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BOB ROWE INTERVIEW

Q: Hi, and thanks for listening to Grid Talk. Today we have our special guest, Bob Rowe who is President and CEO of Northwestern Energy based in the Pacific Northwest. Bob has been CEO and President since 2008. He's also co-chair of the Institute for Electric Innovation under the EEI institution. Bob, welcome.

A: Thank you very much for inviting me.

Q: I'd like to just ask you to put on your hat for a second at the Institute for Electric Innovation and just tell us what you see happening in terms of shaping the future of the grid there that is particularly exciting and perhaps under-appreciated by the broad public and industry?

A: What's really exciting about is IEI, it's a very collaborative forum, obviously it's part of the Edison Electric Institute Electric trade association. IEI started many years ago with a focus on an energy efficiency and has really moved towards a much broader focus on technology. It's driven by the participating EEI companies but then brings in technology partners. Our focus is on companies that are actually partnering with utilities on emerging technology products in all kinds of

areas. Obviously, security, grid reliability for flexibility, and increasingly the focus has been on customer products and customer service. All kinds of really creative things that technology companies, large and small, are doing with EEI member companies. In the last six months to the year the work of IEI has really come full circle. In fact, just a few days ago we had a meeting---we had the rollout of a new paper rethinking the role of energy efficiency as we move from simply saving kilowatt hours (a classic role), to thinking about the role of efficiency in, for example, network planning, design, investment. Think about efficiency as a carbon strategy; efficiency as a value-added customer service. And of course, whenever you do that, then you have to go back to the regulatory model and ask very difficult questions about whether a regulatory model that pays for a fixed-cost infrastructure by spinning meters and throughput is really adequately supportive of the opportunities in the energy efficiency area. Of course, this is the oldest question perhaps but continues to be the question on the forefront. So, fundamentally IEI is a very focused area within EEI that does allow electric companies and the technology companies to come together and focus on what's most meaningful now. And, also, hopefully, look over the horizon just a little bit.

Q: So, Bob, let's go down to Northwestern Energy based in Montana, South Dakota and Nebraska with approximately 735,000 electric and gas customers. You're in a part of the country that the rest of the country probably does not pay a lot of attention to as the current tragic wildfire season. Let me ask before we go any further, how is your service territory there?

A: Overall probably, we certainly have had some fires in Montana with one very significant fire just north of Bozeman and quite a number of residents in a pretty rugged area were evacuated. We had to certainly shut down power and our crews were very much a part of the recovery. Actually, you're right; many of your listeners probably don't know quite as much as our part of the world and maybe I should say just a little bit. South Dakota, beautiful state, thriving economy, high plains. South Dakota, we are electric and natural gas vertically integrated on the electric side. Nebraska and central Nebraska, we are natural gas. Operate that as part of our South Dakotas territory. And then South Dakota, we participate in the Southwest Power Pool and we've found real value for our customers there. Montana...

Q: Your market is really changing and one of the main changes is the subtraction of coal resources out of the Northwest, primarily retirement of units of Colstrip. So, as I understand

reading your literature and your resource planning, you going to move from a resource-adequacy situation to a potential shortage in coming years. How big of a worry is that for you and what are your plans for addressing that?

A: It is a very large worry and has been and actually just to close the loop, that's a question specific to Montana. Montana, we're on the Western Grid. There's not an organized market; it's primarily bilateral arrangements and then in Montana, our predecessors at Montana Power Company went through supply deregulation and ultimately divestiture. So, imagine an electric company serving a large rural area with no owned resources and participating in a bilateral unorganized market and with an obligation to serve. That was our situation as recently as 2008. We've made a lot of progress in terms of meeting our customers' energy needs particularly through acquiring the essentially run-of-the-river hydro system in Montana. And that was transformative in terms of providing a basic set of resources dedicated to serve our Montana customers at cost, but also transformative in terms of the carbon of the energy that we delivered to our customers.

Q: So, you picked up about a dozen hydro units? Who owned them previously?

A: They were part of a sale by Montana Power Company to PPL, effectively all of the Montana generation---all the generation owned by Montana Power Company was sold to PPL in the aftermath of deregulation.

