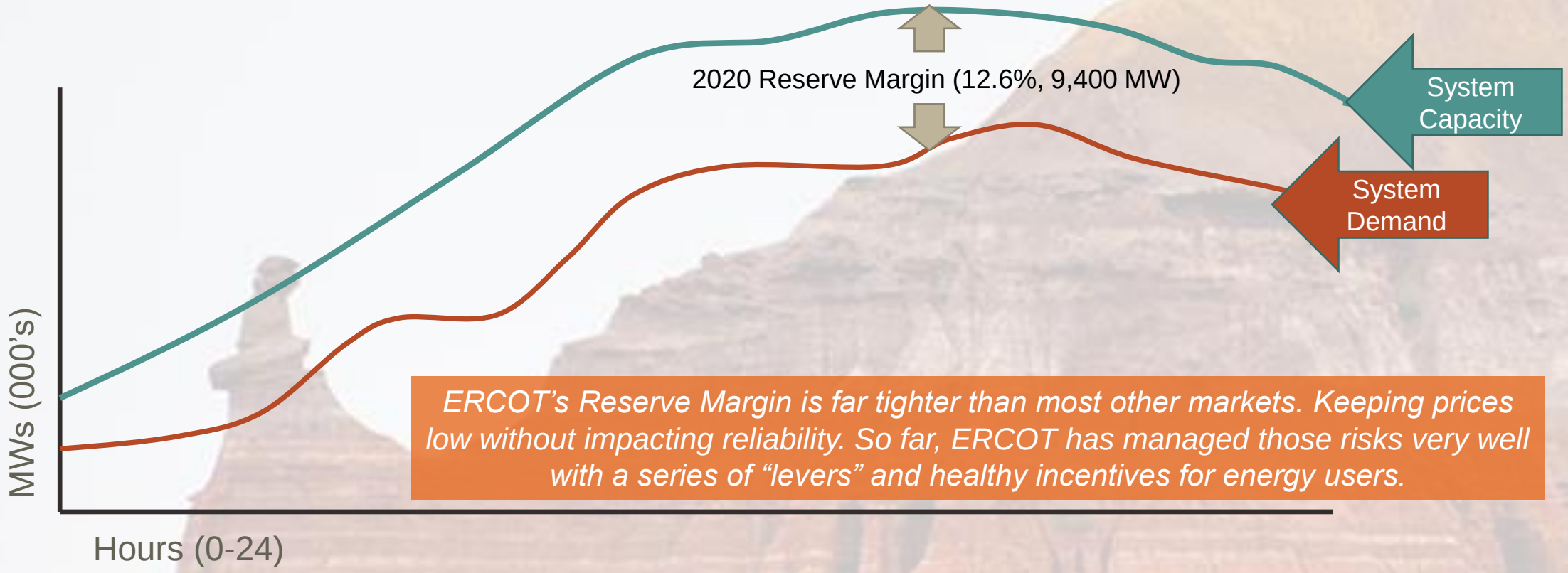
Reserve Margin

Keeping ERCOT Efficient and Cost Effective

Reserve Margin = the amount of reserve capacity ERCOT maintains to keep the grid safe and operational. It is the difference between the systems maximum capacity and the demand at any point in time.



ERCOT's Reserve Margin is far tighter than most other markets. Keeping prices low without impacting reliability. So far, ERCOT has managed those risks very well with a series of "levers" and healthy incentives for energy users.

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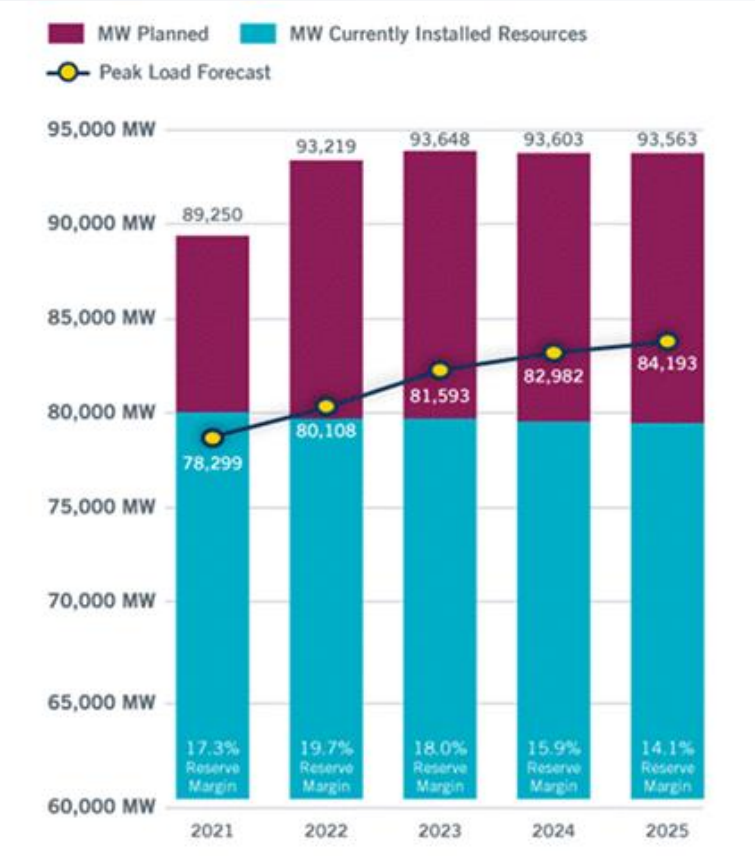
Peak Load Continues to Increase

