MARTY ROSENBERG
6.14.2021
Grid Talk #215
CAROLINE WINN INTERVIEW

Q: Today, we're with Caroline Winn who's the CEO of San Diego Gas and Electric. Hi, Caroline.

A: Hi, how are you?

Q: Great. Thanks for joining us. I want to start off with the top of my concern for a lot of folks in California with fire season coming upon us. And there've been a lot of initiatives undertaken by utilities across the state of California including yours, and the state and local government. Are you hopeful that the outcome this year will be different from the last few years and what new is going to be tried this summer?

A: Well, I think that's a great question and listen, wildfire risk is always something that we're concerned about and it's our top risk that we've been working to mitigate for over a decade. We've invested significant amount of capital into our system over the past ten years to ensure that we mitigate the risk of wildfire but I think more importantly, we've also invested significantly in our tools to give us better situational awareness so now, we have weather stations throughout our entire service territory, probably one of the densest weather networks of any utility, and it's giving us 30-second real-time data on

the wind conditions, on the humidity levels. We have field sticks out in our areas of our territory. We have mount-top cameras with high definition, so we are alerted up to ten days in advance to give us that time to prepare when we believe that these wildfire Santa Ana wind conditions are coming. And that has been differential for us because it has allowed us to perform a number of activities from pre-patrolling our lines to ensuring that our customers are not surprised when these types of weather conditions occur and that kind of awareness to allow our nonprofits to be able to reach out to their constituents through the channels that they get their information; that has been differential for us so a significant amount of investment in improving our situational awareness and knowing when this weather is coming and in addition to strategically undergrounding our overhead lines in high risk areas and hardening and changing out our wood poles to water-resistant steel poles and larger conductor with larger spacing – all of those things in addition to, we've also added aerial assets so that if a fire was to occur regardless of the cause, we have aerial assets that we have purchased or leased that CAL FIRE, our local fire agency has access to and they're the ones that dispatch that to any type of fire and one of those assets is one of the largest firefighting helicopters in the world, so we have

done a lot to prepare for climatizing our systems for the last ten years.

Q: So, Caroline as I see it, there are two aspects of the problem. One is climate change and weather patterns shifting and the other is avoiding unnecessary blackouts due to fire to the extent that you can. Can you segregate those two questions: (1) Is it inevitable that is it to be a bad fire season this year or are some of the steps you're taking to spot fires early. Are you hopeful it will prevent fires from getting out of control? And (2) about the blackout situation; do you think you're better prepared to avoid that kind of scenario?

A: Well, Marty, the first question is around the drought and certainly the drought and the very warm summer that we expect is exacerbating the situations so like we see those grass fires earlier in the year than we normally would. And so, yes, the drought conditions are adding to the higher potential so we have gotten our teams ready early but you know, wildfires in California are almost a year-round type of event so we're always prepared but we have done a number of things different this year to prepare for a very active fire season. Probably, last year was very active as well I would tell you and we had a number of these Red Flag days where the National Weather Service calls for these unusually extreme fire weather conditions and we're all

hands-on deck and last year was a little different because we're in the middle of a pandemic and we operated our Emergency Operations Center for the most part virtually. And I will tell you that we were successfully were able to convert the technology and we practiced it and we drilled it so that every employee was ready for the situation that we were facing. So, that's the answer to the first part of the question. But I think that the drought combined with the warmer weather which we're having this week in California and probably much of the Western States is causing the fire activity and the fire potential to start earlier in the season. The second question – can you remind me of the second question?

Q: Well, to put a point on it, do you anticipate having to have rolling blackouts to avoid electrifying areas that are going to be hit by high winds?

A: So, the rolling blackouts that you mentioned is something that we call in California, the Public Safety Power Shutoff, and we use it as a last-resort tool that if the wind conditions are such that they're extreme and it's endangering communities, we will utilize our Public Safety Power Shutoff. At SDG&E in our service territory and our customers since we've been working at this for over a decade, we've been able to be highly surgical in the neighborhoods that we have to turnoff and we only do it to

the most endangered neighborhoods that are experiencing these types of conditions. We've installed a number of what we call Sectionalizing Devices and this is a device that can really turn off one branch instead of the whole entire circuit and they're all mostly remote controlled so we could do it fairly quickly. And so, this has been something that our teams have been working on and really dedicated for the last I would tell you three years to really ensure that we only perform these Public Safety Power Shutoffs to the most endangered communities that are having the most endangered types of weather conditions. And with the number of the weather stations, we have combined with these Sectionalizing Devices, we can tell that one circuit, you could have ten, twenty, thirty-mile an hour difference in wind conditions so having a more surgical approach has helped us ensure again that only the most endangered communities are turned off.

