

WHITE PAPER

Demand Response in the Lone Star State

BY NASH WHITNEY
Business Development Manager, Generac Power Systems

INTRODUCTION

Texas is a hot place, and not just in early August. The demand response (DR) market in the Electric Reliability Council of Texas (ERCOT), the independent system operator (ISO) for the Lone Star State, affords an incredible opportunity for businesses to explore cost-effective ways of incorporating standby generation into their power cost management strategy. Demand Response is not a new concept, and has been discussed at length, however, the DR market in ERCOT is unique. This paper will explore the structure and opportunities of DR found within Texas.



TEXAS POWER MARKET

ERCOT is deregulated, which means in effect that power in Texas is an open, fungible market. Prior to deregulation in the mid 1990's, local utilities, such as Houston's HL&P, owned the generation, transmission, distribution and retail pricing of electricity. These vertically integrated monopolies were broken apart into generation, transmission, distribution and retail. Since deregulation took effect in January 2002 with the approval of Texas S.B.7, change has been the only constant in how power is delivered to Texans. New Independent Power Producers (IPPs) have been able to initiate commercial operations across the state aimed at optimizing spark-spreads. The number of Retail Energy Providers (REP) have grown to become a dime a dozen. There are over 250 REPs in the state each offering their own approach to selling electricity across residential and commercial/industrial accounts. However, transmission and distribution organizations are the only entities that operate under the former semblance of regulation, since it is not feasible or advisable to have hundreds of companies setting up their own lines and transformers, nor operate them effectively.

For the last decade and a half, this change has continued to lay the groundwork for a unique opportunity. Reserve margins, the ratio between installed capacity and peak demand, have continued to trend downward from early overcapacity to well below the 13.75% target set by the ERCOT board of directors. This downward trend signals continued tightening of capacities and increase strain on the grid. Multiple factors contribute to this trend.

- **Population:** Texas continues to add more people to its residency than any other state in the Union. More people means more demand on the grid.
- **Renewables:** Clean Energy continues to be the fastest growing constituent of Texas' energy mix. The installed cost of renewable capacity continues to decline and the realized efficiencies continue to increase making them incrementally appealing to adopt. However, the intermittency of renewables has placed strain on base-loaded generation making them less efficient. Moreover, renewable production forecasts are accompanied with inherent risk, potentially leaving shortfalls in producing capacity when it is needed the most. Inconsistent realized capacities leads to inefficient allocations of power.
- **Industrial Growth:** As the oil and gas space continues to drive a significant part of Texas' economy, the industrial load demand associated with expanding infrastructure in the Permian, Eagle Ford and Gulf Coast Refineries has helped shift the paradigm for how power is produced and delivered. Thousands of megawatts of power are consumed drilling for oil and gas, pushing product to refineries, and processing them. These facilities while growing increasingly more efficient, still require power.

What does all this mean? It means that ultimately markets will reach an equilibrium, a point where supply will equal demand. It means that as the demand in the state grows, supply will continue to work to pace just ahead where spark-spreads continue to be profitable, but the overall resiliency of the grid is maintained. This is where DR in Texas plays a critical role and where participants in the various programs can extract substantial revenues from the market. systems.

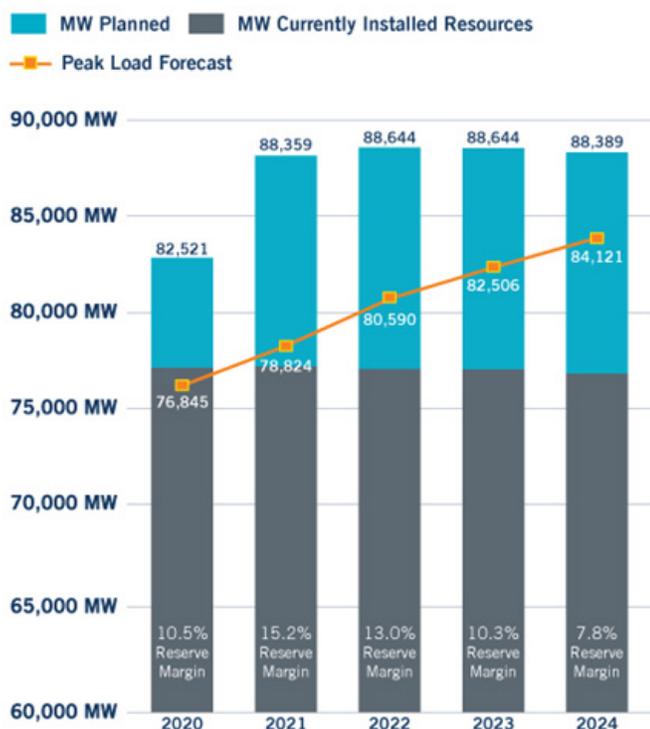
Demand Response in Texas

DR, at its core, is a contract of first right of refusal that ERCOT and a private business owner agree to. Under certain conditions detailed below, ERCOT has the right to call on a business owner to curtail their load, or in some instances, dispatch a generator. In return, ERCOT offers payments according to a combination of time-indexed market prices, time to response and classification that can easily surpass \$80,000 / MW-yr. ERCOT categorizes these classifications as load resource (LR), emergency response service with ten-minute response (ERS-10) and emergency response service with 30-minute response (ERS-30).

Levels	Responsive Reserves	Description	Demand Response
Conservation Alert	<3,000 MW	ERCOT can call on all consumers take conservation steps, reducing overall strain on the grid.	N/A
EEA 1	<2,300 MW	Conservation Needed: ERCOT has authority to call on ERS-30 registrants to curtail agreeable loads.	ERS-30
EEA 2	<2,300 MW	Conservation Critical: ERCOT has authority to call on both ERS-10 and ERS-30 registrants to curtail agreeable loads	ERS-30, ERS-10
EEA 3	<1,000 MW	Rolling Blackouts: within 30 minutes of event, ERCOT has the authority to instruct local utilities to reduce demand on regional grids by implementing rotating outages.	All dispatchable capacities and demand response curtailments.