How Does This Compare Against the Reserve Margin?



Peak Load Forecast from 2021 – 2024 are expected to grow by 7.5%.

- With this increase, ERCOT will rely on almost exclusively new solar and wind generation build to increase its reserve margin
- Many market participants don't expect the projected amount of solar and wind to be built, resulting in tighter reserve margins than projected in the CDR
- Alerts expected to increase and the potential for “levers” like demand response to be used more often.

"ERCOT is prepared to use the tools and procedures that are in place to maintain system reliability during tight conditions," said ERCOT President and CEO Bill Magness.

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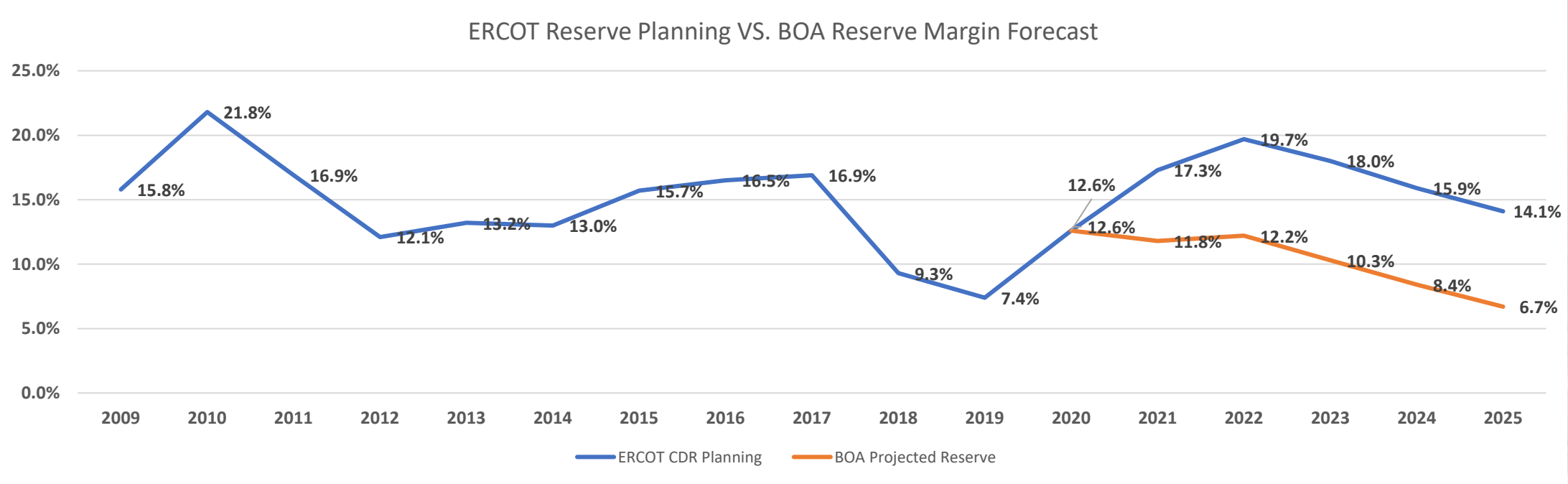
Future of Reserve Margins in Flux

Conflicting Opinions Create Some Confusion For Participants



- ERCOT's optimistic view of reserve margin is debated by other independent forecasting agencies
  - Renewable intermittency, record heat, and delays in renewable infrastructural development are driving a more pessimistic point of view on the future of reserve margins

