



THE WIRE



CURRENT NEWS FROM THE ELKHORN RURAL PUBLIC POWER DISTRICT

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Serving the Elkhorn River Valley since 1940

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POLAR VORTEX IMPACTS SPP GRID RELIABILITY

From the General Manager:



Back in February more than a few customers were wondering; “Why in the world would there be rolling blackouts when

the temperature is 25 degrees below zero?” The short answer is to prevent a longer uncontrolled outage that could last days or weeks.

Let me explain in a little more detail to try and answer some of the relevant questions that folks might be asking at this time.

Southwest Power Pool

Elkhorn is a participant in the Southwest Power Pool (SPP) through our power supplier, Nebraska Public Power District (NPPD). SPP is one of nine Region Transmission Organizations (RTO) across the United States. The service territory of SPP covers over 546,000 square miles, with members from all or parts of 14 states, both north and south of Nebraska. (See map to the right.) SPP does not own the generation assets, but helps coordinate generation with energy needs. An analogy that I recently heard compared the SPP to an air

traffic controller. The air traffic controller does not own the planes or the airport, but oversee the safe operation and coordination...I would not want to fly without them. Belonging to such an organization helps mitigate risk for their members by spreading generation resources and load over a bigger footprint. Think of a diversified portfolio, one wants the right mix within the portfolio to mitigate risk. The SPP does have a variety of different generating resources in the mix. Some of these resources such as coal, hydro, and nuclear are considered base load generation, as they run consistently. Another valuable trait of these resources is that their fuel sources can be stored on site

which can mitigate transportation risk: i.e. Coal in a pile; hydro in a dam; and in the case of nuclear, in a reactor. Natural gas can be used as a base load, but really functions more as a dispatched resource, to be called upon when needed. Most often, natural gas is used when non-dispatched resources, such as wind and solar are not generating. Wind and solar energy are non-dispatched resources because they cannot be called upon to run when we desire because they are controlled by Mother Nature. Batteries (storage) and geothermal can also play a role in the energy mix, but currently have little impact.

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GRID RELIABILITY CONTINUED

Importance of Energy Mix

So why is this important? Because during the polar vortex scenario, these generation mixes played a significant role that impacted the reliability to our customers. You probably heard that some of the wind turbines in the south froze up during the extreme cold and were not available for generation. What also is important to remember is that during the cold spell, the wind was not blowing much. This really was a mixed blessing as the wind chills would have been brutal, but we might have had more generation available. The cold temperatures in the Southern states impacted the demand for natural gas, as it was needed for heating and to offset wind that was not generating. This

taxed the natural gas system and led to supply issues. Additionally, in the South, the cold impacted other generation sources as they were not winterized for such extreme temperatures. With the entire SPP footprint experiencing extremely cold temperatures and high loads (see map below comparing temperatures with the SPP map), the lack of generation assets to offset the loads became a very serious problem.

Rolling Blackouts in NE

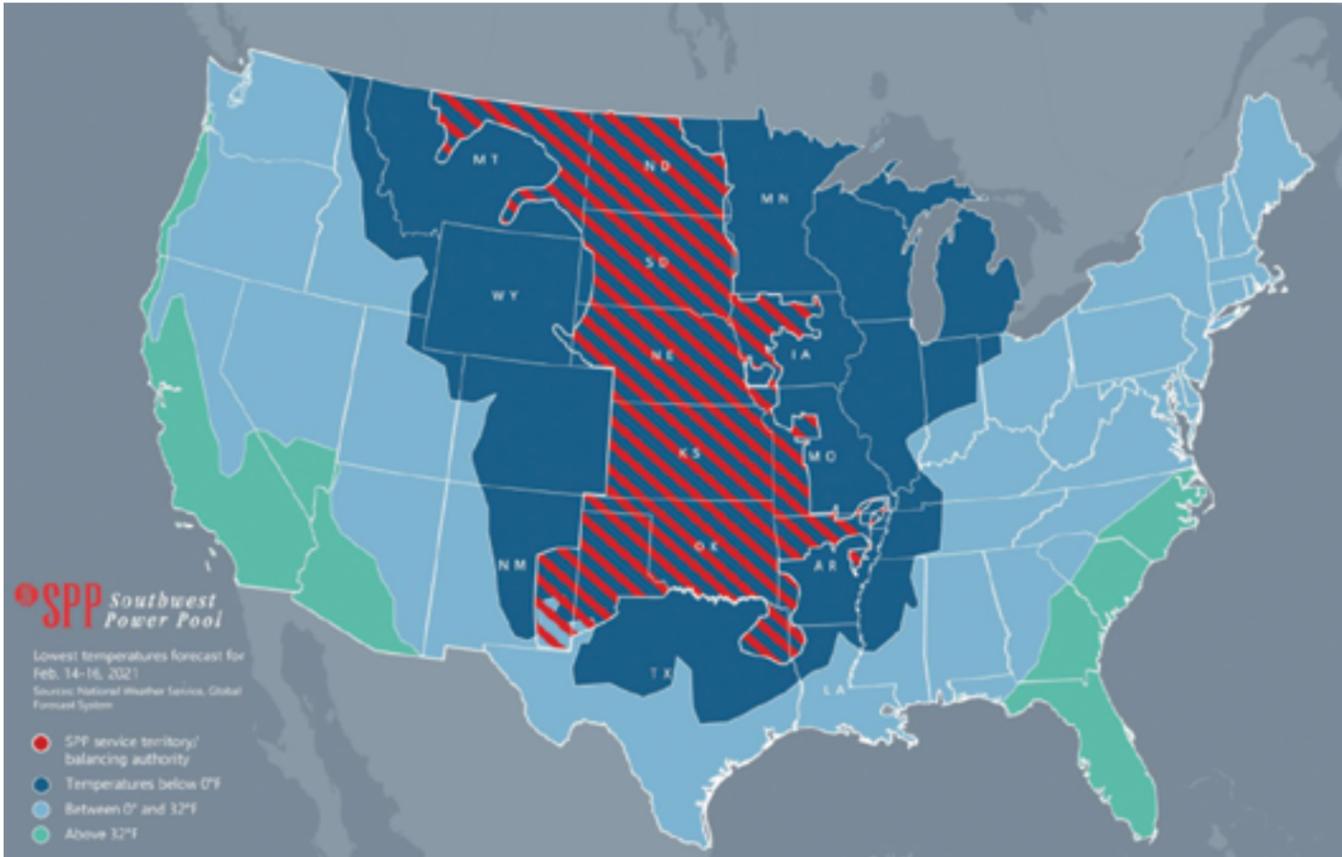
In Nebraska during the bone chilling cold weather, NPPD's base load generation assets were performing very well, which raises the question as to why Nebraska experienced rolling blackouts. Well, although we may not

