

MARTY ROSENBERG
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Grid Talk #221
PHILIP JONES INTERVIEW

Q: Welcome to Grid Talk. Today we have with us, Philip Jones up in the Pacific Northwest, who's Executive Director of the Alliance for Transportation Electrification. Hi, Phil. How are you today?

A: Good, Marty. How are you?

Q: Good.

A: I'm very fine.

Q: It's an opportune time to connect because EVs are increasingly in the headlines. I'm sure you saw Ford's announcement just yesterday that it was going to invest \$11 billion dollars in four factories. Do you think that represents a sizeable evolution in our commitment to EVs and where is this all headed?

A: Yes, it does. It's a sizeable investment and as you probably read in the press release, it also had the sizeable investment from SK Innovation on the battery side so we are seeing battery makers, OEMs; auto OEMs like Ford really step up now. You know, General Motors, another member of ours in ATE has this relationship with LG Chem and a couple of months ago, they announced some major new battery facilities in Tennessee as well

so the major OEMs in North America are stepping it up. Obviously, there has been talk about on-shoring production of batteries and getting a stronger U.S. capability, both in the critical materials that go into batteries like cobalt and lithium and other critical materials, but also training the workforce. Ford announced yesterday that they are committed to a pretty sizeable investment in workforce training in Texas as well so I'm very pleased, Marty, in that this is all coming together. I've been working hard on this for three to four years with my members of the Alliance and working with states and a number of factors are coming together so these investments are really very, very good news.

Q: Part of the infrastructure program that's being debated right now would create 500,000 charging stations..

A: Yes.

Q: And would that in itself go a long way to eradicating range anxiety and how would it change the face of our nation?

A: To some extent it would and we're very pleased that the Biden Administration put out that commitment. It gets into the details of charging types and infrastructure and power delivery, electric power delivery. We probably don't want to get into those weeds today too much, but we prefer generally to focus more on the use cases and the power delivery aspects based on

the batteries that Rivian, GM, Ford, Mercedes, Audi; they're all publishing these numbers and now we have specific announcements from SK and LG Chem on the gigawatt-hour capacity of these new plants. So, we prefer to look at things like okay, how many of the chargers are going to corridor charging on the interstates and the highways? How many are going to workplace? How many are going to residential? And what we focus the most on is the public infrastructure and by public, we mean, it should be publicly-accessible to all and open so there's no proprietary system, no proprietary plug; it has to be the universal plug, and so, we're mapping that out in terms of how much investment is needed and we believe that the \$7.5 billion dollars in the Senate bipartisan package is great, but it's only a down-payment on what is necessary so we've estimated that anywhere at a minimum from \$30 to \$40 billion will be necessary over the next 10-12 years to get to where we want to go, and all...

Q: Roughly speaking, what would that look like where you want to go?

A: In terms of power delivery, it's a huge number of gigawatt hours so I don't have the numbers at my fingertips but some utilities and some on the energy-delivery side, we are talking about an increase in load of, instead of utilities growing, it's close to 0.5% because of energy efficiency, they'll be growing

into 1.5 to 2.0% range annually. We as a nation as we electrify transportation will...there's going to be a significant increase in use, probably 15 to 20% over the next 20 years. And then you throw in buildings and some industrial uses that are going to electrify, it's even greater than that, so it's...this is a very substantial transformation so yeah, the 500,000 number is a useful metric and we like to use that when we go around to the states and talk, but really for utilities and for vendors, the charging station folks, it's really, what type of charger do we put in? What's the power level? Where's it going to be located? And all of those things lead to the alleviation to what you call range anxiety, Marty, so we've got to get it; range anxiety because people don't want to buy EVs generally, one of the biggest reasons is because of range anxiety. They feel that they're going to run out of fuel, the stations are not there. The other reason, major reason, is cost, up-front capital cost. Still more expensive for an EV over a conventional auto, but that's changing, too.

Q: Uh hum so, help people who don't have EVs or people who don't have the macro level understand. Most people who get EVs, do they have a charger in the home and what percentage of the time will they have to have their car charged away from the home? Will most of the EVs be used for commuting or do you see

them ultimately taking the place of gas cars and going long-distance driving on vacation occasionally?

