

# NRG Residential Virtual Power Plant (VPP): A Reliant Case Study

As the leading state in both energy production and consumption, Texas must find a way to overcome high energy demand while facing rapid population growth. Historically, the focus has primarily been on the supply side of energy generation to meet growing demand. Today, Texas has the opportunity to harness residential demand-side management (DSM) and distributed energy resources (DERs) to form virtual power plants (VPPs) to help better manage the grid while supporting reliable and affordable power to all customers. So how does it work?

## HARNESSING THE POWER OF RESIDENTIAL VIRTUAL POWERPLANTS (VPPS)

**For several years, Texas electric customers have been able to shop for retail plans that include or leverage smart thermostats.** These plans help manage electricity costs while also curtailing usage without perceptible loss of comfort and giving customers a right to override the thermostat's automatic setting.

For one of NRG's retail brands, Reliant, this demand response (DR) engagement through thermostat adjustment occurs in one of two ways:

1. Direct Load Control: Average 20-30% reduction in customer demand during the period thermostat is controlled.
2. Behavioral DR: Customers who actively participate lower their demand by approximately 10-15%.

With Direct Load Control, customers that participate in an event shave an average of 1 kW over a three-to-four-hour period. So, if 1,000 customers participated, there is the potential for a ~1 MW total reduction in demand when deployed.

## VPP GROWTH & RELIABILITY

In Texas, ERCOT manages the flow of electricity to more than 26 million customers - about 90% of the state's electric load. And about 7 million of those are residential customers who live in areas of the state open to retail competition. **Reliant's standalone thermostat VPP (excluding other devices & services) has grown nearly 40% in four years.**

In addition to smart thermostats, which interact with the largest source of residential load (HVAC), customers are increasingly adopting DERs like battery storage.

A customer in a detached single-family home that has smart HVAC controls paired with battery storage can reduce demand by up to 40-100% (on average) over a four-hour period, depending on the size of their battery.

As technology is more widely adopted across ERCOT, aggregated flexible load across millions of homes dispatched specifically for reducing peak demand will be capable at scale. This creates a meaningful reduction of demand during peak summer and winter days and decreases strain on the grid caused by extreme weather events or renewable intermittency.

**Creating VPPs through increased adoption and orchestration of home energy management technologies will increase load flexibility, contributing to ERCOT grid reliability while also giving customers a higher level of resiliency.**

