



Backup Generation for Critical Facilities

A TCAP WHITE PAPER



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Winter storm Uri exposed numerous problems with both the current operations of the ERCOT electric grid and the financial design of the competitive market. In addition, there were issues associated with the state's natural gas delivery infrastructure needed to provide fuel to many of the generation plants in ERCOT. These, and other exposed deficiencies, resulted in undue financial burdens for end use consumers and other market participants that will be felt far into the future.

During the last regular session of the Texas legislature there were many bills passed that enacted various reforms of the Texas electric market and the governance and responsibilities of regulators and associated service providers that support the market. While some changes were achieved, TCAP thinks there were still many areas that both Texas regulators and legislators did not address in a manner that will resolve many of the potential problems that were encountered during Uri. This sends end users a clear message that consumers of electricity are going to need to remain responsible for managing their own energy future. The ability to be self-sufficient and provide for your own energy needs, at least for a short period of time, may protect an end-user from both loss of service for critical facilities and exposure to exorbitantly high prices and financial hardship.

The good news is technology is helping to provide an increasing number of options to provide this protection for end use customers. From more traditional options, such as on-site back-up generation, to newer technology options, such as battery installations, there are more options available to an end-user that allow the utility to operate during times of stress on the ERCOT grid when reliable service and reasonable prices may not be available.

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One of the great lessons emerging from the winter event is that it is probably time for all end users to identify and review their critical needs as well as options to provide for these needs for times when the larger ERCOT grid may be unable to do so.

TCAP strongly encourages its members to perform this review of critical facilities and seek to find the alternatives to the traditional grid that best serve their particular needs. We will discuss the many considerations and issues of backup generation on the following pages.

NEW LAW FOR CRITICAL FACILITIES

As a result of Winter Storm Uri, the Texas Legislature passed SB3 which specifies that a utility providing potable water must take steps to ensure the provision of water at a pressure of at least 20 psi during an extended power outage. The bill outlines that a utility should develop an emergency preparedness plan (SB3 – Section 26) that should include one or more of many possible measures to ensure service including, but not limited to, use of on-site electric generation, use of portable generators, hardening of the transmission and distribution system providing electricity to the facilities, designation of the facilities as critical load facilities, or other potential options. For entire bill, view [here](#) or find the URL in the End Notes at the end of this document.

ON-SITE BACKUP GENERATION

On-site backup generation is often installed at critical facilities simply to maintain operations when the



power goes out. Not only can this backup generation provide electric service when needed, it can sometimes be used to provide additional revenues to the end user via participation in demand reduction programs offered in the market or reduce electric costs for larger accounts with appropriate metering.

Traditional back-up generation sources may include generators powered by natural gas, diesel fuel or possibly fuel oil. Newer technology sources could also include batteries, solar, or wind generation tied in behind the meter or even a combination of several technologies.

Some TCAP members found out during winter storm Uri that their installed backup generation wasn't always available, often due to operational issues that emerged in the extreme cold weather or a lack of availability of fuel to run the generation. This unfortunate situation underscores the need that all necessary reviews and actions are taken to insure an installed backup resource will provide reliable service when needed.



RELIABILITY AND FUEL SOURCE

Generally, natural gas, diesel, or fuel oil generation will in most cases provide a very reliable back-up source of power that should allow an end-user to remain off the grid for an extended period of time. Generation based on wind and/or solar are intermittent resources and rely on the provision of sufficient wind or sunlight and the ability of the generators to operate during extreme weather events. For this reason, these intermittence sources may not be as attractive for many back-up service requirement situations.

That being said, any source of generation fuel, including fossil fuels that are not able to be stored on-site may suffer from delivery failure or exposure to extreme fuel pricing during emergency conditions. This situation occurred with many sources of generation during winter storm Uri including wind power, solar power and natural gas power. Delivery of diesel fuel or fuel oil can also be an issue if roads are compromised and

the plant does not have sufficient on-site inventories to meet needs.

Batteries store power taken off the grid for re-use at a future time. A fully charged on-site battery array can also be a reliable source of back-up power. It is important to be aware that the time the battery can act as a back-up power source is limited, unless the battery has an opportunity to take power off the grid to re-charge.

