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A LOOK AT THIS SUMMER'S TEXAS ELECTRICITY MARKET

HOW EVERY BUSINESS CAN PREPARE



Conditions for a high-price electricity market seem to be on the horizon this summer.
For Texas businesses, that presents an opportunity to find a better, more efficient energy approach.

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Introduction

Summer heat, rising demand, and tightening supply increase the price risk for electricity consumers this summer.

For Texas businesses, this can be both a challenge — and an opportunity. At NRG, we think a hot summer defined by market scarcity can be an external force to encourage refocused energy planning for a smarter energy future.

This white paper presents both sides of the energy equation:

1. How the marketplace is shaping up for the season and, specifically, how rising demand and changing supply could result in a market defined by "scarcity pricing"
2. How businesses can adjust their strategy for this summer and beyond through a deep-rooted knowledge of how they use energy and a shift to risk-avoiding energy plans and tactics

Summer Forecast: What Energy Customers Need to Know

Electricity experts in Texas agree that several signs are pointing to a challenging summer for not only generators and retailers, but for customers as well.

As we move head-on into the Texas summer, it is important to understand the issues impacting the electricity market and how to adapt to a season that could bring forth the three "highs:" high temperatures, high demand, and high prices.

In many ways, the Texas electricity market is much like the market for any consumer good. If demand rises and supply fails to keep up, conditions develop for price escalation. This is simple competitive-market economics. When it comes to electricity as the product; and June, July, and August as the time period; the ingredients for higher prices are moving into place.

Scarcity pricing and what that means

Scarcity pricing refers to the price escalation that occurs when supply becomes tight in a commodity market. In other words, a scarcity market is a high-priced market, and scarcity in Texas electricity appears to be approaching.

Opportunities for savvy energy customers

So where does that leave electricity users? As with any situation, advanced knowledge, a cool head, and a proactive, realistic sense of preparation can mitigate the economic challenges summer months can bring, leading to positive outcomes. Before getting to the opportunities, we will first examine the individual factors leading to price concerns in more detail.

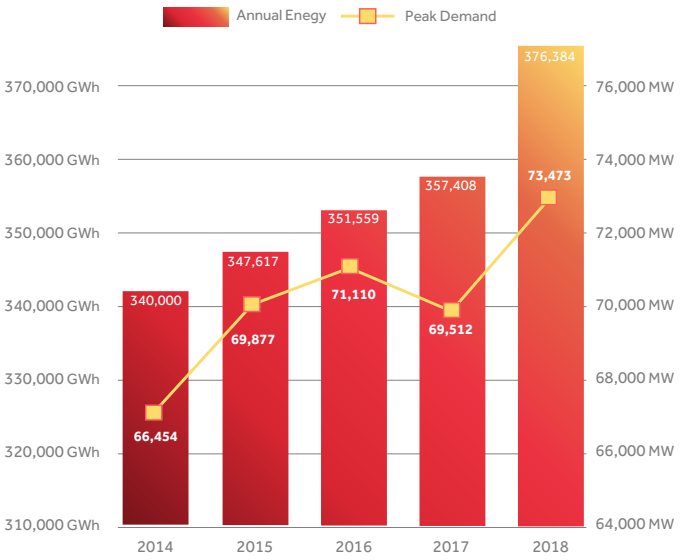
Market Knowledge: Foundation for Action

It is important as an energy customer to know not only that the supply/demand balance is tightening, but **why**. For years, many of us have grown accustomed to a low-price, low-risk Texas electricity market. Knowing why these years of a relatively calm electricity 'sea' have changed will help all of us adjust to what may well be a new normal.

Energy demand is rising

The first factor in the price equation is demand. As more people call Texas home, and as more businesses set up shop to serve them, the demand for electricity grows.

ERCOT's system set an all-time demand high of 73,473 MW in July 2018, culminating in a 1.6% average annual growth rate in hourly peak demand over the last decade. [See page 2, 2019 ERCOT Planning December 21, 2018 Long-Term Hourly Peak Demand and Energy Forecast.]



Credit: ERCOT State of the Grid 2018

ERCOT forecasts especially high growth in demand through 2022 — 2.5 to 3%, according to a May 2019 update of its Capacity, Demand and Reserves (CDR) Report.

