

Winter Weather Prep Report

Introduction

In February of 2021, the state of Texas and the broader South-Central US experienced record-setting sub-freezing temperatures combined with snow and ice for almost a weeklong period. This severe winter weather event caused the Electric Reliability Council of Texas (ERCOT) to initiate load shed of up to 20,000 megawatts (MW) across the state to avoid a total grid collapse. Similar actions were required in grids surrounding ERCOT including Southwest Power Pool (SPP), Midcontinent Independent System Operator (MISO) and the country of Mexico. The October 2021 Fiscal Notes issued by the Texas Comptroller indicated that Winter Storm Uri financial losses have been estimated at \$80-\$130 billion to the state of Texas, with at least 210 deaths attributed to the storm. Numerous articles and studies have been written reviewing the causes and impacts of this weather event. A summary report from the Texas Comptroller and a report from the University of Texas at Austin are attached (Appendix 5) providing detailed information on the impacts to the state and the series of events that led to the subsequent grid instability. The Federal Energy Regulatory Commission (FERC) and the National Energy Regulatory Commission (NERC) also performed a detailed assessment that provides an in-depth evaluation of the events and shortfalls that led to the performance issues of the electric grid (Appendix 6).

While the impacts were significant across the state, the impacts here in the San Antonio and Bexar County area were equally as impactful. Loss of power, and then water, to large portions of the area created numerous hardships across our community.

Immediately following the event, CPS Energy internally identified numerous lessons learned from the event including improvements for any such future emergency event. In the subsequent weeks and months numerous assessments were performed at local, state and federal levels. Most notably for CPS Energy was the report and recommendations issued by the Committee on Emergency Preparedness (CEP) initiated by Mayor Nirenberg under the purview of the City Council of San Antonio. The full CEP report is attached to this document (Appendix 1). Other pertinent assessment reports are outlined in this document.

All recommendation items associated with internal lessons learned and the CEP recommendations were completed by year end (2021). While there will continue to be improvement activities around many of these items for years to come, a completed status for this effort meant the issue/recommendation was fully addressed, or it was mitigated for the 2022 winter season with an on-going project established with the appropriate business unit. Some items, such as those associated with market redesign, may go on for years or by nature do not have a defined end.

This report provides a summary of gaps identified and the activities performed by CPS Energy to address those gaps where we have control or influence. As will be pointed out, many of the failures in this event go well beyond the direct control or influence of CPS Energy alone.

Assessments and Recommendations

There were a multitude of assessments and action plans developed by a variety of entities, and this report will summarize the key actions for CPS Energy. There is significant overlap between these reports relative to issues needed to be addressed at all levels. At a high level, recommendations tend to fall into the following categories:

- Power Plant Operations
- Electric Grid Operations
- Agency Collaboration and Coordination
- Communications, particularly to the Public
- Operation of Inter-Related Infrastructure

City of San Antonio CEP “A Response to the February 2021 Winter Storm”

In the aftermath of Winter Storm Uri, Mayor Nirenberg sought a means to evaluate the performance of the City of San Antonio’s (CoSA) Emergency Operations Center (EOC) and the municipally-owned utilities (MOUs) in the days leading up to, during, and after the storm. In doing so, he formed the CEP, which consisted of several City Council members and three (3) other prominent figures in the community.

The committee was charged with establishing key focus areas, dissecting our performance and providing recommendations on any areas warranting marked improvements in resiliency prior to another storm of similar or increased magnitude. The committee issued several requests for information related to the established focus areas to facilitate its evaluation of each entity.

In the CEP final report, the committee issued nine (9) recommendations with several sub-components directly to CPS Energy along with nineteen (19) recommendations issued to the San Antonio Water System (SAWS) and/or the CoSA EOC where CPS Energy was indirectly involved.

There were two (2) recommendations with three (3) sub-components that focused on Market Redesign. The recommendations requested we seek legislation to increase generation reserve capacity, interconnect with neighboring grids, advocate for incentivizing generators to increase supply, and address price manipulation by The Public Utility Commission of Texas (PUCT) and ERCOT.

