MARTY ROSENBERG
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BARBARA SUGG INTERVIEW

Q: Hi. We're pleased to have with us today, Barbara Sugg, who is with the Southwest Power Pool as President and CEO. Hi, Barbara.

A: Hello, Marty. How are you?

Q: Good. I want to talk to you about a lot of things and start out with the elephant in the room which is the outage that happened in mid-February. But to help our listeners, tell us a little bit about Southwest Power Pool as one of nine ISOs or RTOs, charged with keeping adequate transmission infrastructure in place and keeping a healthy wholesale electric power market.

A: Well, sure. Let me just start by expressing my appreciation and for this conversation today. I think it's a great opportunity to talk about Southwest Power Pool and I'm kind of honored to be here. So, Southwest Power Pool has been around since 1941 and yes, we do manage the transmission grid and operate a wholesale energy market across fourteen states from the Canadian border in northern North Dakota down to southeast New Mexico. We've been around since 1941 and have been providing reliable services and adding different functions as the industry

evolves over the decades and have 104 members today, with being anything from federal agencies, investor-owned utilities to independent power producers, transmission developers, co-ops, muni's, etc., so we've got quite a variety of membership.

Q: The 14 states you oversee and work with include Texas so I right off the bat want to ask you when you say you focus on reliability service, what do you do and what don't you do and where does ERCOT take off and where do you leave?

A: So, ERCOT is actually not part of the Eastern Interconnection which Southwest Power Pool is part of. To the west of our footprint is the Western Area Interconnection and then south of in the southern part of Texas– the largest part of Texas; I say the southern. It's not exactly the southern half, it is – SPP has membership in the panhandle of Texas and a little bit on the southeast side of Texas that is outside of the ERCOT Interconnections…

Q: Okay. So…

A: And so, there are DC-Ties that connect SPP to ERCOT in Texas…

Q: Okay. So…

A: And so, we are neighbors with ERCOT.

Q: When the power outage hit in mid-February, it cascaded quite rapidly, leaving you to declare the first emergency in SPP

history; I think it was 10:00 a.m. Monday on the 15th of February, and that led to rolling blackouts – controlled service halts I think is the term you use. Talk us through what happened and then we'll discuss what lessons you think are the takeaways.

A: Okay, sure. So, on Monday, February 15, we did have a situation where the amount of energy that we were producing and the amount of energy that we were able to import from our neighbors was not enough to cover the load and there is a variety of reasons for why there was not enough, but the primary reason would be insufficient fuel supply and happy to go into more detail on that. When we got to the point that we were having to use our operating reserves in order to cover our load, that's what triggered us getting into that energy emergency alert level three, which is, if you; it doesn't necessarily mean that you will have load shed; however, if you continue to not have enough energy to cover the load, then you've got to cut some of the load and so, for a little less than an hour, we cut about 600 megawatts in our footprint. That was about 1½ percent of our load and that load shed was actually spread across the fourteen states. So, our members in Texas, again, up in the panhandle of Texas - let's say the Amarillo area and percentage based on load; their percentage of that 600-megawatt load shed for that 57-minute period.

Q: So, when we're talking about the power outage, of course, there was bad, record-bad winter weather across the whole Midwest during that timeframe. Are we talking about a crisis outside of ERCOT that affected SPP and caused and, let's jump in and talk about insufficient fuel. I assume you're talking about natural gas.

A: Primarily natural gas.

Q: How much; was it coming out of Texas?

A: Yes, some of it is coming out of Texas but there were shortages on the natural gas side. So, Southwest Power Pool operates as a single Balancing Authority across all fourteen states so we've got to balance generation and load. And again, we're trying to import as much as we can from our neighbors when our generators fell short due to fuel supply, and so we imported quite a bit of the energy from our eastern neighbors that we have direct transmission paths with, primarily the Midcontinent Independent System Operator who was also importing energy from PJM, all the way on the East Coast. And so, the issues that Southwest Power Pool had were similar to that in ERCOT in the case that we had more load than we could supply energy for but it wasn't nearly as significant as what happened in ERCOT. So, our load shed on Monday was for less than an hour and it was 1½ percent of our total load. Very, very different that what

happened in ERCOT. On Tuesday, we had another load shed even that was a little over three hours and it was only about 6½ percent of our load so it was more significant than on Monday, but it was still nothing in comparison to the massive amounts of load shed that occurred in ERCOT.