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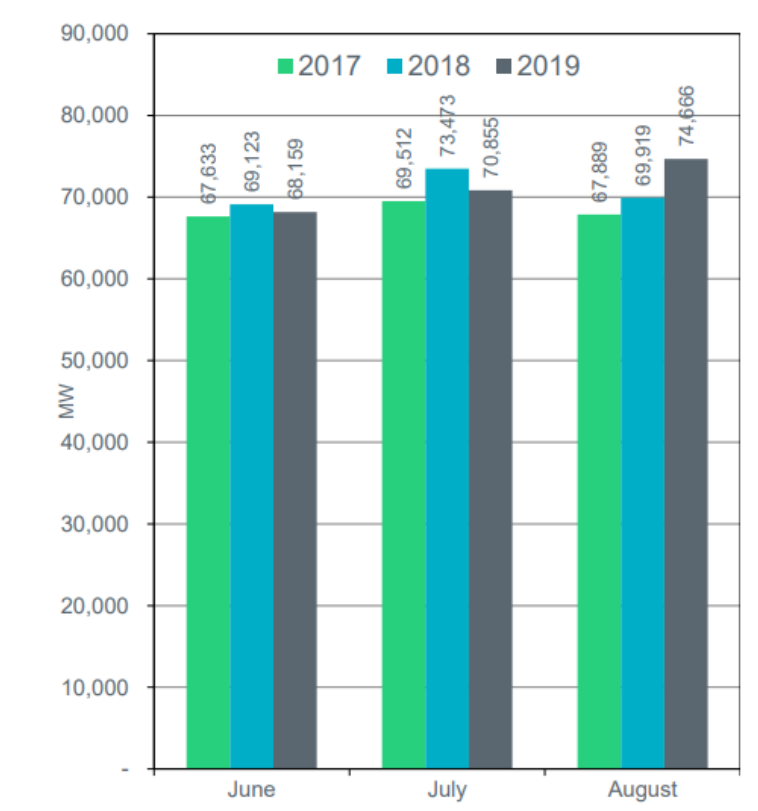
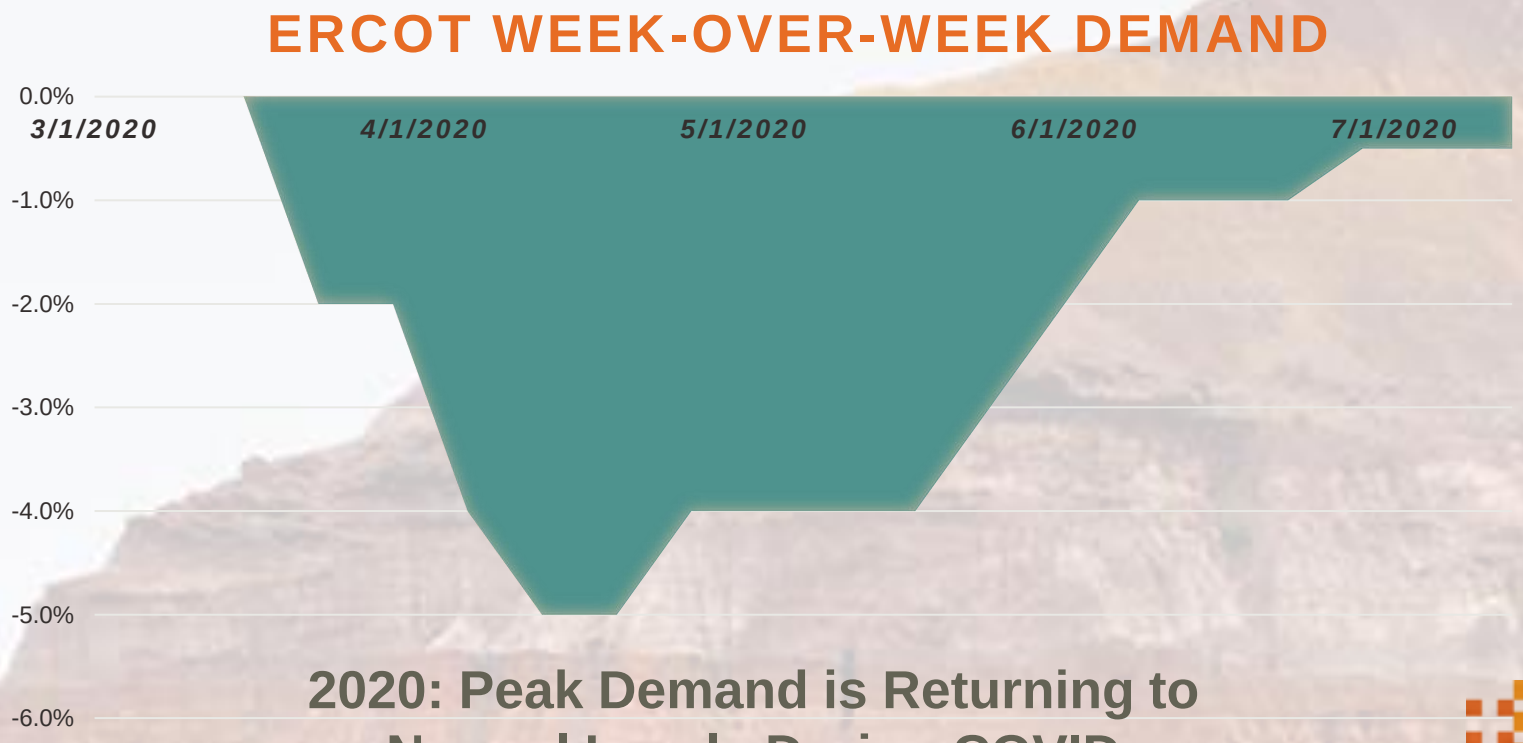
ERCOT Peak Demand