There were two (2) recommendations focused on Plant Operations & Support. The recommendations requested we rethink our strategy regarding the purchase, transport and storage of natural gas for usage at our plants and within the community. Additionally, we were asked to refocus on our sustained history of plant operational excellence to improve reliability for our customers, especially during storms like Winter Storm Uri.

We received three (3) recommendations focused on Grid Operations & Support, also referred to as Outage Management. The recommendations requested we upgrade the automated outage management program to handle larger load shed requirements, revisit the number of circuits classified as critical or interruptible as well as the classification methodology, and that we review opportunities to provide power to SAWS pumps stations in areas where critical circuits are not available.

Finally, we received two (2) recommendations with seven (7) sub-components focused on Communications from a Customer and Stakeholder perspective. The recommendations requested we develop a comprehensive communications protocol tailoring customer messaging to critical service and

safety issues, enhance calls for energy conservation, and issue advance notification of potential load shed risks. This advance notification should be coordinated with the EOC, be reasonable in timing, indicate customer's circuit status, and provide customer action tips and key information during an outage. Additionally, we were asked to collaborate with other agencies to develop a year-round emergency readiness campaign to educate residents on how to prepare for emergencies.

As mentioned above, there were several recommendations in which CPS Energy was indirectly involved. We are indirectly involved in five (5) recommendations assigned to SAWS. In these recommendations, SAWS was asked to work with CPS Energy to place critical facilities on uninterruptible circuits, identify potential locations for back-up power, perform tabletop and field disaster scenario exercises, and develop protocols for unified messaging during emergencies. Additionally, they were to meet with CPS Energy to ensure compliance with PUCT Electric Substantive rules.

As for the CoSA EOC related recommendations, the EOC was asked to update its Hazard Mitigation Plan to include prolonged storms and utility outages, identify backup communication devices, prioritize the purchase of generators for key city facilities, and to develop contingency plans for remote work during power outages. They were also asked to develop training scenarios related to utility outages, enhance training across CoSA departments, and to create an annual emergency response tabletop exercise program. Finally, the EOC was asked to adjust its relationship with the MOUs regarding command and control, review its involvement in CPS Energy load shed decisions, ensure the MOUs customer messaging is coordinated through the Joint Information Center (JIC), enhance customer's experience with Customer Call Centers, ensure impacts of rotating outages are clearly communicated and identify a situational awareness platform for a clear picture across all agencies.

[Texas PUCT Order 25.55 Weather Emergency Preparedness](#)

In November, the PUCT issued an order under Chapter 25 Substantive Rules Applicable to Electric Service Providers, aimed at winter weather preparation of generation resources and transmission service providers in ERCOT. The requirements for 2021 are the first of a 2-phase improvement plan identified by the PUCT (Appendix 2). These rules identified generation and transmission preparations required by December 1, 2021, with compliance defined by submission of forms by utility CEO's followed by facility inspections by ERCOT. CPS Energy has submitted the required forms and is in full compliance with the requirements identified. In addition, ERCOT has inspected both selected generation and transmission infrastructure with no issues identified during the on-site inspections. Phase 2 requirements remain to be defined through evaluation of risks, needs and definition of required standards. PUCT Order 25.55 and Rulemaking to Establish Electric Weatherization Standards are attached (Appendices 3 & 4, respectively).

[FERC/NERC "The February 2021 Cold Weather Outages in Texas and the South-Central United States"](#)

FERC/NERC issued their joint report in November 2021 (Appendix 6). The 313-page report includes detailed analysis of the multiple contributors to the event with information on the broader South-Central US region. The 28 recommendations align with issues identified in other reports but point out the issues experienced were identified after the 2011 event with limited material changes made. Of the 28 recommendations, nine (9) were identified as "Key Recommendations," with the first identifying revisions to the Reliability Standards (RS) and included 10 sub-parts. These RS revisions are focused on generation reliability and ensuring critical status of natural gas facilities in load shed procedures. The

next three (3) recommendations are associated with improvements to the performance of generation units in severe winter weather events, addressing both the design/operating requirements and how to fund the needed retrofits and improvements. The next four (4) address issues around natural gas supply, the second largest cause of generating unit outages during Winter Storm Uri. The last two (2) “Key Recommendations” target grid preparation for cold weather at the ISO/RTO level (e.g. ERCOT) related to assessment of reserve margin. The remaining 18 recommendations cover a variety of issues including load shed operations, forecasting, outage reporting and several proposed study areas.