Q: So, as we're trying to figure out what happened here. It seems like it would be helpful to talk about a crisis within ERCOT as separate from the crisis within SPP. I'm sitting in Kansas, one of your 14 states, and we had some of those rolling blackouts up in our service territory. Is it fair to say that some of the criticism that's been leveled at ERCOT, that they haven't hardened their generation and haven't hardened their gas transmission infrastructure exists, and is applicable to the 14 states outside ERCOT that you work with?

A: Well, I am going to hesitate a little bit to pontificate on exactly what happened in ERCOT. There are a lot of investigations underway there. For Southwest Power Pool, and we had – first of all, we are doing a comprehensive review now that will study all aspects of the operational side. We'll study the financial side. Our Market Monitor is doing an independent review. We've got our state regulatory commissions looking at this event and we have a review just on communications from Operator-to-Operator communications and of course, all of our

public communications as well. And so that – I fully expect that review to turn up some recommendations for us. You know, winterization contributed to some of our shortage but don't really know how much of it. We had 28,000 megawatts of accredited capacity for gas, of our gas fleet and only 12,000 of that 28,000 was actually generated. And the vast majority of that shortage – and that's a tremen… – I mean, that's less than half of our gas units were able to operate just due to fuel supply, shortages on the natural gas side. But even on the coal side, we have 24,000 of accredited capacity and we were only able to get 16 to 17,000 of that produced and again, this is going to be fuel-supply related, but on the coal side, as I understand it, quite a bit of the issues there would have been winterization; coal piles freezing up as an example and so…

Q: Many of the utilities in your service territory in your region are experienced dealing with bad, cold, winter weather…

A: Correct.

Q: And do have processes and technologies in place to mitigate this.

A: Correct.

Q: Is there some aspect of coal pile freezing and natural gas pumping that just can't be protected and will be overwhelmed by bad weather?

A: I don't think so. I think that they can be protected. Certainly, the gas industry and the electricity industry are interdependent, and so – the gas production plants for gas require electricity. The gas generators require natural gas to produce electricity, and when gas is unavailable, and it's also at a record high price, reaching market caps within our up in our energy market – that creates a challenge where the gas plants are not able to secure their gas. They could possibly have some additional firm contracts for gas but they may not have a much firm contract for it now and having not needed it in the past. But at the end of the day, the gas is going to be given the first priority for gas is going to be given to the end-use consumers, the local distribution companies for gas who people are using gas to heat their homes in the winter and they're not using it so much in the summer and so we are able to produce the entire accredited amount of gas in the summer because we're not competing with anybody else for that natural gas, but you had record use of it in people's homes which makes it more difficult to acquire for generation unless you had firm contracts in place. But even then, if the shortage is significant enough, then those firm contracts will be cut in order to supply people's individual homes with natural gas. And so, there's got to be some coordination – more coordination.

There's been quite a bit of coordination between the two industries; the natural gas industry and the electrical industry, but there's more work that's needed and perhaps even price caps to help protect the consumers and the purchasers of gas during these extreme conditions.

Q: So, I respect your disinclination to pontificate but I'm going to ask you one more question and that is, you talk about coordination between gas and electric. What about having ERCOT out there, not under the same FERC, principles that you and other ISOs and RTOs observe. Do you think that the kinds of problems that affected your area within Texas and ERCOT could be mitigated if ERCOT would cease to be an island unto itself?

A: Yes, I do. I do think it would be very different had ERCOT been part of the Eastern Interconnection or the Western Connection – their inability to import more from their neighbors. Now keep in mind that we imported a lot; record amounts for us because we've never needed to import it as much as we needed it at the time, and ERCOT is limited by their DC-Ties that, just think of them as very small pipes coming in and out of ERCOT. And so, one of the challenges that they had is lack of capacity that could come in from outside. The other thing that's interesting and different about ERCOT is ERCOT does not have reserve margin like Southwest Power Pool does, and so,

they also, I believe, accredited their wind and solar at a higher amount. We accredited wind at about 3,500 megawatts or so. We have over 20 gigawatts of wind nameplate capacity in our footprint but we know that during those kinds of conditions, you can't count on wind whether it's because of turbines are freezing up or because the wind has laid down but the amount that we accredited for wind was met. In fact, it was exceeded. And so in ERCOT, I think they're – I don't think they have the capacity requirements that we have where on our load-serving entities are required to have 12 percent additional capacity, and so, that's just another difference that ERCOT does not require of their entities, as I understand it.