Demand Response in the Lone Star State

In the summer of 2019, ERCOT issued its first Energy Emergency Alert (EEA 1) event in five years. High temperatures drove record power demand, while the wind stood still across West Texas causing a critical shortage of wind generation. Wholesale market prices for power hit \$9,000 / MWh. With sustained growth in electricity demand, increased reliance on non-dispatchable renewable resources such as wind power, and total conventional generating capacity levelling off after 2021, this will continue to push reserve margins tighter through the mid-2020s. ERCOT publishes seasonal resource adequacy reports that outline the capacity and demand forecasts. The below graph is an output of the bi-annual report issued in May 2019.



FINANCIAL ADVANTAGES OTHER CONSIDERATIONS OF DEMAND RESPONSE

The most important financial feature of demand response, in ERCOT as well as in other ISOs, is that the programs provide payments to registrants regardless of whether an event occurs. Short of a monthly test, there are no requirements to run outside of stated EEA events. This has multiple advantages; primarily it limits the amount of variable costs associated with running. With the surplus of natural gas, fuel costs aren't terribly high, but it is still a consideration in your economic/investment modeling. Additionally, the DR cash flows paid by ERCOT quarterly for participating in the DR programs provides some consistency to generator owners which eases the burden for securing financing, and providing revenue streams back into the business. These cash flows can be used to finance in part or in full the entire cost of the standby generator system.

An important consideration to make when exploring the financial benefits of participating in demand response is who will be responsible for dispatching them. In order to control interruptible and dispatchable loads in Texas you must be registered as a Qualified Scheduling Entity (QSE). QSE's are the brokers of power that submit bids to buy and sell energy on ERCOT's day-ahead and real-time markets on behalf of business owners. Most participants in DR enlist in programs through an aggregator who then enrolls large conglomerated blocks of power from multiple businesses. Aggregators will be responsible for the relationship between you and ERCOT, facilitate payments from ERCOT to you, and manage the curtailment or dispatch event. Aggregators are not the only QSE's in ERCOT, so there are multiple options for you to enroll, but aggregators are typically dedicated DR players, and experts in the space.

Additional considerations that should be made when exploring adding standby generation to your business or facility are the amount of hours that you are expecting to run in resiliency mode and in demand response mode. The number of hours outside of emergency generation are limited under the Environmental Protection Agency (EPA) emergency certification for emissions. Industrial engine gen-sets come with EPA emergency certifications, but they can also come with EPA non-emergency certification. That means that the engines can run unlimited hours without a site emissions permit, notwithstanding any regional or local emission regulations. This is a large consideration when exploring how to best leverage DR agreements and how aggressive you want to participate across the various DR programs. This comes into play when enrolling into both ERCOT's ERS system, as well as utility-based 4CP programs. 4CP is a curtailment program that allows business owners to curtail their loads during four 15-minute peak periods across June, July, August and September and as a result, the transmission charges for the entire prompt year are reduced. The variable for this program is that the actual timing of 4CP peaks is unknown. There are forecasts that inform both aggregators and business owners of when they might be, but they can also change. In this program, success is dependent upon an abundance of caution; if you miss just one of the four 15-minute peaks, then the savings of the program can be greatly reduced. This means that participants in the 4CP program generally curtail much longer than the 15-minute peaks, in an effort to ensure their loads are reduced when the 15-minute peak actually occurs. 4CP programs vary by individual utility companies, depending on their overall exposure to peak demand pricing on the real-time market, but generally they are structured the same across the state. By definition, both 4CP and ERS programs are curtailment events, meaning you are not required to have generation to participate; you are only required to reduce your load. However, allowing the continuous operation and productivity of a facility or business to be dependent on switching lights and equipment on and off either for ERS tests and events or for chasing 4CP peaks is less than economical. Standby generation with an EPA non-emergency certified natural gas engine is the backstop that lets you extract demand response

SUMMARY

As you explore how to optimize business operations, increase your resiliency and equitably participate in the growing Texas power market, DR should be a serious consideration. Through the various ERCOT DR programs, you can offset the cost of standby generation significantly and longstanding participation in the DR programs can easily recover hundreds of thousands of dollars across the lifecycle of your generator that go directly to your bottom line.

- Texas will continue to be a viable market for dispatchable demand response resources as ERCOT manages the balance of generation cost, increased capacity from renewables, reducing carbon footprint, and adapting to increasing demand.
- Demand Response will continue to be the leading buffer that economically moderates the ebbs and flows of the unknowns in the power market.
- Industrial engine generator sets will continue to play an important dual role: A reliable source of backup power for your business, and a vital element in ERCOT's demand response toolbox.
- Participation in DR can recover a substantial portion of the capital and operating costs of a standby generator over the operational life; like an insurance policy that pays for itself.

With appropriate considerations, participation in DR can greatly influence your business, making your more profitable and resilient.

ABOUT THE AUTHOR

Nash Whitney is a 12-year veteran of the energy industry and has been part of the Generac Power Systems team as a Business Development Manager since May 2019. Whitney focuses on cultivating new opportunities in ERCOT, SPP, MISO and the southwest across energy management, demand response and oil field power generation. Based in Houston, Whitney develops relationships with utilities, cooperatives, oil and gas majors and energy management firms across the region. He is a graduate of Principia College with a B.S. in Physics and Rice University with a Master of Energy Economics.