Regardless of which type of back-up generation is being considered, it is important to consider the potential threats to the back-up service and which type of back-up generation best meets these potential threats. Often times this largest threat is fuel related and is centered around the ability to obtain a firm reliable source of fuel supply during emergency type conditions. For batteries this could be the ability to recharge the battery once discharged and for fossil fueled fired resources it would include the ability to get fuel to the generator site in basically all types of conditions.



In addition to fuel supply, it is also important to consider the impacts of potential weather on the operational viability of backup generators. There were reported generation outages during winter storm Uri that were based on instrumentation or equipment failures created by the extreme cold and not the availability of fuel supplies. Again, it will be important to consider the greatest potential threats to service in your area and install systems that will be able to operate during these stressed conditions.

ERCOT AND OTHER REGULATORY REQUIREMENTS

There are a number of regulatory considerations and obligations that come with the installation of most backup generation systems. Some of these regulatory requirements will vary based on the type

of backup generation being installed and may require action prior to installation. For example, if the backup generation to be installed uses fossil-based fuels, the generator will need to obtain an air permit prior to operation. There are different levels of permits for different levels of usage. Generally, a full permit is best as it will allow the generation source to operate under a wider range of environmental and market conditions as compared to other permits which may only allow for operation during emergency or similar periods.

In addition, ERCOT may impose various registration and reporting requirements on backup generation based on the size and other considerations. If the installed backup generation will be over one megawatt in size and there are plans to have the facility tied into the distribution grid to potentially put power back onto the grid, ERCOT will require the generation facility to be registered with them.



Just because you produce excess energy doesn't mean that you automatically get paid for it.

The backup generation owner may also need to register with ERCOT as a Resource Entity by submitting a Resource Entity Application for Registration (found in [Section 23 of ERCOT Protocols](#)).

It is important to note that if the backup generation is under one megawatt in output and/or if the back-up generation is used exclusively as backup power (such as to provide an Emergency Response Service (ERS) or similar load response service) then the distributed generation backup generation unit MAY not need to register with ERCOT. The requirements in the areas of registration and reporting are changing constantly. TCAP recommends the member call TCAP and/or ERCOT prior to installation to discuss project specifications and current market requirements in these areas.

In addition to obtaining an air permit, the back-up generation owner will need to work with the distribution service provider (DSP) to coordinate interconnection onto the distribution system. You will need to make sure all DSP requirements for interconnection are met and the correct form of metering is installed to support anticipated operations (ERCOT polled settlement meter or TDSP read metering). The requirements of metering are being established by ERCOT and can vary based on a facility's unique characteristics and the markets the generation owner wants to participate in. The new generation owner will also need to negotiate an arrangement with a Retail Electric Provider (REP) for the purchase or offset of production from the backup generator. Typically, this is the REP that serves the ESID (meter ID number) for established usage at the backup generation site.

For backup generation under one megawatt, some of the registering requirements mentioned above may not be necessary, but it is still important for the backup generation owner to negotiate an arrangement with the REP serving load at the location as output injections into the DSP distribution system will be treated as a reduction of load used for settlement purposes and there will need to be a financial accounting of this activity on the customer bill.

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SELLING ENERGY OR CAPACITY INTO THE GRID

There are a number of programs that will pay generators for making their capacity or energy



available to the system or pay loads for cutting back on their usage. Having backup generation may allow an end user to take advantage of many of these programs either by providing excess power to the electric grid or using their backup generation to serve as a reduction to end usage.

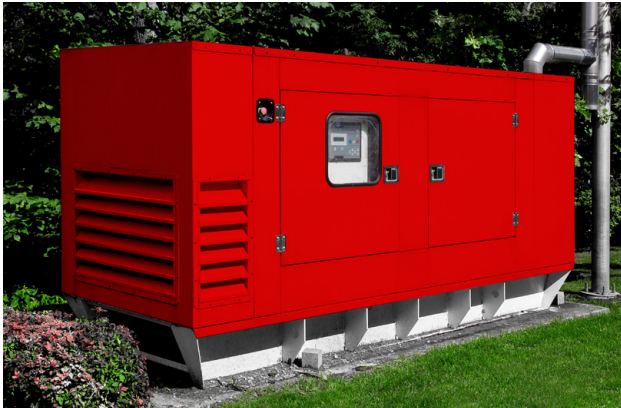
Generator based programs are typically designed so that the generation owner gets paid for making their capacity or energy available for dispatch by ERCOT. Typically, the generation owner will need to provide any energy within 10-30 minutes of being requested by ERCOT. Some services may require an even faster response time. Typically, the generation gets paid just to stand by and be ready to serve, but that can change at any time. Some programs allow the provider to pick the hours they will offer such a service. Many programs are bid-based with prices being set by the last bid selected.