Q: Right and perhaps more elemental: they don't have a business signal for liability down there in their energy markets, do they? They don't accept liability? Electricity is sold at the lowest price…

A: Right.

Q: And they don't have a way of capturing value, I don't think, to harden the grid against the kinds of problems that came up in February, do they?

A: Not that I'm aware of, not that I'm aware of.

Q: There are going to be studies, you said, underway at SPP and clearly there will be multiple studies within ERCOT. How do

you see all this work being integrated and you learn from them, they learn from you? Is there anybody coordinating this? Is it the Department of Energy? Is FERC? Who's going to try to orchestrate a kind of integrated fix to what went wrong in February?

A: I would expect that to fall to NERC. So, FERC and NERC have both discussed inquiries and we've begun getting data requests. I believe that's being managed through NERC. SPP is, we're doing our own review but there's also something else that has been underway at NERC for a while, is a cold weather standard that has been in development for a while. In fact, there's a manager from Southwest Power Pool that actually is chairing that Standards Development team, that drafting team, that's been working on that standard that would require where they had been maybe suggested in the past, but would require more winterization. Now, ERCOT is subject to the NERC Reliability Standards and there has not been required mandatory standard related to winterization, but there is one coming. I don't the specifics of it but it's been in drafting for a while and I believe will come through the approval process within the next few months and be something that certainly all of our utilities will be required to comply with, but ERCOT will, as well.

Q: Every piece of bad news usually has some good news associated with it and I think you would agree with me. The degree of public interest and concern about these issues has been heightened. The whole energy complex is undergoing profound changes and I assume this is true within SPP of increased development of renewable wind and solar. You have 60,000 miles of transmission which, to give context, would circle the earth 7½ times and your territory of 552,000 square miles is about double the size of France. What do you think folks living in this area need to know about SPP? What challenges you face, and what plans you have under development to deal with these matters I just brought up?

A: Well certainly we're continuing to look at transmissions. We've invested – our member companies have invested $8 billion dollars in transmission upgrades and if not for that, our situation in February would have been much worse. That robust transmission allowed us to import as much as we did. Now, there were still areas of congestion that prevented us from maximizing the generation that our northern states were able to produce because of the congestion in our north-to-south-flows, and so we've got to spend some time looking at that. We've also got to think about, from a predictive perspective, we've got to look at how we plan for events like this, this hundred-year polar

vortex. We should not assume that it won't happen again for a hundred years. We should look at opportunities to learn more climate change and what might be affecting the system such that we're not purely basing our expectations on the past and how things performed in the past and what happened in the past, and using the past to predict the future. Now it's a huge datapoint but I think that there are some other areas that need to be part of the planning process. If we really want to be resilient, we have got to a better job of predicting – I mean, projecting those kinds of conditions on our system and being prepared for them and not just as giving as much focus on the history, though it is very important to do that. And, there's got to be some additional analysis out there. Certainly, climate change projections would indicate that these types of extreme weather events would – may happen more frequently. We've never had a situation until February 14-15, or rather 15-16. We never had a situation where the entire Southwest Power Pool footprint was below zero and was the coldest part of the country. And; however, we would be naive to think that won't happen again and so we have to focus on that and we've got to really shift our mindset to looking at what the projections are for the future.

Q: What kind of preparation, assuming what you just said is becoming a guiding principle for you, what kind of things are

you doing right now to deal with a more rapidly changing climate and possibly a more extreme climate?

A: Well, we're really just now starting to look into this. The EPRI, Electric Power Research Institute, is beginning to do some studies in this area too, and Southwest Power Pool will be very engaged in that in looking at that innovation and technology advances to help us with that, but we – right now, we're talking about it and looking to see where we can get engaged and where we can learn, and then how we can use our – you know, integrate more information into our modeling tools. But we aren't there yet.

Q: What role would energy storage possible play in a fix of a multi-day outage? Is that technology at a place yet where it could play a role or is that down the road?

A: It's really not there yet. I think that - I definitely think that it has a place and can be a tremendous game-changer for the industry but the technology is not there yet. It is coming and we've got storage in our generator interconnection queue and usually it's typically paired with solar but the size of the batteries to be able to provide the amount of energy needed over a sustained period of time is just not there yet. Now, I think there is a tremendous opportunity to use solar, sorry, I mean storage on a smaller scale for perhaps for

emergency situations that are not hundreds of megawatts and do not last for hours at a time. I do think there is an opportunity there but the technology is not to the level yet that we can really factor it into our reliability.

