

## Microgrids During the Texas Deep Freeze: More Than Just Keeping the Lights On

### Introduction

Between February 13th to February 17th 2021, a record-breaking winter storm swept across the United States, causing 170 million Americans to be placed under winter weather alerts. By the end of the storm, 5.2 million homes and businesses had lost power, 4.5 million of which were in Texas.

Texas experienced subfreezing temperatures over several days, which not only increased the demand for electricity to untenable levels, but the weather conditions themselves caused failure across all power sources – natural gas, coal, wind and nuclear – resulting in nearly half of the total power generation capacity of the state to go offline.

Insurers estimated the damages from the utility blackouts to be almost \$200 billion, making this storm the costliest natural disaster recorded in Texas' history.

### PowerSecure's Role

During this winter storm, PowerSecure's microgrid systems produced over 2,260MWh of reliable energy and operated 898 successful load management and standby events for customers in Texas, a testament to the scale and dependability of PowerSecure systems and solutions, with repeatable success over its 20-year history.

While these performance statistics were significant, what was also meaningful was the range of customer benefits that the distributed power sources were able to provide. Here are some of their stories.



## A Tale of Two Retailers

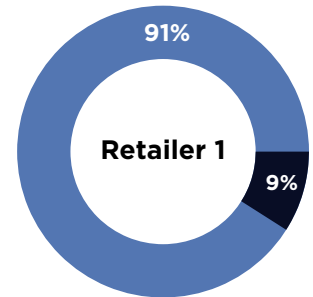
**Retailer 1:** This major retailer has multiple Texas locations equipped with PowerSecure systems, which were initially installed with resiliency in mind. During the winter storm, most of this retailer's stores unfortunately experienced utility outages—both unanticipated outages and rolling blackouts.

To keep the lights on and merchandise safe, PowerSecure systems operated continuously on average for 19 hours per store, and a maximum of 3 days and 18 hours in one location. In addition, once the power came back on, PowerSecure systems operated for up to 13 hours in select locations in a load management capacity to defray the cost of electricity during peak pricing times. Overall, 91% of the 55MWh of power that PowerSecure systems provided to this retailer was for utility outage management, with the rest being for load management operation.

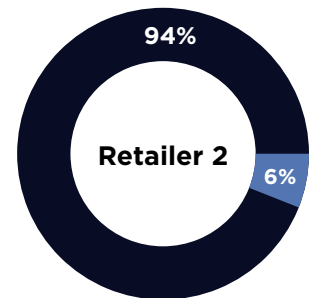
What was particularly difficult with this storm was that even with the lights staying on, customers could not get to the stores for a while due to treacherous road conditions. This meant that having continuous and reliable power had a bigger bottom-line impact by keeping this retailer's perishable merchandise fresh until customers could return to the stores.

**Retailer 2:** For a second retailer that PowerSecure works with, the benefit provided by the microgrids was very much skewed in the opposite direction. For this retailer, also with multiple locations, the primary issue was not about power availability but avoiding the very high ERCOT system cap prices.

As a result, 94% of the PowerSecure systems' runtime during the winter storm was for load management, to save on electricity cost. In some stores, the grid power savings was more than \$7,000 a day, resulting in a total grid power savings of tens of thousands of dollars, just over a several-day period. One location operated in load management mode for 5 days and 13 hours, as it was more affordable to do so than purchase power from the grid. In total, PowerSecure systems supplied 475MWh of power to this retailer during the extreme weather.



■ Utility Outage Management  
■ Load Management



■ Utility Outage Management  
■ Load Management





## PowerSecure Microgrid Customers Helped Their Local Communities

**Water Treatment Facility:** After Hurricane Harvey knocked out power to this Texas water treatment facility, PowerSecure was brought on to design, implement and operate a resiliency solution. 3.575MW of generation was installed to power the facility's surface water treatment plant, the raw water pump station, the wastewater treatment plant and the water pump station. PowerSecure completed the project in July 2020, a month ahead of schedule.

Similar to the aforementioned retail locations, this water treatment facility proactively ran its system during the winter storm to help ease strain on the local grid and ensure continued water access to the community. The systems ran in load management mode for 13 hours and provided a total of 20MWh of power.

However, by the early morning hours of Monday February 15th, 2021, the grid power's frequency had dropped to below threshold levels, causing PowerSecure's generators to drop in frequency and voltage too, as they were running parallel to the grid. While most generators would have tripped offline, PowerSecure's units successfully stayed online, and were ready to switch over to island mode had the grid power dipped any lower.

Eventually, when several rolling blackout events were introduced to further ease the strain on the grid, two of the PowerSecure systems provided power to the facility in island mode, for a total operating time of 2 days and 12 hours.

In summary, this water treatment facility was able to help its local community by using its PowerSecure system to serve in different roles and successfully address the shifting needs of the grid during the extreme winter weather.



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**Air Force Base:** Similar to the water treatment facility, PowerSecure's Air Force Base customer, located a few miles from the Texas border, had made the decision to install a PowerSecure resiliency solution as a result of a previous weather event, which in this case was an ice storm. Recognizing that reliability was important for both the base and the local cooperative utility, a joint decision was made to implement a PowerSecure microgrid that both the Air Force Base and the co-op could operate in times of need.

During the winter storm, neither the local co-op nor the base lost power. However, the whole region was under SPP emergency alerts, so the co-op had to look at all the resources that it had available. The PowerSecure microgrid was the primary resource called upon to help curtail system load for several scheduled five-hour stretches during Level 2 emergency. When the system hit Level 3, the co-op ran the PowerSecure system continuously. "If we weren't able to get that load off, we would have had to have more rolling blackouts," said a representative from the co-op. "We were able to stay at Level 2 most of the time thanks to the load being shed," he continued.

In total, the PowerSecure system was called upon 96 times to shed load during the winter storm, supplying 208MWh of power to the Air Force Base.

### Conclusion

The recent 2021 winter storm across the southwest demonstrated that onsite distributed energy resources can deliver diverse value streams beyond what the customer may have originally counted on. And, while the idea of proactive load management for economic benefit might seem complicated during an emergency, having a fully-managed system like PowerSecure's means that ensuring and optimizing system performance to maximize value is a built-in service built on the foundation of a customer care model that supports 24/7/365 on-demand service amid business continuity events.

As increased levels of intermittent renewable sources become grid staples and uncertainty around extreme weather events rises, it is a great time to consider on-site energy resources as a business enabler – to ensure business continuity and to serve as an energy portfolio play that stabilizes or boosts the bottom line.

**For more information,** get in touch with PowerSecure's team of storm response experts: <https://powersecure.com/contact>