The recommendations also include proposed timelines for implementation. Only two (2) were identified for implementation for the 2021-22 winter weather season. Only one (1) of those two (2), Recommendation 12, applies to CPS Energy as an entity (Generation Owner/Operator). This recommendation is:

“Generator Owners and Generator Operators should incorporate weather forecasts into planning the operation of their generating units prior to cold weather to lessen the impact of cold weather events on the performance and availability of the units. For example, adding a temporary wind break can protect exposed equipment that could potentially freeze (based on the forecasted wind and/or precipitation).”

CPS Energy was already compliant with this recommendation going into the February 2021 event and has further strengthened this practice. While a media assertion was made of the use of an intern for weather related assessments, the fact is that CPS Energy used, and continues to use, a weather forecasting professional service, DTN, that provides detailed local, regional and national analysis from highly experienced and qualified meteorology experts including PhDs. In addition to this technical support service, we are also in the process of hiring a full-time staff meteorologist to better support the operation and planning of our infrastructure. This hire is expected to be accomplished in Q1 of 2022.

The second recommendation for implementation in 2021, Recommendation 8, is:

“To better provide Balancing Authorities with accurate information under TOP-003-5, R2.3.1.2 (“fuel supply and inventory concerns”), Generator Owners/Generator Operators should identify the full reliability risks related to the contracts and other arrangements they (individually or collectively) have made to obtain natural gas commodity and pipeline transportation for generating units, including but not limited to volumetric terms, transportation service types, and impacts from potential force majeure clauses. (Winter 2021-2022)”

Although CPS Energy has accomplished the risk assessment related to natural gas reliability and addressed those risks through storage, transport and firm gas contracts, the information was not requested by or provided to ERCOT. This information would include competitive terms that would not be provided without appropriate protections. Although not a regulatory requirement or request of CPS Energy, we do believe we have addressed the spirit of the recommendation.

CPS Energy Preparations for Winter 2021-2022

CEP

Since the CEP issued its report and recommendations in June of 2021, CPS Energy has worked diligently to put actions and plans in place to address all the recommendations in preparation for the 2022 winter season. Specific action plan responses to the Municipal Utilities Committee (MUC) on each of the CEP recommendations are included (Appendix 7). As summarized in the following and documented in the appendix, all recommendations have been addressed for this winter with several identifying longer-term action plans.

In our responses to the CEP recommendations related to Market Redesign, we addressed the dynamics associated with market redesign rulemaking, the entities (Texas Legislators, PUC and ERCOT) responsible, and the associated timelines for implementing changes by engaging and providing input during the many policy making meetings held throughout the year. This includes the tracking of 28 topics from 41 meetings involving the above entities.

In our responses to recommendations related to Plant Operations & Support, we completed efforts to procure the natural gas needed to adequately supply our natural gas-fired generation units and for distribution to our customers. We were able to address this by reviewing our winter strategies and processes and launched a multi-pronged approach to assure adequate supplies of natural gas. As it relates to the operational issues experienced at our plants and the South Texas Project (STP), we implemented a plant specific weatherization improvement plan, modified our planned outage schedule to maximize unit availability in critical months, and protected all exterior piping with enhanced freeze protection (e.g., heat tracing). Additionally, we had a third-party contractor assess and validate our weatherization improvements.

In our responses to recommendations related to Grid Operations & Support, also referred to as Outage Management, we enhanced our automated rotating outage program by increasing the load shed limit to our share of 20,000 MW, evaluated previous circuit designations and expanded the number of interruptible circuits, and reviewed the critical facilities list provided by SAWS to pinpoint power source opportunities for these facilities. We presented our proposed recommendations to SAWS and await their feedback. As stated earlier, we also had a third-party contractor assess improvements to our automated outage program with the increased number of available interruptible circuits. We received a favorable assessment from this contractor validating the improvements to our outage program.