Load reduction programs tend to operate similarly, paying a load for the opportunity to request the lower consumption from the grid during times in which ERCOT needs more generation or a lower usage demand.

In addition to these programs there are also REPs who will work with an end user or generation owner to lower or offset their usage to free up the energy they would use to sell into the grid during periods when market prices are high. Typically, the REP will monitor the market prices and alert the end user or generator when savings opportunities exist. If the end user lowers or offsets their usage the REP will get credit at the higher market price for energy left on the grid. The difference between the market price and the contract price at which the end user buys the energy is typically split on a negotiated percentage basis with the end user.

PROCURING OPTIONS FOR BACKUP GENERATION

Purchasing and installation costs can be an imposing item when looking at generation options. There are often a number of opportunities for achieving installation with greatly reduced up-front costs. When considering options for installation and financing be aware that the ability for the end user to both control when the unit operates and achieve the



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benefits of additional revenues and reduced costs vary significantly. This is based on the structure of the backup generation project ownership and the project providers. It is wise to review a number of potential approaches and choose the one that best meets the end-users needs. TCAP can often help in reviewing options and contract structures and make recommendations for achieving the potential benefits of backup generation.

The simplest approach to getting backup generation at critical facilities is to self-fund the building of the needed generation facilities. Owning the facilities

maintains local control of these assets, typically housed on land owned by the TCAP member so that the member can often pick and choose where backup generation is built, the size of the backup generation and other critical siting and operating decisions including which revenue generation programs the backup generation may participate in. If the TCAP member wants to maintain ownership and local control, but does not wish to devote the assets and energy needed to operate the facilities there are often companies that will perform these functions for a fee.

A second approach that has been popular in recent years is to allow a third party to both build and own back-up generation on your site that has enough load usage to offset the generator output. Under these arrangements the third party will both own and operate the back-up generation system. Your on-site load source will become a load offset if needed. The third party will determine which revenue generating market programs it wishes to participate in and will typically keep most or all of the proceeds from these programs. There is often provision within the contract that details payments the end user would make to the generation owner if the backup generation were used strictly to offset energy usage needs from the grid.

The advantage of these types of programs to the end-using TCAP member is they can be confident that on-site backup generation is present to serve their potential needs, without a large cost investment in building facilities. The downside to this approach is that most market providers of this type of service are only interested in larger load areas that can support the building of backup generation large enough to support needed revenue goals.

A third approach, which can be thought of as a sort of hybrid between the two previously discussed approaches is to allow a third party provider to build back-up generation which they will own under a lease agreement with the TCAP member that also offers a future option to purchase the facilities. This approach can allow for a good degree of customization and creativity in designing the contractual and financial aspects of the lease agreement, operations and maintenance and potential future sale of the facilities to the TCAP member. These types of arrangements can be advantageous for a member that would like to get backup generation facilities installed quickly, but may not have sufficient financial reserves to fund the building of the facilities at the current time.

PREPARING FOR THE FUTURE

It used to be, here in Texas, that we had to prepare for multiple, century-mark and above heatwaves and drought. Now we also have to consider what to do in the face of snow, ice, and frigid temperatures.

With so many issues to balance now, what type of backup generation will best suit your city's needs? What margin of backup power do you need and for how long should it be able to run? Will you combine it with a demand response mitigation strategy or not? What will it cost, and would it be better to purchase outright or to lease?

There are so many variables to consider, and so little time before the next unforeseen catastrophe could make you wish you'd decided sooner, where do you turn for help?

TCAP is here to help you sort out the issues and options from an unbiased, outside perspective. Just give us a call!

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END NOTES

Page 2, SB 3 Bill: <https://capitol.texas.gov/tlodocs/87R/billtext/pdf/SB00003F.pdf#navpanes=0>



About TCAP

Unlike the sponsors of other reports about the state's deregulated power market, TCAP derives no profit from selling electricity. Instead, the 169 political subdivisions that comprise TCAP purchase electricity for their own governmental needs. TCAP understands how high-cost power can cause businesses to relocate out of state, and can place heavy burdens on home consumers. TCAP wants what all Texans want: an affordable and reliable supply of power and a vibrant economy.

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