The Impact of Record Heat in 2019, COVID in 2020



2019: Record Breaking Demand in August



2020: Peak Demand is Returning to Normal Levels During COVID

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ERCOT'S LEVERS

Reduce Risks to Reliability and Meet Demand Needs

- **ERCOT's Balancing Levers**
  - **Generators remaining in the market when supply is needed**
    - Price caps: $9,000/MWh where it's closer to $2,000/MWh in other markets
  - **Demand Response and Demand Management:**
    - **Demand Response – Ancillary Programs**
      - Help the grid by quickly and temporarily reducing electrical demand when the grid is stressed to prevent brownouts and blackouts
      - Helps customers by reducing net energy cost and generating revenue
        - Programs include **LR** and **ERS**.
    - **Demand Management – 4CP** (Coincidental Peaks) or "peak demand management"
      - Help the grid by reducing peak demand during the hottest and highest demand days
      - Helps customers by reducing electricity charges through lowering the capacity charge

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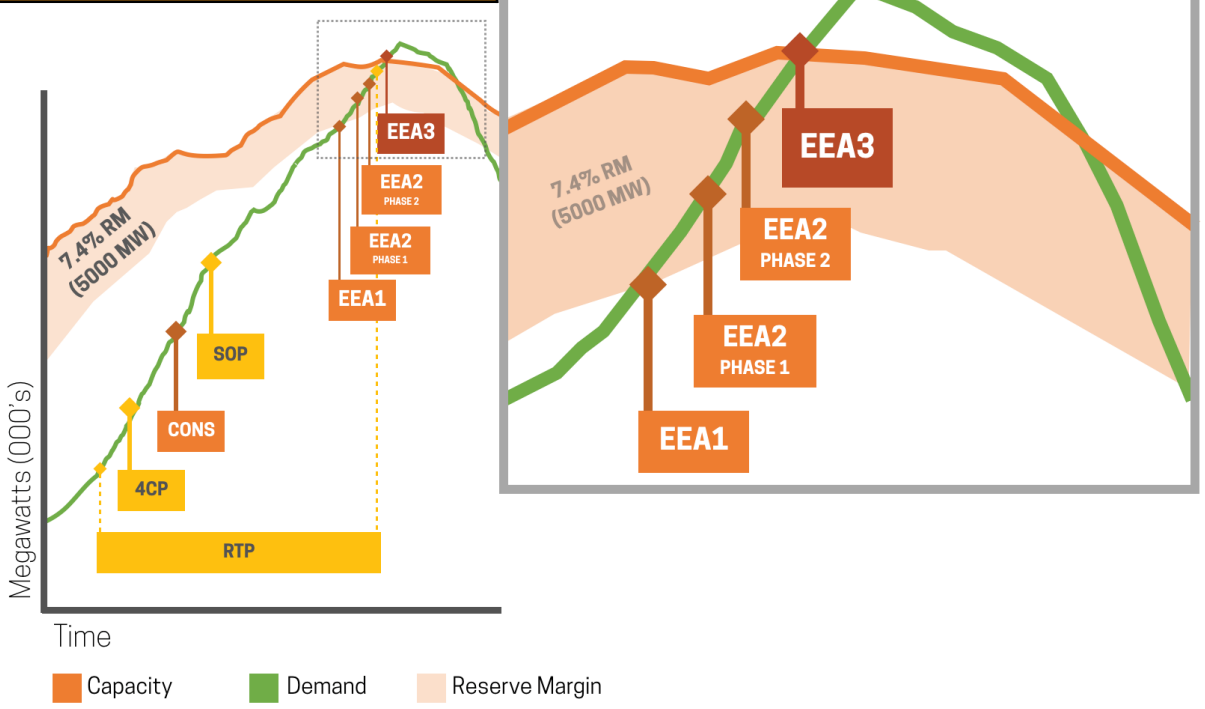
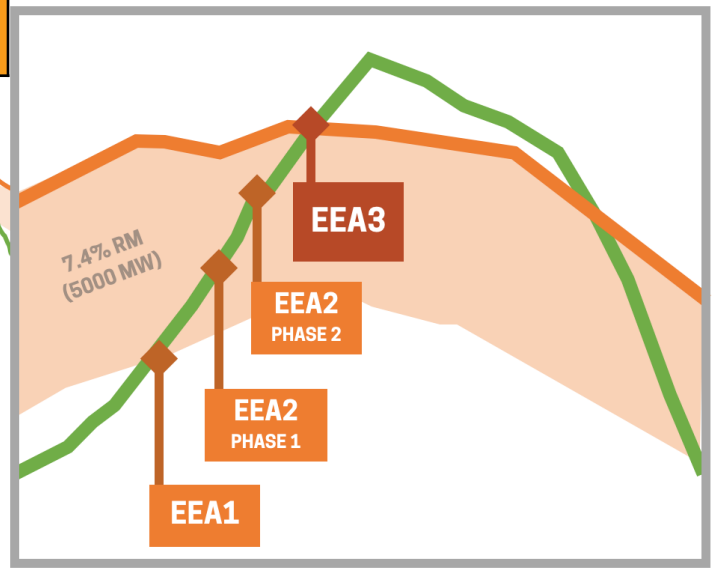
Understanding EEA's