Summer Summary: 2020-2024					
Load Forecast, MW:	**2020**	**2021**	**2022**	**2023**	**2024**
Summer Peak Demand (based on normal weather)	76,845	78,824	80,590	82,506	84,121
plus: Energy Efficiency Program Savings Forecast	1,764	2,065	2,285	2,592	2,821
Total Summer Peak Demand (before Reductions from Energy Efficiency Programs)	78,609	80,888	82,875	85,098	86,943
less: Load Resources providing Responsive Reserves	-1,173	-1,173	-1,173	-1,173	-1,173
less: Load Resources providing Non-Spinning Reserves	0	0	0	0	0
less: Emergency Response Service (10- and 30-min ramp products)	-749	-749	-749	-749	-749
less: TDSP Standard Offer Load Management Programs	-219	-219	-219	-219	-219
less: Energy Efficiency Program Savings Forecast	-1,764	-2,065	-2,285	-2,592	-2,821
Firm Peak Load, MW	**74,705**	**76,683**	**78,449**	**80,365**	**81,981**

Source: ERCOT CDR Report, May 2019 update

[1] ERCOT data

This year's reserve margin is tight, longer term uncertain

The reserve margin is the key measure when looking at supply and demand for any particular time period. This is the cushion of power-generating capacity available when demand is at its highest.

When reserve margin forecasts get too tight and fall below recommended levels, prices in the ERCOT market can increase to very high levels to indicate scarcity. A maximum price of $9,000/MWh can be reached during these times of low electricity reserves. A high scarcity price is required to encourage investors to build new capacity.

Looking at anticipated supply, demand, and weather for this summer, ERCOT issued its final Seasonal Assessment of Resource Adequacy (SARA) on May 8, citing a low reserve margin of 8.6% (compared to 10.5% last year and 16.9% in 2017). In the news release, ERCOT said:

> *"In all of the scenarios studied for the final summer SARA, ERCOT identified a potential need to enter Energy Emergency Alert (EEA) status in order to maintain system reliability. The final summer SARA report includes a forecasted peak demand of 74,853 MW, which is 1,300 MW higher than the all-time peak demand record set last summer on July 19."*

Beyond 2019, the latest CDR shows increasing new builds and increased reserve margins. The reserve margin projection for 2020 is 10.5% and the reserve margin in 2021 is 15.2%. What is important to note about these projections is they are dependent upon new generation being constructed as planned. The CDR includes 13.4 GW of new wind, 6.6 GW of new solar and 2 GW of new gas generation that will need to be completed by the summer of 2021 to reach the 15.2% reserve margin. However, historically the CDR has overstated the amount of wind and solar that gets built and we expect this trend to continue. Also, the vast majority of the gas generation projects included in the CDR have a history of being delayed (originally planned to be constructed in the 2016-2018 timeframe), making these projects questionable. In summary, we are happy to see the potential for a better balance in supply and demand, but remain cautious in relying solely on the projections included in the CDR.

Supply profile shifting

Also important to note, the emergence of renewable generation has altered the supply structure within ERCOT. To see how much, compare the total generation percentages by energy source in 2009 and 2018. Note the rise in natural gas-fired generation and renewable energy and the decline in coal-fired and nuclear generation.

Energy by Fuel Type within ERCOT Comparison of 2009 to 2018 (Major fuel sources)

SOURCE	2009	2018
Coal	41.2%	24.8%
Natural Gas	35.7%	44.2%
Nuclear	15.0%	10.9%
Renewables (wind, solar, hydro, biomass)	6.6%	19.8%

