

TRUFlex™ Protect

An unintentional pilot program in Farmersville, TX

While most of Texas experienced widespread power outages during the 2021 Deep Freeze, the City of Farmersville was able to maintain electricity service for all 4,200 of its citizens. The Utilities and Public Works Department in Farmersville leveraged the capabilities of their Tantalus AMI network to ensure vulnerable residents and critical services never lost power while sharing the burden of rotating outages across the rest of the community. Farmersville's ability to prevent catastrophic outages became a real-time test case for the Tantalus Grid Modernization Platform that enabled it and the new product that resulted—TRUFlex Protect.

Background

Winter Storm Uri hit Texas hard in February of 2021. It affected all 254 counties in the state, causing long-lasting power outages that lead to over 200 tragic deaths and an estimated \$80 to \$130 billion in economic damage. The state and its power grid, ERCOT, were not equipped to handle the impacts of the storm. Texas' preference for electric heating over gas meant that the extreme cold resulted in an insurmountable spike in demand for power.

In addition, ERCOT is one of the 9 out of the 13 American grid regions rated at Elevated Risk or higher for load shedding by the North American Electric Reliability Corporation (NERC). Load shedding techniques are often antiquated and imprecise, requiring boots on the ground and sometimes affecting critical systems.

And Texas learned the cost of not being prepared for this extreme weather event in the hardest way.

The Challenge

Texas distribution utilities operate a series of feeders to areas of individual households. Vital services (like hospitals and prisons) are on critical feeders that should never be shut off. However, many homes are also attached to these critical feeders.

As Winter Storm Uri approached, only about half of the feeders in the state could be rotated for outages—meaning half of all Texans would bear the brunt of load shedding for the entire state, while the other half would never lose power because they were connected to a critical feeder. Making matters worse, switching feeders off and on often requires someone physically on the ground—difficult if not impossible in the middle of a winter storm.

Feeder shutoff is never appealing, but doing nothing in a circumstance such as this is not an option. If the required load shed was not achieved, the entire utility and ALL of its customers would be disconnected. That is why in 2021 in Texas—when the half of feeders available for shedding were not enough—customers on those feeders experienced extended outages instead, for an average of 41 continuous hours. Also, many critical feeders vital to hospitals, water treatment plants and pumping stations had to be shut down.

In the end, 4.5 million households lost power, affecting the lives of over 10 million Texans for days as utilities struggled to manually restore power and water in the aftermath of the storm.

Farmersville was in the middle of this and would have faced the same outcome if it couldn't manage to reduce power by 10% as Uri bore down and drove power use higher and higher.



The Solution: Resilience and Resourcefulness

Farmersville took an unconventional approach.

Instead of manually shutting down whole feeders, Farmersville leveraged its Tantalus TRUConnect AMI (Advanced Metering Infrastructure) solution to cut power to individual homes. This feature was designed for occasional non-emergency situations like move-ins and outs, non-payment scenarios, and pre-pay systems. In response to Winter Storm Uri, Farmersville upscaled this system—intended for singular, specific situations—into an emergency response.

Farmersville did experience rotating outages, but not on the feeder level, and without the catastrophic failures that much of Texas experienced. With a utility team working around the clock, Farmersville meticulously managed power outages on a home-by-home basis. Instead of the sledgehammer approach of feeder outages, Farmersville's Tantalus AMI offered the scalpel—vulnerable residents and critical systems could safely retain power, while the burden of outages was shared equally across everyone else. It did not matter where on the distribution network a customer was located.

With outages across non-critical customers lasting only 2-3 hours, Farmersville met their load shedding obligations. Water pumps stayed on, no one lost power for days on end, and vulnerable customers were protected. The community came through intact.

The Result: TRUFlex Protect and Its Benefits

After what turned out to be an unintentional pilot program in Farmersville, Tantalus began preparing an advanced load shed system that could provide all the benefits of edge control, yet be automated and scalable. Working hand-in-hand with Farmersville, Tantalus set out the requirements for this system:

1. Respond quickly and effectively
2. Maintain customer-specific load shed patterns independent from distribution grid and neighbors
3. Exempt critical loads and vulnerable customers
4. Maintain a smooth and adjustable load profile
5. Reduce cold load pickup
6. Keep power outages short to maintain heating, cooling, refrigeration, and property protection

The ideal solution was the combination of a utility load management system with an AMI 2.0 that supports edge applications. Tantalus already offered both, with the TRUFlex

Load+DER Management solution and the TRUFlex Load Champ edge app available on TRUConnect AMI. By enabling the Load Champ app on existing AMI hardware, Tantalus provides a second, virtual disconnect capability within a disconnect meter. Without impacting non-emergency situations like move-ins or non-payment, the app operates that second disconnect specifically for load shed. With this combination, Tantalus launched a revolutionary new product which met all six requirements identified above.



The Promise: Preparation and Peace of Mind

To solve the issue of critical load shed, Tantalus leveraged the following solutions:

- **TRUConnect AMI** – the platform that communicates with the grid edge, particularly meters, and hosts apps and intelligence there
- **TRUFlex Load + DER Management** – the solution that controls load and includes the enterprise software application and a collection of edge devices and technologies
- **TRUFlex Load Champ** – the particular edge application deployed to the TRUConnect-enabled meters to disconnect those meters and make them controllable by TRUFlex so they can be shed intelligently

*This combination is **TRUFlex Protect**—a proven solution that uses a grid edge-application over the industry's first AMI 2.0 network with edge processing.*

With TRUFlex Protect, utilities can organize and deploy a load shed plan in stages, but most importantly, plan and practice deployment. For example:

- Stage 1: Activate any load management programs targeting EV charging, electric water heating, and more
- Stage 2: Shed discretionary loads like architectural lighting and low priority streetlighting
- Stage 3: Fully shed customers with backup generators
- Stage 4: Shed regular customers on a scheduled cycle to meet load shed requirements
- Never shed medical and vulnerable customers, municipal infrastructure, high priority streetlighting, etc.

TRUFlex can simplify the expansive traditional load shed methods (involving linemen, dispatch, operations, and customer service) into a process for one set of hands.

This can be automated even further with MultiSpeak and SCADA integrations, or with Tantalus' own TRUFlex Control application. This allows load shed stages to be dispatched and adjusted based on demand.

Beyond the use case described, TRUFlex Protect can be hooked into backup generation, battery energy storage, and microgrid capabilities as a group. Circuit-level switching, like those of commercial parks, can be connected to TRUFlex. Individual commercial customers that don't already have other control capabilities can have switching retrofitted and controlled by TRUFlex.

Perhaps most importantly, TRUFlex Protect can give utilities—and the communities they serve—the peace of mind that when the next extreme weather event hits, they'll be as prepared as they can possibly be.

Conclusion

Winter Storm Uri revealed two hard truths. The first was that utilities' load shed plans were out of date and inflexible while staff had little experience leveraging outdated utility systems to meet the demands of current weather patterns. The second is that the US grid is outdated, and utilities can struggle to meet power demands even under normal conditions. TRUFlex Protect is unique in the industry in addressing both issues. It sheds at the grid edge. It provides a tailored experience for customer needs. It brings precision protection for vulnerable customers. As part of the Tantalus Grid Modernization Platform™, TRUFlex Protect can be deployed at most Tantalus AMI customers using their existing infrastructure and disconnect meters without any hardware upgrades.