Q: Great. Turning to other issues, for our listeners who are outside of California, can you briefly sketch the state's renewable energy objectives and how that's affecting your utility and your customers?

A: Sure. In California, we do have legislation that we've seen for years now that has prompted the utilities to provide renewable energy to our customers. In fact, we were one of the

first utilities, the first utility to exceed the 40% renewable energy to our customers.

Q: And the goal is 100% by 2045?

A: 2045, right.

Q: Can you get there earlier or what do you see?

A: You know, I think that I mean for us, it's about making sure we have the resiliency combined with meeting the renewable goals so it's important for us to make sure that even on these days when the sun's not shining or stopped shining late in the afternoon, in early evening when the winds stopped and not blowing, that we can keep the system going on days like this week when it's going to be a hundred plus degrees. So that's really the engineering problem that we're trying to solve and model and make sure that we have those resilient systems like having natural gas that we are working to cleanup. And we're on some hydrogen pilot projects to see how hydrogen blending can work and it's a promising technology that I think can be a game changer for California as California frequently curtails solar production because the supply part exceeds demand in the middle of the day. Even last year I think California curtailed millions, nearly 1.6 million megawatt hours of renewable energy and there have been times when California had to pay neighboring states to take its excess solar energy to avoid overloading our

power lines so I think that I believe that hydrogen is a huge opportunity for California for our entire sector and already in use in a wide range of sectors such as industrial processes, metals refining, and it's a promising fuel for heavy transport as well, I think.

Q: Talk about storage. There are reports that California will need upwards of 55,000 megawatts of storage to complement renewables. Is that doable and what does that mean for San Diego and its customers?

A: In recent years we've been rapidly expanding our portfolio of energy storage capacity to strengthen grid reliability and to maximize the use of renewable energy. And our portfolio at SDG&E goes beyond lithium-ion batteries. It includes some emerging technologies like the Redux Flow Battery and an ion-flow battery and so soon will also pilot hydrogen for long-duration energy storage. And the Vanadium Redox Flow Battery became the first utility-scale battery of its kind to be connected to the California Independent System Operator Market in 2018. And we recently extended our flow battery demonstration project so that we could test the battery as the means to achieve zero-emission microgrids so our project is really a proving ground for integrating flow batteries with microgrids and we've been investing in various battery technologies for a decade starting

in 2012. In 2017 we went big and built what was then the largest lithium-ion battery storage project in the world and I think the same year, we launched that two-megawatt Vanadium Redox Flow Battery demonstration project. By the end of this year or early next year, we expect to have 135 plus megawatts of utility-owned storage online which will actually triple our capacity. And as we speak, we're also commissioning a lithium-ion facility that we started in construction with another lithium-ion affiliate in April, so we have lots of batteries coming online and I think at this point, energy storage technology is still in its infancy and the batteries on the market last only a matter of hours. So, the holy grail is really long-duration energy storage that can really provide backup power during extended power outages and help to synchronize the supply and demand across the seasons.

Q: Are you thinking that will be ready by 2045 or if not sooner?

A: I'm sorry?

Q: Are you banking on that being available by 2045?

A: Absolutely, so that's why, Marty, we believe that piloting these new technologies is important to do now so that we understand what will work and what won't work. And, we're beginning construction on a green hydrogen project which will position hydrogen as the long-duration energy storage. As part

of the pilot, we're going to install hydrogen storage containers that can support over ten hours of energy storage for a fuel cell. And this project will be co-located with one of our microgrids in a remote desert town in our service territory and we'll be able to leverage the plentiful solar energy really available to produce green hydrogen. And so, lots of new technology and innovations on the horizon that will need to be developed for everyone to meet these very aggressive but needed goals in the next two or three decades.

Q: I remember talking with Mike Niggli close to a decade ago about how EV adoption was going in San Diego and he was kind of startled. So, tell me where you are today and where do you see that going?