How ERCOT Manages Grid Stability

RTP: $8.13 - $9000 MW/h
4CP: 1500 MW's
SOP/CLM: 200 MW's





Levels	Responsive Reserves	Description
Conservation Alert	< 3,000 MW	ERCOT may call upon consumers to take steps to conserve power by reducing consumption.
EEA 1	< 2,300 MW	**Texas Electricity Conservation Needed** ERCOT operator's authority to call on all available power supplies. ERS 30 can be called at this point.
EEA 2 Phase 1 & 2	< 1,750 MW	**Conservation Critical; Risk of Rotating Outages** ERCOT escalates to a Power Warning, which allows ERCOT operators to dispatch Load Resources providing Responsive Reserve Service as well as ERS 30 & ERS 10
EEA 3	Rolling Blackouts	**Rolling blackouts to all areas of ERCOT grid** If capacity shortage is not relieved using voluntary and contractual demand response, ERCOT will instruct utilities to rotate power outages to prevent statewide blackouts.

- When demand approaches what the grid can supply within 3,000 MW's, ERCOT takes action.
- 8 levers are used by ERCOT before they have to call blackouts (BO's).

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Poll Question #1

Are you currently participating in any of the following ERCOT Demand Response Programs?

- Yes, 4 Coincidental Peaks (4CP)
- Yes, ERS-10 or ERS-30
- Yes, Load Resources (LR)
- Yes, SOP Program
- No, but we have participated in one of these in the past
- No, we have never participated
- I Don’t know

Weighing DR/DM Participation

Significant Value vs. Excessive Events

- **Question:**
  - Is this (2-events) a new normal for ERCOT?
- **Answer:**
  - Reserve Margin is increasing; however, as renewable penetration increases it create more varying fluctuations in supply. DR is a key asset in growing renewable resources and bringing balance to the grid.

- **The ERS program has three periods of participation**
- **LR is a year-round program that has 24-hour availability**
  - LR is the last bastion
- **Both programs are standby programs**
  - This means you are paid for being on standby and required to perform one test per year

ERCOT's need for demand response is greater than ever, but the likelihood of events is still fairly small. A win-win for energy consumers.

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Demand Response Program Overview

Emergency Response Services (ERS)

Date Start	Start Time	Day	Duration (minutes)	Program
2/2/2011	5:48:59	Wednesday	1,692- 28 hrs	ERS 10
8/4/2011	15:44:31	Thursday	146 – 2.4 hrs	ERS 10
1/6/2014	7:03:26	Monday	50 min	ERS 10 ERS 30
8/13/2019	15:25:24	Tuesday	60 – 1 hr	ERS 10 ERS 30
8/15/2019	15:13:24	Thursday	90 – 1.5 hrs	ERS 30

Emergency Response Services (ERS)

- Three, (4) month participation periods
  - Feb, Jun, Oct
- Standby
  - You earn revenue even if an event is not called
  - 10-min and 30-min notification programs
- Earnings and payments
  - Paid within 60 days of the completion of a participation period
- You can earn between:
  - $54k/MW-year
  - You CAN participate with LR as well!

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Demand Response Program Overview

Load Resource (LR) Program

Date Start	Start Time	Day	Duration (minutes)	MW Impacted	Explanation
2/26/2008	18:49:00	Tuesday	79 – 1.3 hrs	1,211	EECP Step 2, Systemwide Manual Deployment
2/2/2011	5:24:00	Wednesday	515/8.5 hrs		EECP Step 2, Systemwide Manual Deployment
8/4/2011	14:32:00	Thursday	201 – 3.3 hrs	863	EEA Level 2A, Systemwide Manual Deployment
8/24/2011	15:09:00	Wednesday	215 – 3.6 hrs	634	EEA Level 2A, Systemwide Manual Deployment. Only Stack #1 deployed.
1/6/2014	6:53:00	Monday	60 - 1 hr	1,083	EECP Step 2, Systemwide Manual Deployment

Load Resource Program (LR)

- Program is year-round, 24/7 availability
- Standby
  - You earn revenue even if an event is not called
- Must be able to curtail within 10 minutes
  - Requires an under-frequency relay (UFR)
- How much do you earn
  - $108k/MW-year, without proration