Q: So, I understand that you are trying to buy a significant hunk of Colstrip Unit 4 from Puget Sound Energy; 25% of the output and 185 megawatts for the princely sum of \$1.00. Talk about that deal why it's important.

A: Sure. From a number of perspectives. First of all, it's notable that Talen, the successor of PPL which is a part-owner in Colstrip and is the operator, asserted a ROFR for its rights of first refusal against half of the transaction, so effectively what we are now proposing to acquire is just a little bit over 90 megawatts. And if you look at the stack of resources we have in Montana, currently we are right around 34% wind or solar that we expect to move up to 51%. We are 24% hydro, 10% natural gas, right around 11% coal right now. But back to the concern about resource adequacy, at peak we are essentially 45% exposed to the market. More pointedly, our customers are 45% exposed to the market. So the entire West is concerned about the ability to meet peak. Within the Pacific Northwest, that concern has for a number of years been more acute, but for us the arrow has been at red really going back to our 2015 electric supply plan.

Q: So, the fine point on it and tell me if this is correct. One thing that I read said that the planned retirement of the 3,600 megawatts of coal is going to point to regional peak shortage as soon as 2021. Is that correct?

A: That's correct.

Q: So, how are you going to address that?

A: We have---obviously there are actions on the margin that help, but fundamentally we need to acquire additional dispatchable resources. Acquiring 90-ish megawatts of Colstrip for a dollar is certainly very helpful to fill for a period of time that hole. It's specially to note that an important part of that transaction is a five-year purchase sale agreement back to Puget and we would dedicate essentially the profit from that sale to the eventual closing costs at our existing ownership of Colstrip so there's two sides to the Colstrip transaction in terms of looking forward to the future of Colstrip but also helping to fill the hole near term. But it only fills part of the hole. More broadly---

Q: So, I was just going to say that more strongly pull nationwide to move away from coal as a result of concerns about climate change and there are environmentalists out West and Northwest that want to see all Colstrip closed. You were a state regulator in Montana for a decade so you know how public policy

pressure weighs on this industry. How do you see negotiating a way forward? I assume you need this call desperately and there's going to be a lot of pressure to move away from there. How do you see that being resolved?

A: First of all, at the same time we announced the transaction and I believe the transaction has a pretty strong environmental component through dedicating the proceeds from the purchase power agreement back to the Colstrip site, but at the same time we announced the sale we also did announce what we thought was an actionable plan for the continued reduction in carbon in our Montana portfolio leading to a 90% reduction based on what we know now. Right now, the power we deliver in Montana is over 60% carbon-free. And we're doing that at prices to our customers well below the national average, whereas many companies have announced very ambitious plans to continue reducing carbon but thanks to the hydro transaction we're starting from a very, very high base point. Our responsibilities to our customers are affordable, reliable, and environmentally responsible energy. But the statutory requirement really is focused on long-term reliability and affordability. We think the structure we're putting in place is one that really does honor all of those objectives, again including long-term environmental responsibility. But remember the outages in California are

occurring in a system where, as you noted, there have been some substantial retirements but at the same time they've got right now, I think, 51% of the installed capacity in California is natural gas and that's compared to, I think, about 23% intermittent solar, solar/thermal or wind so it's almost the exact opposite of the situation we have in Montana. And again, the history we have in Montana---the nature of our resources---makes our customers' exposure to peak so much greater; and that's the facts on the ground that we need to address. The core step we're undertaking right now is a request for proposals administered by a third party, and dividing the solicitation into three parts. We're looking for a 20-hour dispatchable (20-hour ride-through), ten hour ride-through, and five-hour ride-through so within that structure there should be an opportunity for a variety of resources to contribute. And in Montana, again the size of our customers' peak exposure is really unlike anything else in our region; dramatically different than anything else in our region. And the nature of that peak; we have a summer peak and a winter peak typically associated with high pressure and high pressure. Obviously, wind in particular is not available but our winter peaks are sustained and they're severe. And if we can't meet our customers' needs there's certainly a financial exposure and increasingly there is an

availability risk as well, and it is our obligation to address that. As part of that, it's our obligation to communicate with our stakeholders, to communicate with our state policy makers to be sure they understand the risk and multiple perspectives on the risk and they understand the set of actions that you can take to help mitigate that risk.