A: Yes, for the last 10-15 years, so many of the or several of the EVs especially; there are two basic types. This is kind of EV 101 type of stuff but plug-in hybrids are; it's a plug-in but it also has a smaller, usually a four-cylinder propeller, a gasoline engine, that helps it go beyond the electric range so think of the Chevy Bolt, the Honda Clarity, Audi makes a number of what we call PHEVs plug-in EVs so those, it's interesting; we have one of those in our family and we use it both for in-city driving and longer distance, too. Longer distance, we don't like to consume gasoline but it gives you that extra oomph or feeling of comfort if you're going on an intercity journey that you're going to have enough fuel to get there. But the industry is clearly moving towards what we call BEVs or pure battery electric vehicles so that's what the Ford Lightning 150 is about that Ford announced recently and big announcement on investments yesterday. That's what the E-Hummer from GM is doing, the Audi e-tron, so these are big cars, big vehicles that have longer ranges. And of course, Tesla has done a wonderful job also of increasing the range of the cars through better, larger batteries, more efficient batteries and better drive trains and various efficiencies in the electric vehicle, and there's this

race now between Lucid Air electric vehicle and the Tesla Model 3 to see who has over 500 miles in range. Polestar...excuse me, Lucid Air appears to be ahead. So, my point is that some of the researchers of EVs in our national laboratories and the think tanks have been focused on the past. You know, when saying people use their PHEVs, their plug-ins, and their EVs only for in-city driving, people drive up to 35 or 40 miles a day; that's all they're going to use it for, but I disagree with that. With this increasing range and capacity of a battery and the increased comfort of the car, we're seeing a lot more use for intercity travel, for going to the national parks and of course, Rivian just introduced its new vehicle, the light truck vehicle that is getting great reviews and they're targeting that vehicle for the outdoors, so national parks, national forests, go hiking, go skiing, whatever, so I guess that I'm saying is, we don't know yet but what I can tell you is the old patterns of using a Nissan Leaf or a shorter-range vehicle just for in-city driving, for an EV, those days are over and I think the paradigm is shifting to kind of a mix but there's definitely going to be longer range with these bigger batteries and hopefully, we can get the infrastructure in as well.

Q: Okay. So, you made mention of the fact that utilities are going to see their electric load go up as...

A: Yes.

Q: Transportation is electrified along with other changes in building infrastructure, etc., so talk a bit what that means in terms of generation as we move to a more sustainable, more renewable mix in generation...

A: Yes.

Q: And then also, what does it mean for the grid? How is the grid currently constituted into being able to plug all of these pieces together and what kind of investment is needed in transmission and distribution to enable all of this?

A: Yeah, so three things: Generation, transmission and then energy efficiency or end-use, or the efficient use of electricity, so let's deal with generation first. We will probably need more generation, but we don't know exactly yet how much and how. Obviously, many of the states have adopted clean energy plans or an RPS that requires increasing amounts of wind and solar in renewable generation so that will probably provide an end to this for those clean energy sources, but the grid is going to become...so let me get to transmission. The transmission issue is going to be dependent; I think we're going to need quite a bit more transmission just because not so much of EVs but just with decarbonization. We are shutting down large coal plants that are far from load and we are building wind and

solar, utility-scale wind and solar far from load like in the Dakotas or off-shore wind off of New Jersey and different places, so we are going to need quite a bit more transmission. Whether or not we need enough; some of the amounts that certain advocates are putting out there, I don't know yet because I think we are also going to see more distributed resources, clean resources, zero carbon resources at the state and local level. So, what that mix is going to be, we don't know yet but definitely we're going to need more transmission. Now on the distribution side, EVs as you know can be used as a distributed energy resource. They're flexible. Yes, they are mobile and they need to be plugged in for the grid operator or the utility to use them but if they are plugged in, they can be used for a demand response, price signals. They could be used, although the Ford solution on this for the 150 is working with SunRun on kind of a home energy management system for backup power, which is great, but if these are going to be integrated actually into the grid, not just the home, we have to go through interconnection standard safety issues and all sorts of stuff but that day is coming. So, my point is that with storage, demand response with EVs entering the distribution grid, we have a lot more; it's a much more complex system to run and manage for the utility and the grid operator but it offers a lot of load for a management

flexibility. So, my last point is energy efficiency. So, we need to continue the efforts on energy efficiency and many states as you know, 32 states I think, 33 states have efficiency; some sort of a mandate, a goal, which is aspirational. So, these need to continue but they're going to have to be modified a little bit because we're talking about load growth with EVs coming into the system, significant load growth and at the same time, we need to continue to use our electricity efficiently so for example on decoupling, on rate design, on these targets and the way they're set where probably the states and the PUCs, we're all going to have to rethink how we look at these issues because it's a new era and so you have pressure, pressure of load growth on one side and then you want continued pressure on the downside with efficiency so it's going to be an interesting time, Marty, for rate design, for program design and trying to combine all these together. One thing that worries me and I see this in my state of Washington; I see it in California, Massachusetts, New York; some of these "very forward-leaning states" on decarbonization; they're passing bills and doing these programs separately, in silos and they're not thinking holistically about, okay, we're shutting coal plants down over here over natural gas. We're increasing load with EVs, we still have decoupling. For energy efficiency, we want to go higher there.