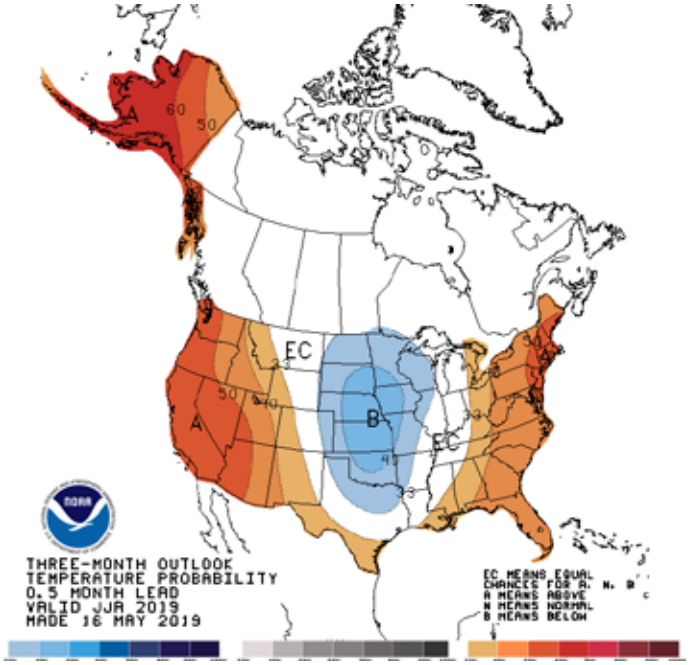
Data from Electric Reliability Council of Texas (ERCOT): Presentations, Operations and System Planning, Energy by Fuel Type 2002-2018.

In general, the emergence of cleaner alternative energy like wind, and the increasing reliance on cleaner (compared to coal), more efficient natural gas generation is a good thing. However, as older, less-efficient units are retired, and the construction of new natural gas-powered units is uncertain, the ERCOT market is becoming more and more reliant on renewable generation to make up the difference. In general, the potential is there for renewable sources to do just that. However, their intermittent nature — the wind does not always blow and the sun does not always shine — adds another element of uncertainty to the energy market.

Layer in the weather

The scarcity dynamic can also be impacted by another factor, especially relevant to Texas — summer weather.

When temperatures heat up, so does demand for electricity. The National Oceanographic and Atmospheric Administration (NOAA) has issued its temperature anomaly outlook for June, July and August 2019, shown below. This outlook forecasts below normal temperatures in northern Texas, equal chance of above or below temperatures in mid-Texas, and above normal temperatures in western and southern Texas.



Heightening risk

What last summer made clear, and what Texas businesses need to understand, is that the combination of growing demand, use of renewable energy, and hot summers, changes the risk profile as we approach summer 2019.

Last summer prices did not rise to the levels expected for a few reasons, some within our control and some not. The power fleet performed well, an accomplishment that ERCOT attributes to advanced preparations, market incentives, and strong system performance. These aspects the industry can generally control.

What cannot be controlled is when the wind will blow. In summer 2018, ERCOT's wind fleet helped significantly. Temperatures rose, but the prices did not, in part because wind resources generated at or above planned levels during times of high demand.

This, of course, is good news — clean, renewable energy aided in keeping wholesale power prices in check. But it also reveals an evolving risk created by the state's increasing dependence on wind power to meet peak usage. Just as the wind contributed when it was most needed last summer, it may not always do so in the future. When there are fewer conventional power plants to act as a cushion, this increased variability in supply creates more price risk.

So what's the takeaway as ERCOT enters summer 2019?

Conditions suggest heightened uncertainty. Wind power could again come to the rescue, but no one knows if peak demand days will be windy or not. It's time to prepare.

NRG's commitment to help

As a major energy supplier within ERCOT, NRG is working to do its part to ease strain on the grid this summer, both on the supply and demand side.

On the supply side, we are restarting a 385 MW natural gas plant in June. The efficient combined cycle facility can meet the needs of about 77,000 homes on the hottest day of the year.

In addition, NRG has expanded its maintenance activities this spring to ensure its generation fleet is in top condition to provide reliable supply during periods of high demand this summer.

On the demand side, NRG is embarking on an educational campaign to help customers understand the benefits to them of better managing their energy use.

Energy Preparedness: Key to Summer Readiness

As energy customers, Texas businesses are not without options when it comes to a summer that presents the specter of higher electricity prices. Like anything, the key is knowledge, advance planning, and taking a proactive stance.