Q: So, you're going to be moving into the Western Region Imbalance Market I believe in 2021. How's that going help you with this situation?

A: It helps, but the Imbalance Market is just that; it's not a tool to address long-term resource issues. And we've committed a lot of boots on the ground to moving into the Imbalance Market. We think it's a valuable step. The other thing though that we're doing at the same time is actively participating the Northwest Power Pool's work around resource adequacy and, arguably, certainly as important, arguably most important of what the Power Pool is doing is first of all, coming out with a common metric, so we're all looking at different kinds of resources and their potential capacity contribution in similar ways, in inventorying existing resources and then being as clear as we can that we're finally dealing with this problem of what I refer to as "too many straws in the same drink." And as you pointed out, that drink is getting drained as resources go off-line, so

that's going to give us an awful lot more visibility into the situation in our own market, and ability to cooperatively plan together. So, the Imbalance Market is important; I would say the resource advocacy work is just as important.

Q: You bring up the straws so let's talk about transmission for a minute. Sparsely populated territories that you serve; you have 28,000 miles of transmission and distribution. My understanding is as you pull and retire coal units, those power lines are not necessarily capable of taking power into a region the way they were designed to take it out. So, talk a little bit about the engineering challenge as we configure in your transmission lines and then let's method out, we'll turn to distribution.

A: Great and yeah, your point is exactly right. We are on the eastern-most edge of the Western Interconnect out of Montana; very light connectivity from our Montana system going east. So effectively power moves to and from the west. The Colstrip line is one of the most important assets. It was built for the specific function of moving power from Colstrip to the western markets, but at the same time, it is also the kind of the arteries for our system serving our Montana customers. After that, the industrial sector in Montana has remained at the market. We are their delivery provider, but not the supply

provider. So for decades and decades, a production facility in Billings, for example, some kind of refinery or whatever it happens to be, had a power plant right next to it. It wasn't having to pay wheeling charges from the mid-Columbia [trading hub]; wasn't concerned about transmission constraints. As units are shut down, conventional units in Montana, that further stresses the physical stress, the physical constraint but also is an economic challenge for the industrial sector. I think you really painted the picture in your question of the Western Interconnect, which is much more longlines, much less dense infrastructure, transmission infrastructure, than is true in the East. And that really allows you to shine a light on what some of the various constraints are. So transmission, most people would recognize, is a key attribute for transactions within the Western United States. Interestingly when I joined Northwestern in 2008, there was a Mountain States Transmission Intertie proposal the company had to move, basically move renewable power out of Montana to the West. It was probably ahead of its time. There really wasn't a lot of parties who were interested in the line, potential project developers in Montana, but it was very, very difficult for them to enter into contracts with load serving entities at the other end. We gave that project a good shot, but again, very, very difficult to build major

transmission project at that time in the West outside of an organized market, as valuable as that would have been. So again, and right now the Colstrip line is going to serve our customers, is the pathway for moving power out of Montana, and increasingly is the pathway for moving power into Montana.

Q: So, let's turn to distribution now. What are you doing creatively with your distribution network?

A: This is really one of the most exciting things, and it's a project that's gone forward in increments really since I joined Northwestern. We do have, like most companies, we have incredible planners; very, very creative visionary, innovative engineers, and we spend a lot of time consulting with stakeholders as well. So, the first project was our Distribution System Infrastructure Plan that had an electric component, a gas component; we brought in a third-party consultant to really hammer away on this and push us. And we also used a stakeholder group. That project overall had about five separate projects on the gas side and the electric side. A lot of it had to do with aging infrastructure, rebuilding capacity in the system and beginning to address rural reliability, and developing an awful lot of data about our system. And again, just as we talked about on the transmission side, our system is rural. It's disbursed and it's pretty darn rugged, particularly in Montana. So, that