Oh, and we have storage over here. We have a fore front storage and so, we need to find ways to bring this together because the utilities still have to operate the grid reliably or FERC DOT or CAISO or PJM as a grid operator and if we have all of these different silos and different parts of both generation and end use, it's not going to work efficiently.

Q: So, this is why I really value this conversation with you. You've had 12 years of experience as a commissioner of regulating...

A: Yes.

Q: Utilities in Washington. You were president of the National Association of Regulatory Utility Commissioners, the body that knits all 50-plus states together and District of Columbia, right, and a few others?

A: Yes, yes.

Q: So, let's look at a basic question here which is one of the things that's said about EV charging is if you can shift charging to the off-peak hours, usually in the nighttime, it mitigates the need for additional generation if you...

A: Yes.

Q: As opposed to doing it during peak drive-time when demand is high. As you look out at across all the states in this country, how many states today have something like a policy that

would encourage EV users in their states to load up their energy off-peak? Is it...

A: You also need a 35; yeah, I'd say it would be 30 to 35 states. You know, the traditional, more conservative states in the Midwest, Marty, the Dakotas, Nebraska, some of the Southern States, although the Southern States are starting to catch up now, have been behind on this so I'd say about 30 to 35. I haven't done a recent count and by that, I mean two things. One is that they've focused on the electrification of transportation issues with workshops or notice and comment period or utility has filed something the commission has had to deal with it. Or, they have off-peak rate; they have some sort of a time-of-use rate, so there are two ways of managing this load, Marty. One is passive and one is active. So, the passive way even though it's really not passive to the consumer is time-of-use rates. So, as you know, rate design is a little bit of a blunt instrument because you do averages during certain periods of the day like 9 to 5; you average it out and you come up with an off-peak rate. And it's not precise because load is peaking. Generation and some circuits are busier than others, right, and certain loads but it generally works, so I would...so that's how most states have started, with the utility filing for some sort of a residential, usually a residential time-of-use rate because 80%

of the charging, over 80% is done at home so that's very convenient for the consumers. The active charging is what we do either through the OEMs, through the telematics and actively manage that load like you can set your car to charge because one of the problems we have if the TOU rates are all set to go off-peak with the cheaper rate at 11:00 p.m., we found in certain utilities that you have a mini-peak on a distribution feeder at 11:00 p.m.; 11:00 to 11:30. So, what we need to do is move that charger to like 1:00 a.m. or 2:00 a.m., so we can do this through technology that Greenlots;, many others; up-lights, many vendors are doing this now. So, that's called managed charging. Also, the utility as I said with a good rate design that maybe has a CPP rate, a Critical Piece Pricing rate that is necessary when the grid is stressed, those two, three, four days during the year when the grid is really stressed, the utility will send out a price signal saying, "It's really going to be expensive tomorrow. We're going to charge you 120 per kilowatt hour or 150 instead of 10¢ or 15¢," so that gets the attention of consumers. But, that's more an active measure so if the consumer wants this cheaper rate of volumetric rates off-peak, the utility should have the ability to manage that load during really stressed times in the grid so I think we're going to see both forms of this management of load. We're going to see the time-of-use

rates as well as managed charging. Some states like mine when I was a commissioner especially in the Northwest because we don't have that much difference between nighttime and daily generation costs because of the hydro, the hydroelectricity and the ability to store all of that water kind of like a battery, but most parts of the country as you know, there's a much bigger difference between night and day so...we were never able to get TOU rates through the commission because one of the bigger opponents was consumer advocates because they felt it was not good for them or some of the industrial customers, the large industrial customers like Walmart, Kroger, the aluminum and steel industries would say, "I want to opt out of this because we're managing our load. It's a very high-factor load business, manufacturing steel or aluminum, we don't need your help." So, my point is that TOU rates sound like they're easy to get sometimes but in a more conservative state or conservative regulatory culture, it's challenging.

Q: But, let me push on that just a little bit more and that is, assuming we're moving towards a day when there will just be electric vehicles available for transportation or, and we can debate when that will happen, but the timeline seems pretty clear. Wouldn't that mean that they'll be a day when we...it doesn't make sense for just 60% of the states to offer time of

day. They'll have to be everywhere and will that level be regulation be across...

A: Yes.

Q: The country? Will it be similar or approach as over...