From Knowledge to Possibilities

- Start by analyzing energy usage for the past 12 months — how much was used, how much was spent, and where and how that usage took place
- Evaluate energy plan alternatives and structures that mitigate risk — as we exit an era of a low-price, low-risk market, reconsider overall objectives and look at strategies that avoid the risk of higher prices
- Consider moving from a risk-based, real-time energy pricing option (i.e.; an Index plan) to a more fixed-price contract with less exposure to market prices
- Examine current electricity contract for the cost impact of making a switch (note that the cost of a switch may still be less than what is saved by switching, especially in a high-price market)
- Look at making changes to energy usage — there may very well be areas of reduction that will have little or no impact on daily operations
- Consider participation in a demand response program — where using less during a time of peak stress on the grid can earn revenue for the company
- Look at the opportunity provided by a demand charge management program — by expertly predicting when a peak usage day will take place, this can help companies who lower their usage accordingly to save significantly based on lower demand charges in the future

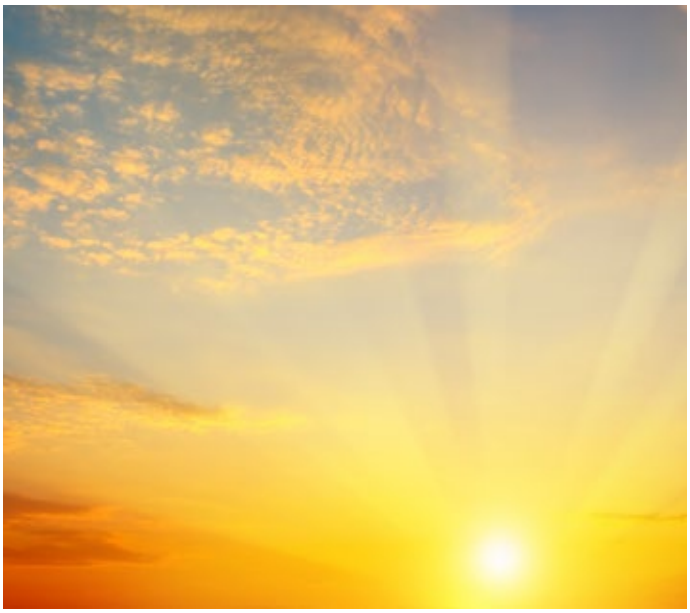
The Role of an Experienced Energy Provider

NRG's team of energy experts works with customers from a starting point of an inherent understanding of their business and daily energy use. Using this as a base, NRG adds years of industry experience, a unique perspective as both a generator and retailer of electricity, and a range of potential solutions to evaluate. From here, the right approach for each customer can naturally emerge.

This can mean an energy plan that locks in a set amount of electricity to help mitigate the effects of extreme heat and price fluctuations — examples include NRG's Fixed Price plan, or blended approaches like a Block & Index or Percent Fixed & Index Plan. For companies committed to renewable energy and meeting sustainability goals, NRG offers these plans in options powered by renewable sources, specifically its new Renewable Select option.

NRG can also incorporate additional solutions particularly suited for a high-price summer. A demand response (DR) program with a tailored energy reduction plan can make using less electricity seamless while also providing the potential of gaining an energy revenue stream when the grid experiences a peak stress event. A demand charge management solution, also known as 4CP Alerts, can help a company reduce future energy charges significantly based on successfully predicting when peak energy events occur and adjusting accordingly.

As the peak summer season approaches, the value of staying informed takes on added importance for all energy customers. Here, NRG is prepared to reach out in many ways. Among them, alert messages emphasizing energy conservation, reminders of voluntary and firm price response offerings that encourage curtailment, market updates to provide awareness of pricing events and appropriate actions, and a fully briefed customer-care team to answer questions on how fixed-price and demand response products can help customers.



NRG also has a response plan in place to handle times when demand and price risk is high. Specifically, that means updates via a customer-driven webpage, actionable email messages, and access to real-time market demand and pricing data through a user-friendly customer portal.

Whether it's the summer season or any season, an ever-evolving energy market should be viewed as an opportunity for knowledge and adjustment — and for every customer to make their energy approach a foundational strength of their company.

About NRG Energy, Inc.

At NRG, we are redefining power by putting customers at the center of everything we do. We create value by generating electricity and serving over 3 million residential and commercial customers through our portfolio of retail electricity brands. A Fortune 500 company, NRG delivers customer-focused solutions for managing electricity, while enhancing energy choice and working towards a sustainable energy future. More information is available at nrg.com. Connect with NRG on Facebook, LinkedIn and follow us on Twitter at @nrgenergy.

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