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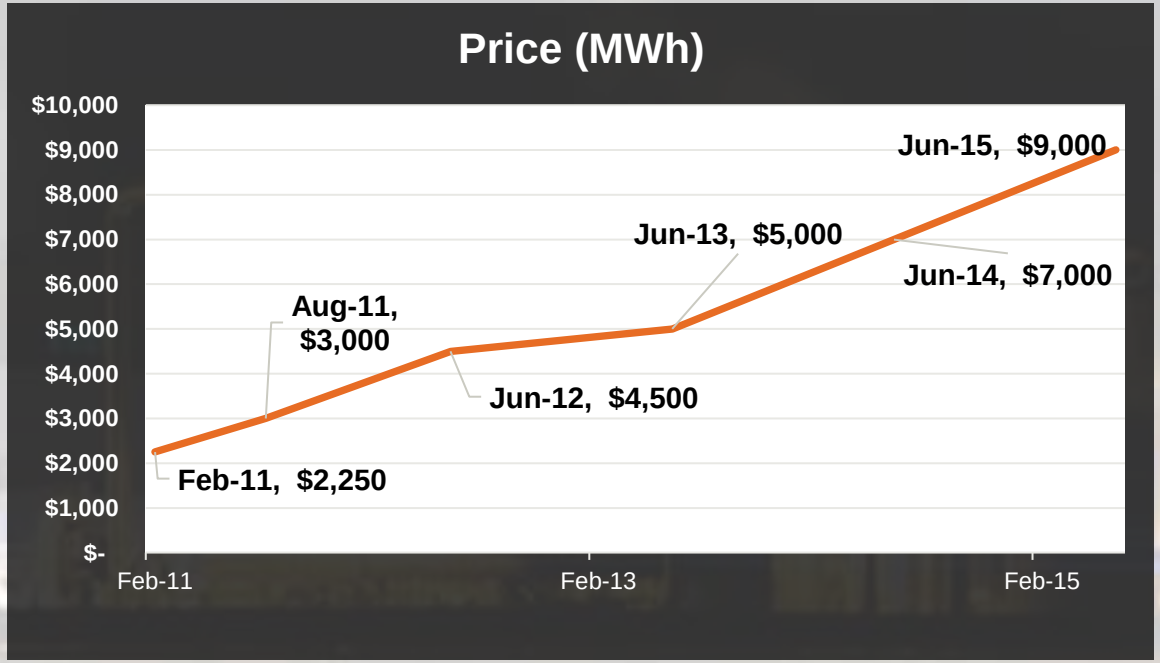
Scarcity Pricing

Small Reserves = Big Earning Potential for LR Participants

Scarcity Pricing

- Increased price as a result of a scarcity of supply relative to demand
- A low reserve and high demand day creates the potential for scarcity pricing
- The Operating Reserve Demand Curve (2014) automatically raises prices in a shortage
- If you are considering or participating in LR, this scenario is your time to be rewarded