project was a real success. We accomplished what we needed to accomplish. Developed a great deal of data, then expanded that approach, again with more stakeholder consultation, to the electric and gas transmission systems as well as the distribution system. Now, we're using that data to be much more predictive in terms of how we think about the system, getting a lot more visibility into the system and being much more precise in how we control the system. So, some of these things will look the same for quite a few companies. Now we are standing up a Distribution Operation Center in phases, we're still in the relatively early phases, which will control both South Dakota and Montana. We are moving toward smart switches in three phases essentially. Some of this comes out of a regional smart grid pilot a number of years ago. Phase I is just smart switches basically between substations. Phase II will have more of a rural focus, and then [Phase III] also working with particularly with sensitive loads around our service area, particularly hospitals. That's an exciting project. Another data-driven project is, we're referring to as the ESID, simply Electric Segment Identification. The average circuit on our system can be as much as 40 miles, but we can break that circuit down into subsegments in between taps or reclosures or airbreaks, and if you can focus in on the sub-circuits, the segments where you

have a quality issue---a reliability issue; whatever the circumstance happens to be, and concentrate your proactive measures on that segment---you can be much more efficient; rather than redoing an entire 40-mile circuit, you can may be able to focus in on three or four, three-mile circuits. So that's an exciting project. Another---go ahead---

Q: I was just going to ask about microgrids. You've got a couple of experiments going towards developments near Deer Lodge in Yellowstone. Can you tell us what you think the potential might be in micro technology?

A: Yeah, and actually that's just where I wanted to go. We have several hundred non-looped rural lines. Our service territory is actually one of the largest in the United States, but obviously, there's an awful lot of dirt between LEDs. And in many areas, we don't have looped lines. We have radial lines. If you're living in an urban area, you're receiving power potentially from two directions. If one line goes out, it can be switched, now increasingly automatically, to another line. An outage in a rural area might be up if, in a mountainous area, difficult to patrol. Outages are a real problem. So, we see one of the opportunities for storage, as it becomes more cost effective. Storage coupled with controls as a way to dramatically improve rural reliability. Our first pilot project

focused on that, as you mentioned, was near Deer Lodge. It was a rural, not very well-performing circuit, fewer than 20 customers. But again, automation plus storage. In that case we also added solar, although the storage can be grid-fed. It's an opportunity to model solar as well. It's worked incredibly well. In Yellowstone Park (it's primarily in Wyoming), we serve Yellowstone Park on a contract basis so we are as disintermediated by politics or regulation. We are able to meet directly with the customers, the Park Service, the concessionaires in the Park; talk about what their goals are, what their needs are, and how we can work with them. So, we have one project up and running at West Thumb (southern part of the Park) West Thumb on Yellowstone Lake. Years ago, there had been a line out to that location. It was taken down quite a while ago, so the facilities there were just working off of a generator. We installed, instead a of a traditional battery install, something that's really more like a super-capacitor. So far, that's working extremely well, just as expected. That was a relatively small application. We're going to do essentially the same thing at a larger level at the ranger station.

Q: So, Bob, do you see some micro-grazes potentially replicable and will you be using them more and more with your customers?

A: Yeah, it's a project that we believe, again, comfortable with the technology and so forth that's performing as stated and then price has become attractive. We see actually a large number of rural circuits where the technology can make sense to manage system costs as opposed to building a redundant line and to improve reliability. So, it's something we're very excited about. We know there are other companies that have similar challenges, maybe not quite on the scale we do, but we think it's an application that could make sense in other systems as well.

Q: Great. Thanks for talking with us, Bob.

A: Thank you. The questions are great as always and I always enjoy listening to your podcasts.

A: Thanks to Bob Rowe, President and CEO of Northwestern Energy for sharing his insights about the industry and in particular, his part of the industry in the Pacific Northwest. You can send us feedback or questions for future podcasts at GridTalk@NREL.gov and we encourage you to give the podcast a rating or review on your favorite podcast platform. For more information about this series or to subscribe, visit smartgrid.gov.

END OF TAPE