A: Sure. We're very – we're proud of the work that we're doing on EV adoption. I would say that over the past decade we've made enormous strides in electrifying the transportation sector. I think electric vehicles in our region is more of a common sight just like rooftop solar is in San Diego and throughout much of California. In 2010, maybe when you talked to Mike Niggli, there were less than 800 battery and plugin hybrid cars in California. Now, I think the end of last year, California had more than 600,000 electric vehicles, more than an 800-fold increase. And our service territory has really experienced similar hockey-

stick growth in EV adoption and we've made up about ten – we in San Diego make up about 10% of California's population, and we have around 60,000 EVs on the road in our service territory. And over the past decade, we've developed robust portfolios of EV charging infrastructure programs to support electrification, a full spectrum of vehicles and equipment, whether it's light-duty, medium-duty, heavy-duty including trucks, school busses, transit busses and forklifts. And we're bringing chargers to multi-unit dwellings, office buildings, municipal facilities, schools, parks, beaches, airport facilities, delivery hubs, and other commercial sites. And today, we leaned in early and we built over 3,000 chargers and in the coming years, we expects to go thousands in the region to help California's really ambitious clean transportation goal. According to one of the analysis I've seen, to meet Governor Newsome's goal for light-duty vehicles, we need 1.5 million chargers statewide or twenty times more than what we currently have right now. And so, we have a long way to go and we think we're trying to get there as quickly as we can while also maintaining a focus on equity, right? We're taking extra measures to ensure that EV charging infrastructure gets installed in communities of concern and it's very important. We know we need allies to move the needle so the past year, we've helped created a regional collaborative effort called Accelerate

to Zero Emissions and this coalition really brought together local cities, counties in our regional transportation planning agency to drive resources and investments around a unified EV strategy. It seems like almost every week you hear about car manufacturers, both established brands and startups, adding to the lineup of battery electric and plugin hybrids, and I believe the EV prices are going to continue to drop putting them within the reach of more and more consumers.

Q: You have incentives to encourage use of charging off-peak. How successful has that been and how is it challenging your company to meet this growing demand for electrification of vehicles?

A: You know, that's a great question. As part of our program to install that we call, Power Your Drive, and we've over 3,000 chargers we've already installed. It's on a day-ahead rate where the rates change every hour depending on the electrical demand of that circuit so it really does incent customers to charge in the middle of the day when we have an abundance of energy and it dis-incents charging at our more peak hours after when the sun is going down, so between four and nine, so that's an innovative way to help our customers to charge their vehicles. Like for myself, I'm on a rate for my home where I charge my vehicle between midnight and 5:00 a.m. and I believe it's somewhere in

the 9-10¢ a kilowatt hour which equates to 75-80¢ per gallon of gas, and if you compare that comparatively for a gallon of gas in California which is over $4.00, that's quite economic and it's charging my vehicles at the right time of the day.

Q: How has this EV advancement meshed with your overall electrification of your market as folks are trying to get away from fossil fuels? Are you seeing a lot more reliance on electricity and what are you doing to promote that?

A: Yeah, California has been I think ground zero for transportation electrification and we've been at the forefront of the movement which I think is the key to achieving carbon neutrality. And getting there requires reimagining the transportation sector which in California, is the largest source of greenhouse gas emissions with over 40% so not surprisingly, electrification has gained the most momentum in the transportation space, but there's also a lot of work going on besides clean transportation and the challenge ahead of us is how do we manage the electrification of everything; the cars, the buildings and other facets of our economy in parallel with the efforts to decarbonize and harden the grid against climate stress that we talked about earlier; all without compromising reliability or affordability. And we can't get to where we need to get to without investment in modernizing our energy system

and we're making unprecedented investments while pursuing some innovative public and private partnerships. And, we've received several Federal and state grants to advance microgrid technologies and we've been fortunate to have the NREL or National Renewable Energy Laboratory as a partner in this effort. And most recently our parent company Sempra, announced that a Memorandum of Understanding with NREL to research and develop innovative solutions to help shape our lower carbon futures so we're definitely appreciative of the Department of Energy's leadership in this area for sure.

Q: Well, in addition to having 1.4 million electric-metered customers, you have 873,000 gas-metered customers. Is there a – talk about what this move towards electrification means and how it complicates a business such as yours which has a large customer base using natural gas. Do you see any need to evolve them away from that natural gas over the decades to come? How's that going to play out?

A: Well, as we talked about earlier about grid resiliency, we do see a need for clean fuels to be part of the equation to get to a hundred percent renewables and which is why we're piloting early some of these hydrogen projects that we're working on. I would say in terms of our 800,000 thousand plus gas customers, our job is to keep that system safe and reliable and continue to

invest in best practices to do that, and we've been very focused on that. While also, the thoughtful and disciplined to how do you cleanup your fuel sources? How do you cleanup natural gas? How can we use hydrogen or renewable natural gas as opportunities to really cleanup natural gas? Because it is an affordable choice, an affordable commodity for customers and many customers prefer natural gas when cooking or heating or fireplaces or all of that, so it's important that we continue to make sure that that system is safe and reliable and we're continuing to do so.

Q: Well, let me ask maybe a simple question, maybe a stupid question, but 30-40 years from now would those 875,000 customers potentially be on hydrogen for their homes as opposed to natural gas?