When reserves drop below 2,000 MW, Scarcity Pricing will reach $9,000/MWh

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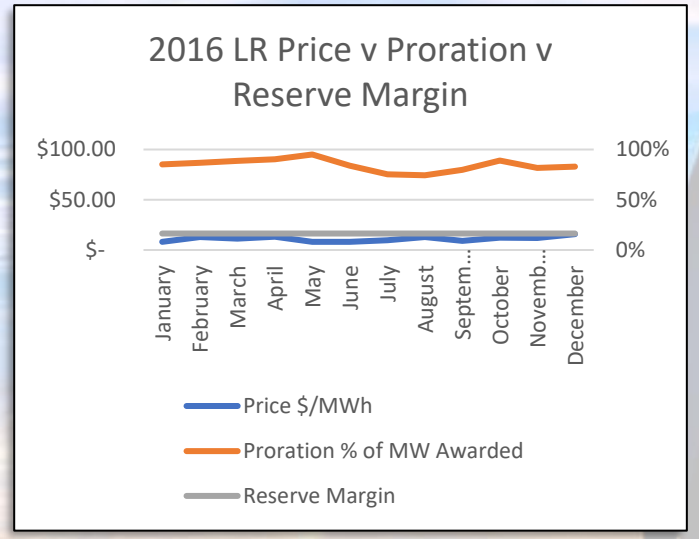
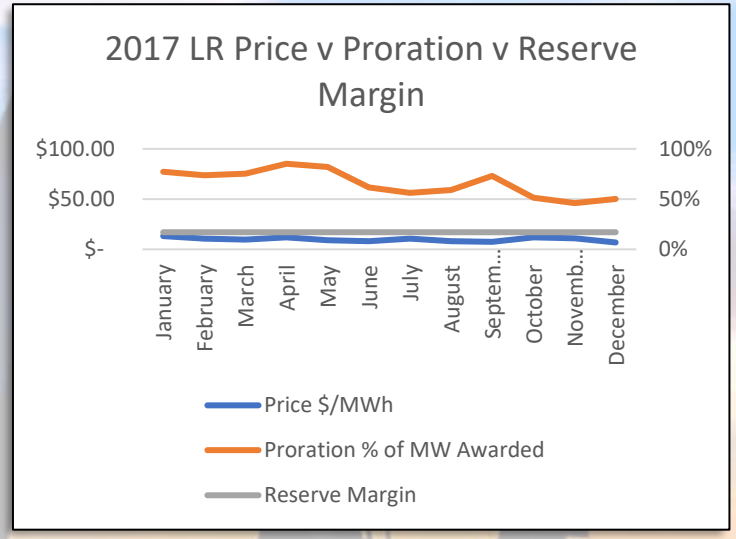
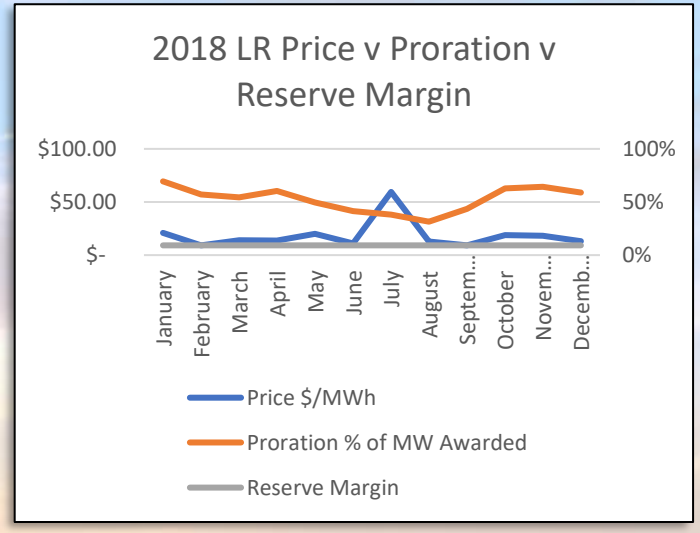
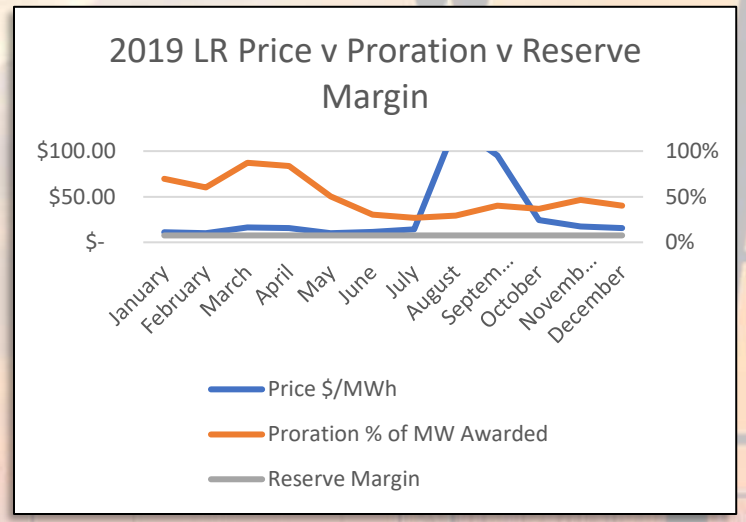
Comparing Proration

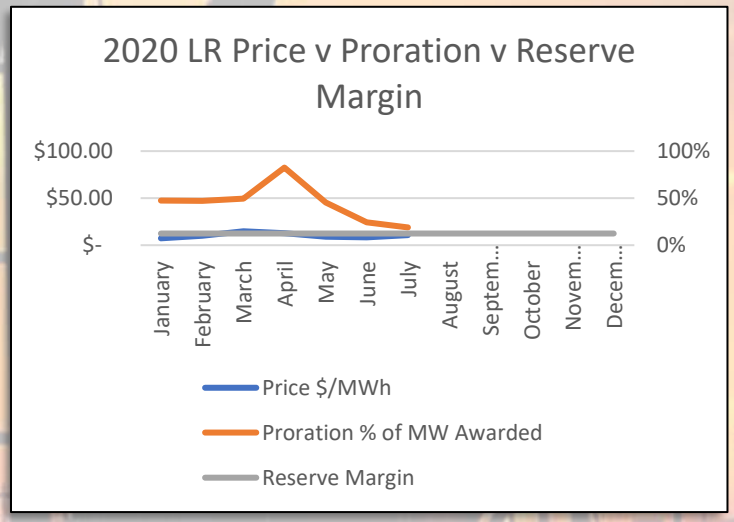
Making Proration Work for You Organization