Finally, in our responses to recommendations related to Communications from a Customer and Stakeholder perspective, we revised our Emergency Communications Plan to include developing templates for use by our personnel to send customers during specific emergencies and an update to our social media strategy. The customer messaging will include information related to preparation, safety, energy saving tips, and powering your home following an extended outage. It will also include procedures for operating in the EOC's JIC, as well as implementing an annual tabletop exercise/training program with partner Public Information Officers.

Internal Lessons Learned

While the CEP evaluated and identified areas where we could improve, we conducted our own self-evaluation immediately following the storm where we also identified areas warranting improvements, some of which were similar to the CEP recommendations. Although we categorized these lessons

learned with subjects that were relevant to us, we took the liberty of categorizing them with terms that should resonate with the community (Appendix 8).

As much of our community sheltered in place during the storm, our restoration personnel were navigating the treacherous road conditions to restore power as quickly and as safely as possible. Service restoration proved to be very difficult to sustain due to extended power outages at our District Centers impacting cooking and bathroom facilities. We also depleted most lodging resources required for crews to recover overnight at the Centers due to the increased number of personnel that could not safely travel to their residences and return after proper rest. As such, we have executed contracts to ensure our restoration personnel can safely recover overnight without concern for the lack of operational sleeping, bathroom and cooking facilities if they are required to stay at the Centers due to inclement weather.

As noted from the CEP recommendations, we recognized that we could improve communications, both externally and internally, leading up to, and during events like Winter Storm Uri. We improved our crew recall process to ensure all crew members receive timely updates regarding the emergency information. We made other improvements that increased our capability to expand response operations at our control center and the efficiency of our remote workforce. As many of our customers may have experienced, the outages affected our cellular and radio network, challenging our ability to communicate with crews. As a result of these communication challenges, we recognized a need to develop a means to provide a clear picture of the customer experience, improve the “My Energy Portal” interface, explore alternate communication methods and identify commercial partnerships during load shed initiatives.

The widespread extended outages experienced during Winter Storm Uri stressed our normal dependable resiliency measures (e.g., backup systems). They deployed as designed but we were not able to refresh them once they were fully discharged. We identified opportunities to enhance or replace the current systems while also adding these systems to our preventive maintenance checklists. This also afforded us the opportunity to improve the visibility and resiliency of our AMI network infrastructure.

To improve plant operations, we updated our plant inspection checklist to include critical components and insulation, as well as increased plant-specific equipment, parts and supply inventory to increase resiliency. We also noted that we could improve reliability by increasing water pressure monitoring and our fuel oil storage capacity for use during emergency situations.

Although we were generally prepared for cold weather, the extended extreme weather conditions presented challenges with refreshing staffing levels due to the high number of hours our personnel worked during restoration efforts before the required recovery period or “crew rest”. The high number of personnel on “crew rest” due to the extreme conditions affected normal crew availability over a 24-hour period. Additionally, the extended duration of the storm impacted other processes related to personnel activity and actions that should have been completed over the course of the storm. This may have been more severe if we had not already established remote work processes but there is some room for improvement.

For instance, it was noted that personnel may not have been adequately trained on activities and actions required during catastrophic scenarios or extended operations and the operation of recently

commissioned system components during an energy emergency event. As a result, additional training programs have been identified to address these gaps going forward.

Lastly and likely most importantly from a reliability standpoint, we discovered several opportunities for weatherization improvements in all facets of our gas and electric systems. We increased the frequency of inspections, testing, and preventive maintenance of critical facilities. We reviewed protective equipment settings to assist with restoring large amounts of load following an extended duration outage. We added protective measures to ensure the equipment would function as designed in extreme weather conditions. To keep these and other issues at the forefront, we updated our pre-event checklists to include most of these items as we prepare for extended extreme weather events.

Future Improvements

While significant improvements have been accomplished to address the issues identified internally and externally in preparation for this winter, it is recognized that there are longer term improvements that must be pursued to continue to strengthen the overall resilience of our system. The following is not an all-exhaustive list of future efforts, but highlights several key areas being pursued.