like the answer, it is because we belong to the SPP and we share in the good times and in the bad. As recent as last August, the shared SPP generation resources came through for us here in Nebraska when we needed to import energy into the state because of some unexpected generation issues during a heavy loading period. You did not hear much about that as there was adequate power available elsewhere in the SPP footprint. This time there wasn't adequate generation available within the SPP footprint; we were all required to share resources to avoid longer term outages.

Balancing the Grid

One might ask, why would there have been longer term outages

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GRID RELIABILITY CONTINUED

without rolling blackouts? The balance of generating to offset load is a delicate business, it must be watched very closely. For example, when you go to turn on the lights you expect them to come on, now think of this repeated multiple times simultaneously and with many different loads, some big and some small. The electric generators must be ready to serve these loads at a moment's notice. If this does not occur, the balance between generation and load is impacted and an automatic process of shutting down the electrical grid can occur. Ultimately, this could lead to what we call a "black start" event where the regional grid is started up one piece at a time balancing generation and load. To say the least, this is not an event that one would ever want to experience. It might take days or even weeks to restore power, depending on the magnitude. Therefore, although extremely undesirable, rolling blackouts directed by SPP and managed by NPPD at the sub-transmission level, with little notice, was the alternative to a much more catastrophic outage. We know this was a hardship for our customers and we truly regret the inconvenience it caused.

Role of ERCOT and Deregulation

To follow-up on a couple other questions that have been circulating, I need to share a bit of information on the Electric Reliability Council of Texas (ERCOT). They are the RTO

for most of Texas. Not only did they recently have reliability issues, but they now have affordability issues. They were very close to a "black start" event, even closer than the SPP by initial reports.

One question that has been asked is: At the time of the "rolling blackouts", was power from the SPP going to serve ERCOT? RTO's do have limited lines between each other and can share power. Therefore, RTO's do share generation resources with other RTO's if they have a surplus, but in this instance, there was no surplus to share.

The second question asked by a customer was whether they would be receiving an extremely high-power bill like what they had heard about in Texas? The answer is no; your bill may have been higher because of increased usage due to the cold, but nothing like those in Texas.

In fact, not only will your monthly power bill not be outrageous, but we do not anticipate that this event will have any long-term impact on rates. You may remember a few years back there was a lot of talk at the state legislature about deregulation and how it could be good for customers. Long term that has not panned out and these large power bills for some Texas customers is just another example of the unintended consequences, which fortunately we are not currently dealing with here in Nebraska.

Looking Forward

Perhaps the polar vortex weather event was a rare thing or maybe it provided an opportunity to more closely examine the generation mix within the SPP footprint. We are facing some very dynamic times within the electrical industry and there are many different perspectives on how to best move forward.

Here are just a few things that must be considered. Are we being intentional about our electrical energy mix in the United States and will it be reliable?

How will renewables impact reliability? What role will nuclear power play in carbon reduction, if any? Without base load generation, will we have reliability? What technology innovations must be developed in the electrical industry? Will we need to build new infrastructure to better serve people's energy needs? How will regulations and subsidization play a role in our energy mix? How will electrification of the transportation industry impact the electrical industry? How do we keep a diversified reliable generation portfolio? Etc. The challenge is finding the right balance to ensure reliability. As we were recently reminded, one thing is for sure, electricity is very important to our daily lives. I think I am safe in saying that there will be a thorough review to determine better ways to avoid such occurrences in the future.

Hopefully, this event places an emphasis on importance of Nebraska's coal and nuclear resources that were extremely valuable during this polar vortex.



LINEWORKERS BRING THE LIGHT.

Lineworker Appreciation Day

On April 12, remember to
#ThankALineworker.

ERPPD would like to recognize all our lineworkers and what they do for the district and for keeping the lights on. ERPPD lineworkers have 404 years of combined service and experience. Be sure to express your appreciation when you see them! #thankalineworker



If you see roadside crews, please slow down or move over when possible.



Know what's below.
Call before you dig.