Q: So, here's a little pushback on that which is your experience on the 15th and 16th where you said that you had minimal disruptions. They were rolling, they were a few hours maybe at a locale. It seems like that would be ideal were it a hospital or a police station might have a battery unit outside and would have come through unscathed.

A: At a consumer level, I 100 percent agree with you; a hundred percent agree with you. As an opportunity for backup generation, but on the scale of providing hundreds of megawatts, I don't see it, at least, not in the near future. In the five to ten years down the road, absolutely.

Q: So, historically SPP and entities like it have been very macro. Do you think it might be the time to start getting more granular and micro and bringing these kinds of solutions within your territory, or is that something the utilities have to do?

A: No; there are opportunities. The markets are evolving. FERC is looking for opportunities for more entities to be able to be smaller behind-the-meter generation, to be able to offer that generation to the energy market, and so there are – there is

definitely work underway to integrate it. It's just that the existence of it right now is not enough that we can use it as an accredited capacity, for example.

Q: Barbara, before you took the helm of SPP about a little over a year ago, you were senior vice president of IT and chief security officer. Tell me from that perspective what your take is on threats of grid insecurities from bad actors in foreign countries as you see it at SPP. Do you see more kinds of incursions and how are you hardening your system?

A: So, I actually haven't been CEO for quite one year yet. I've actually got two more weeks to go and I'm wondering what else can happen to be very unique in my first year of - at the helm. But also, I was reminded of something that you said earlier about – I was reminded of a testimony I gave in D.C. several years ago on cybersecurity and the electric utility industry, and I mentioned that a one person, one entity's detection is everyone else's prevention. So, one entity that has an issue becomes an opportunity for everybody else to learn and grow and protect and prevent things from occurring. Now, the cybersecurity Standards Critical Infrastructure Protection Standards go along, that are mandatorily required throughout our industry require quite a bit of cybersecurity protection and separation of our most critical assets from let's say, our

corporate systems. And so, cybersecurity is taken very, very seriously in our industry and by Southwest Power Pool and I really enjoyed that job. Of course, my entire career has been in IT until moving into this role as CEO. Having said all that, there is no amount of defense in place to guarantee you protection from a cyber-breach, and the bad actors are changing and evolving and growing in number and we've said for years, it's not if but when. It is definitely very much still our number one corporate threat or corporate risk rather that we are managing as best we can and looking at cybersecurity and there are cyber mutual assistance programs that SPP is a part of. We're part of the CRISP Program that allows us to share and have constant monitoring of the traffic that's coming in and out of our network. And so, cybersecurity; it never sleeps and the bad guy only has to be right once, and…

Q: Is there any overlap between the massive shift you're going to have to do to deal with weather, more violent weather and the threat of cybersecurity breaches where strategies you take on one front will help you on the other front?

A: That's a great question. There probably are some. I hadn't really given that much thought. One of the concerns during these weather events is that if you take your focus off of cybersecurity because you're so concerned about reliability that

you could potentially let your guard down and we certainly can't let something like that happen…

Q: Was there an uptick of cyberthreats on February 15 and 16?

A: Not that I'm aware of; not that I'm aware of, no.

Q: I would think that one possible area of overlap would be what we were talking about a few moments ago, which is that to the extent that customers had mission critical points like police and fire stations and hospitals. If they get more robust with microgrids and storage, that helps everybody deal with both risks, I would think.

A: It does, it does, and you know, they've got to be as protected from a cybersecurity perspective because they can also be a threat, right. You know, a breach among an end-use consumer that has perhaps generation in form of battery storage or solar farm or whatever it may be that they're offering into our energy market, the risk of that infrastructure not being as well-protected creates a risk for us so we have to consider how, at least, the minimum of how the critical infrastructure protection standards would apply to these types of behind-the-meter, what we call behind-the-meter generation; these assets that are smaller can be just a risky to us if integrated with our systems if they don't have the same cybersecurity protections in place. We've got to be sure that we consider that as well.

Q: Well, thank you, Barbara. It's been a pleasure and an honor to talk to you today.

A: Well, thank you so much for the interview. I enjoyed it.

Q: We have been talking with Barbara Sugg who's the President and CEO for almost a year now, of the Southwest Power Pool, sharing her insights about changes in the industry in her bailiwick and beyond. Please send us feedback or questions at GridTalk@NREL.gov. We encourage you to give the podcast a rating or review on your favorite platform. For more information about the podcast series or to subscribe, please visit SmartGrid.gov

END OF TAPE