Market Redesign

The PUCT has issued a 2-phase blueprint for market redesign in ERCOT. Phase 1 consists of nearer term items that have general agreement to move forward. Several items were identified for immediate implementation, although changes to wholesale energy pricing related to Operating Reserve or “available energy above current demand” was the only significant immediate impact. Other actions in Phase 1 include programs to incentivize load response (generators addressing increased demand), a program to incentivize on-site fuel (e.g., natural gas) storage facilities for generators, Fast Frequency Response for batteries (battery storage deployment to stabilize the system), and various generation services to support system stability. Phase 2 identifies two reliability programs, an obligation for Load Serving Entities to contract dispatchable generation to cover needs, and a Backstop Reliability Service used to procure additional dispatchable resources to prevent emergency conditions. These two (2) programs are far more controversial and could take years to implement. Market Redesign is an activity that is always in progress at ERCOT through stakeholder groups, but the past winter event and the gaps identified are driving demand for market mechanisms to ensure the reliability and resiliency of electric service to all Texans. These efforts will include many stakeholders from all market segments and the CPS Energy Government Relations team will continue to be actively involved in monitoring these activities and ensuring our interests are represented.

Power Generation Resilience

As identified previously, the PUCT issued an order under Substantive Rules 25.55 identifying requirements of generators and transmission owners in ERCOT to be completed by December 1, 2021 in preparation for the 2022 winter season. These requirements were based on two reports resulting from the 2011 winter weather event. These reports were of best practices prepared by Quanta for the PUCT, and a NERC/FERC report on the 2011 winter event. These actions constitute Phase 1 of the PUCT’s improvement plan. Per the PUCT

“The phase-two weather emergency preparedness reliability standards will consist of a more comprehensive, year-round set of weather emergency preparedness reliability standards that

will be informed by a robust weather study that is currently being conducted by ERCOT in consultation with the Office of the Texas State Climatologist.”

It is unknown exactly what implications these rules will have for transmission and generation owners, but much more rigorous severe weather design standards for this infrastructure is expected. CPS Energy infrastructure is in accordance with or exceeds current design standards and best practices but requirements in excess of these standards are possible requiring additional investment to meet these new standards. We will monitor these developments to ensure we are addressing these as they are issued and are taking some proactive steps in doing engineering assessments of our power generation plants under more aggressive requirements.

At the federal level, additional requirements are expected as a result of the joint FERC/NERC report “The February 2021 Cold Weather Outages in Texas and the South-Central United States” previously described in this document. While these recommendations could likely influence requirements in the PUCT effort, ultimately many of these will become requirements in the NERC RS. ERCOT entities are subject to the Reliability Standards, although the process of these revisions can take months or even years to incorporate. While this process will take some time, CPS Energy is in the process of reviewing the FERC/NERC recommendations to identify any areas for proactive improvements.

Electric Grid Operations

The amount of load shed required in the 2021 event revealed the need for increased flexibility and controllability of load at the distribution level to support the ERCOT system and avoid a grid collapse and to minimize the impact of that action to all customers. The immediate actions previously described have put us in a good position to manage a similar event if encountered, but increased controllability in the distribution system is a need. This need is not only associated with load shed, but in the ability to manage rapid changes in our distribution system related to electric vehicles, battery storage, distributed generation and demand response.

There are multiple efforts that target this increased flexibility. Our Distribution Automation project will provide the ability to break our circuits into smaller segments providing increased flexibility and control. One aspect of this is the ability to shed (put into a manual outage) an increased number of small segments of customers thereby spreading the shed activity out over an increased portion of the system, further reducing the impact to individual customers. There are additional benefits to this capability such as in “cold load pick-up,” voltage management, and increased flexibility to manage “critical” loads in emergency operations. Additionally, there is a project in place to upgrade the Distribution Management System, which is the overall control and monitoring system for the electric distribution system. These projects represent significant, long-term capital investments into our distribution system but will provide future benefits for severe weather operations.