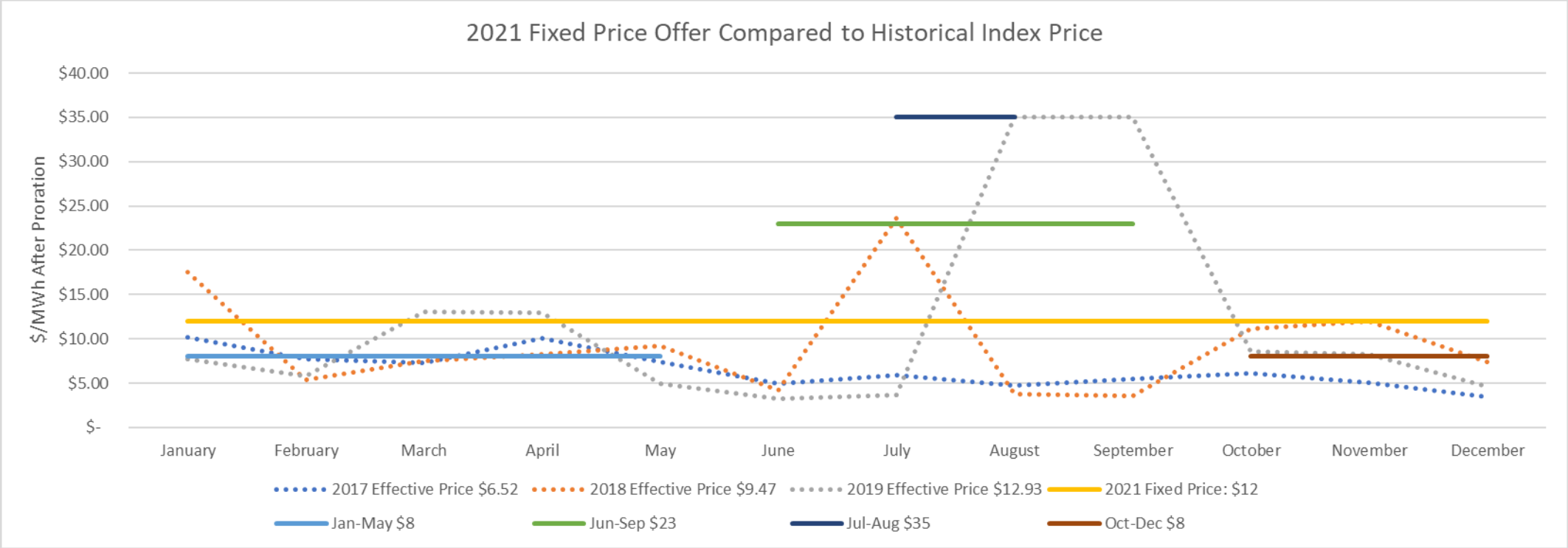






Demand Response Program Overview

LR – The Benefits of the Fixed Pricing Model



Fixed pricing models introduce a flexible way to maximize revenue and mitigate participation risks

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Selecting Demand Management Options

Considerations for Program Participation

Organizational Situation and goals	Program Option
Direct Electricity Cost Savings	4CP ERS or LR – offset cost through revenue generation
Generate revenue to fund energy projects or bottom line	ERS or LR
Resiliency and Grid Support	ERS (10) and/or LR leveraging DERs, Gens
Under frequency relay in place	LR
Monetize assets for upgrades or installations of new energy assets	LR or ERS
Better prepared and trained on how to deal with potential power outages	LR, ERS
Corporate citizenship – helping your community maintain lower energy costs & environmental impact, and improve grid reliability	LR, ERS, 4CP

If You're Doing 4CP …

You Should Be Doing ERS/LR – Same Financial Impact Without Disruption

Case Study: The Value of ERS and LR over 4CP

- An organization doing only 4CP
  - Would potentially curtail 6 times (July 2019) at 3 hours each time
    - 18-hours of disruption to your business
    - Missing peaks results in proportional lost savings
  - Performing in ERS guarantees revenue earnings
    - Your maximum commitment is limited to your scheduled time periods
    - Up to 8-hours per season

ERS/LR – Less Disruption, More Revenue

- 4CP will require more events to hit peaks
- ERS/LR will have far fewer calls
- Revenue earned will be greater than savings obtained, with lower risk to fail

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What’s Next for Texas

- ERS Contract Term Changes
  - ERS contract term from 3 to 4 starting the Oct 2021
  - Two 4-month summer and winter terms
  - Two 2-month spring and fall terms
- LR participation without UFR
  - Adding a new product called ERCOT Contingency Reserve Service (ECRS)
  - Will be available no earlier than January 1, 2022
  - Does not require an Under-Frequency Relay (UFR)
- Introducing storage (battery) rules to the market
  - Stakeholders currently reviewing rules
  - New rules for storage over the next year

BATTERY STORAGE

Poll Question #2

After seeing this presentation, do you believe that LR could be a good fit for your organization or facility?

- Yes
- No
- Not sure, would like more information

Questions?

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