A: It will be everywhere, Marty, so I agree with you on that but whether...so I think it's going to be like when you and I used to talk when I was president of NARUC and can only nudge certain states using my bully pulpit so far, so, which I tried to do as you know on cyber security and safety of the natural gas pipeline infrastructure. I did that and FERC came in afterwards and other presidents do this, too, and DoE does this; Federal, so, the Federal agencies can offer carrots as well as sticks, but mostly carrots to get the states to move but at some point, if the states don't move, you're right; something's going to happen. It's either going to be a power outage or we're going to have reliability issues. Texas is a different matter. ERCOT; I don't know what's going to happen in Texas. A lot of my friends like Alison Silverstein and others are trying really hard to get that market organized and maybe even interconnected with the rest of the grid of North America more fully, but I don't know if that's going to happen but the other parts of the country, we're probably going to see more of RTOs or RTO-lites like we see with CAISO, the Imbalance Market. We're going to see these

ISO markets develop services for ancillary services coming out of EVs and flexible load management and so it's going to be a different world and I agree with you that if we get 70; 50-60-70% of the fleet, light-duty and medium-duty electrified, they...we just need to have both these passive and active load management policies in place because otherwise, the system's not going to work.

Q: Last question I'm going to ask you about is the speed of adoption of EVs.

A: Yes.

Q: Currently the United States has about 17% of the world's EV fleet.

A: Yes.

Q: Europe has a third and China has 44%..

A: Yes.

Q: With 4.5 million cars compared to what, about 1.8 million in the United States so if one assumes whoever has this technology will own the future of at least of transportation, technology and industry. Why is the United States lagging? Is it only a matter of time before we get leadership on this and how serious is this lagging of Europe and China right now in your mind?

A: Well, we are lagging for several important reasons. One is, we've abandoned under Trump, the Paris Climate Accord so and even under previous administrations, we were not aggressive enough in adhering to our international obligations. This is my view, Phil Jones but even as I was President of NARUC as you know I was pushing Regina McCarthy and the Obama Administration for faster retirement of coal plants under the CCP, the green power plants, so we've kind of been laggard there as opposed to Europe; this has been stronger. The other thing is we live in a federal system and so, we're not like the E.U. and China but China is run by the Communist Party. They have state-led China that controls 90%-plus of the grid. They basically tell the provinces, although there is a lot of give and take between the provinces in Beijing, but they developed some consensus, they developed some very significant incentives to push EVs along so, they also have more of a long-term vision as an authoritarian state with a central party leadership. Once they come up with a vision of what industries they want to dominate, as we've seen with the bridge and road initiative, they will go after that. We, in our country, we're much more decentralized and democratic so we have a lot of studies from the national laboratories, from the national academies, U.S. DoE, and the states and California's doing this; New York's doing that, so it's much

harder to pull our country together so it takes a bit of a crisis or a bit of a sense of urgency, like we're falling behind, and I hope I've been able to engender a little bit of that in two years of running around the country talking to state decision-makers because this has always been part of my message is that we need to have a vibrant and a strong automotive; not just automotive; we call it e-mobility industry now and because if we don't, we're going to lose out on this, these industries of the future. Europe is a different matter. Europe is kind of an interesting hybrid and Norway got a lot of attention at the Super Bowl with that General Motors ad, so a lot of us have known about the Norwegian story for a while but Norway of course, is not part of the E.U. so put that aside for a minute but the E.U. has come up with good policies on batteries, battery consortium on emissions; they have very tight emissions. That's the other thing about us, Marty is, in my view, we've become so fixated on corporate average fuel economy standards, CAFE, and this big fight we had in the Trump Administration between California and the Federal administration that we just got lost in the weeds on that and we lost about four or five years. And so, yeah, it's a combination of all of those things. Those things don't happen in Europe, so they have a commission, they have a supportive parliament. They support climate accords

and so, it's easier and they're smaller countries like the U.K., that's doing a great job now on clean transportation, so they're able to move, even under a conservative Boris Johnson administration who's not a Labor Party guy, he's not a Green Party guy; he's a Conservative guy so anyway, those are some reasons about why we've fallen behind, but we're catching up, just like the press announcement from Ford yesterday, is positive; the announcements from General Motors and others so I think we're getting there but you know what they say about America, it takes a few pokes to awaken the sleeping giants, so, so I think we're getting out of our slumber now and we're getting activated.

Q: We've been poked.

A: We've been poked a few times.

Q: Thanks, Phil. It's a pleasure great talking with you.

A: You're welcome. Thanks, Marty.

Q: Our guest has been Phil Jones, who's the Executive Director of the Alliance for Transportation Electrification. Please send us feedback or questions at GridTalk@NREL.gov and we encourage you to give the podcast a rating or review on your favorite platform. For more information, please subscribe at SmartGrid.gov.

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