System hardening is the other primary aspect of better preparing our transmission and distribution system for severe weather events. As described for Power Generation Resilience, there will be updated regulatory requirements for the design and operation of transmission infrastructure, as this is critical to the overall stability of the grid. We will be monitoring those changes and staying proactive in addressing new standards as they are developed. We also have projects in place to continue to make our distribution more resilient to severe weather. The cost of hardening the entire distribution system through undergrounding or similar measures would be unbearable for our community and estimated to

be billions of dollars. We do have projects in place to underground or otherwise harden vulnerable or particularly critical infrastructure moving forward but is limited by budget funding.

A new focus in the area of system hardening is in the utilization of microgrids. This concept is not new but a growing option with advances in automation, controls, storage, communications and generation options. These systems are still a relatively costly option and funded by the customer and currently utilized in military applications or where there is a strong customer economic benefit to justify the expense. We have been increasingly assessing this option for other critical applications in our community and will look for ways to reduce cost or obtain external funding. We are currently in initial discussions with CoSA on this option to support Resiliency Hubs for emergency support of communities. This effort is budgeted by CoSA and will have a broader resiliency application beyond electric power.

Emergency Coordination

Emergency coordination between entities was identified as a significant gap in the 2021 event where lack of information and coordinated decision making between entities such as CPS Energy, SAWS, CoSA, the EOC, Bexar County, and others created inefficiencies and ineffectiveness in the overall response. While CPS Energy had a representative at the EOC throughout the event, the ability to quickly access and provide real time situational awareness information to support decision making was lacking. While some dashboards and data sources have been identified to support emergency operations, we have initiated a project to develop a platform to provide improved situational awareness information for leadership and decision makers.

Coordination with our partners continues to be a priority as we move forward. We have held several tabletop exercises with various entities over the year. We are working to build on these initial efforts and ensure we are having routine coordination meetings, joint trainings, and exercises that address current and growing threats to the reliable operation of all critical infrastructure. This would include efforts with CoSA, Bexar County and our suburban cities on emergency shelter support, critical facility/load considerations, and other emergency operations interfaces.

Communications

In addition to the communication protocols and processes identified, there were shortfalls found in the capabilities of our communications infrastructure for internal and external communications. Internally, field personnel communications were challenged by the end-of-life Harmony radio system. The Alamo Area Regional Radio System (AARRS) is a project that has been in progress for some time and is scheduled for roll out in Q2 of 2022. This system is shared by CoSA, Bexar County and CPS Energy and will provide significantly improved coverage and resiliency than the current system. Collaborative work with communicators and public information officers from CPS Energy, CoSA, Bexar County and the EOC occurred throughout the year. Communicators aligned on the activation and protocols for working in the JIC and are committed to working on consistent and clear messaging with customers and the public in the event of extreme weather events and sustained outages. Additionally, CPS Energy launched a proactive messaging system for customers and stakeholders that alert them of the potential for weather impacting outages. Customers and stakeholders are encouraged to make emergency preparations and are provided outage updates, depending on the severity of the event. We will continue to encourage customers to update their emergency contact information they have on file with us so we can reach them in the event of an emergency. The Corporate Communications and Marketing team also launched resource webpages in English and Spanish with safety tips and informational videos about outage tips,

generator safety and the load shed process. Those webpages are www.cpsenergy.com/prepare and www.cpsenergy.com/preparar. A joint informational flyer will be sent to all CPS Energy customers with emergency preparedness information in English and Spanish in February. Ongoing and collaborative efforts with our partner communicators will continue. Externally, we will continue to pursue options for broad emergency communications to customers. We have made significant gains using existing internal systems, but there is still opportunity for improvement.

Conclusion

CPS Energy, the broader electric utility industry in Texas, and other critical infrastructure failed to meet public expectations in many ways through the February 2021 winter weather event and resulted in numerous hardships in our community, across the state and throughout the South-Central United States. CPS Energy leadership and personnel have worked tirelessly over this past year to be self-critical and proactively address the areas identified for improvement. These activities have put CPS Energy in a much better position to handle a similar event if it were to occur. However, we are dedicated to customer service and continuous improvement, and we will continue to pursue numerous additional efforts around the reliability and resiliency of our gas and electric services.