A: Yeah, very possibly. One of our strategies is all around clean fuel, so how do we think about hydrogen blending in our power plants, right? And, there's a lot of work going on in Europe and a lot of great demonstration projects where they're doing a significant amount of hydrogen blending. So, we do think that we need to accelerate decarbonization of the gas system with a clean molecule, green hydrogen. Again, green hydrogen renewable natural gas as well as the advancement of these long-duration energy storage and carbon-capture technologies. And,

achieving this carbon neutrality is going to require, I believe, embracing a wide range of solutions including reimagining our existing our gas infrastructure.

Q: The kind of reimagining that's taking place at the utility is changing its business model in profound ways and you sit on the board of SEPA, the Smart Electric Power Alliance, and they've launched the utility transformation challenge. Talk a little bit about what it signifies and how it will affect you at SDG&E.

A: Well, the energy industry is arguably, facing more disruption in the past decade than it has in the past century, right? and I think at SDG&E we have to embrace disruptions to drive reinvention and innovation. That's the most exciting part of my job and our jobs working in the utility is embracing that innovation which is really a cultural imperative for us at SDG&E and we've long-recognized that it's just not enough to keep the lights on and gas flowing. Our customers, our regulators, our investors, our shareholders, the communities where we all live and work and our company values demand that we do much more so just beyond delivering clean, safe and reliable energy, we're really committed to playing an active role in facilitating a just and equitable clean energy transition and we're committed to advancing broader social and racial quality. And our

commitment has only strengthened by what's happened over the past years, so they think about it, so sustainability and equitability are really built into every corner of our operations and into everything we do, so not just where we place EV chargers or not just which vendors we partner with it for goods and services, but also, how do we direct our charitable contributions where we plant trees and where we conduct outreach for remote customer assistance programs and so, I would tell you that our entire workforce is really focused on ESG principles and that will only continue to develop over time.

Q: You joined the utility back in 1986 as an engineer and now you sit in the CEO seat, so a lot of work in terms of your talent and vision being rewarded. Talk a little bit about the path you've taken to get there and how you'd like to change it for women that are entering the workforce now or in the next few years.

A: Well, this is a topic that's near and dear to my heart and certainly when I graduated from college, I was one of just one I think, one or two females in my class so again, something near and dear to my heart. So, one of my passions is, inspire more girls, particularly for those from communities of concern or underserved communities and communities of color to really pursue careers in STEM; science, technology, engineering, and

math. And while we've made great progress over the years and in women in general, I think and particularly women of color, I think they're still severely underrepresented in STEM and in college, again, I was only – many times, I was the only woman in these engineering classes. So, one of the things I launched here in San Diego is initiative, #BeThatGirl. And, we started it in 2018 to really recruit more young girls into STEM professionals. And, we've done, recruited women at SDG&E that have STEM professions that serve as these role models and mentors for girls, so our women leaders in engineering and meteorology and finance, environmental science and other fields, they share their personal journeys from grade school to their careers out to community groups, whether it's Girl Scouts or whether it's the Boys and Girls Club. And, last year, we had almost 250 BeThatGirl role models that took part in these virtual career fairs so the notion is, is that if someone sees that if someone like you could succeed in a STEM-world where sometimes there's a stigma that it's only for boys and you could talk about your own experience, that it will start to change their career trajectory of what they think is possible. And so, this is something that is very fulfilling for me and I think it's been differential. I know several cases – and there's really so much more out there

of young girls who have changed their career professions because of the work that we're doing so I'm a huge advocate of that.

Q: Do you think women will face the challenges of utilities and climate change in a different way from men?

A: I think generally, there are differences between how men and women attack problems, but I think generally, it's going to take everybody to tackle these climate challenges. It's going to take all types; it's going to take women, it's going to take men, it's going to take people of different diversities. It takes different thinking. And again, something I'm passionate about is, you need that diversity of thought. You need the diversity of where you come from so solve these really wicked, hard problems. And so, I believe it's going to take everybody to be able to solve these really tough issues and to be able to build the next new technology or innovative the next new product or policy or best practice to be able to solve the climate change challenges to meet these lofty but necessary goals that our states and our country and the world will need to combat climate change.

Q: Thanks, Caroline.

A: Well, thank you, Marty. I've enjoyed talking to you. Appreciate the time.

A: Great. And thanks all for listening to Grid Talk. We've been talking with Caroline Winn, who's the CEO of San Diego Gas and Electric. Please **send us your feedback or questions 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 or to subscribe, please** visit SmartGrid.gov.

END OF TAPE