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**AUDREY ZIBELMAN INTERVIEW**

Hi and welcome to GridTalk. Today we're very excited to have all the way from Australia, Audrey Zibelman who we know from a variety of roles probably primarily for her role as chair of the New York State Department of Public Service when they introduced some radical changes in the energy sphere in New York State. She's also been CEO and managing director of the Australian Energy Market Operator for over three years, close to four years and after that, was vice president of at the Moonshot X Factory at Google.

Q: Hi, Audrey.

A: Hi, Marty. How are you?

Q: Good. You've got an impressive résumé and you bring expertise from a variety of perspectives. I'd like you to just tell us most recently, help catch us up on what you did at the Moonshot Factory and why anyone should be excited about what they're up to.

A: Sure. Well, at X where I continue to be an advisor, I was brought in to lead a project around grid digitalization and to me, the big critical part of thinking about the whole process of decarbonization is that it's the amount of information we need to use about and the questions around visibility as well as the ability to integrate data and all the various devices that are going to be used to help manage an affordable, reliable, clean electric system is massively more complex obviously than it was historically and part of this is going to be creating these digital spines as they're called or digital platforms that allow us to manage this data and share it in such a way that we can make sure that we're achieving the outcomes that we need to achieve from a societal standpoint so that was what I was doing at X.

Q: So, X as I understand it means literally, you're trying to bring solutions into being that have 10 times the impact, 10 times the impact on tough problems than conventional evolutionary technology. We've got folks like NREL at the U.S. Department of Energy; we have folks like EPRI. Where do you think X is going where others are not going, and how are you interfacing with the industry and keeping them abreast of what you're achieving there?

241

A: Well again, I'm no longer at X. The project is called Project Tapestry and that continues to go on and there's a recognition at Tapestry where it has to be a highly collaborative aspect and they're working with utilities and multiple entities to build this so this is never going to be one entity's never going to be doing it all but there are companies like Canoe Energy which is doing integration of distributed energy resources; SPAN, which is looking at smart panels, all of these are various pieces that are going to be part of what this digital network that needs to occur and what and Tapestry as a project wants to be a big piece of this, too, and I think there's real value so what I think is interesting, Marty, and we can move to the conversation. I think what's happened in the ensuing time from when we created REV and part of what we looked at REV was the need to think about the computational tools and the digital tools that are going to be necessary is the conversation is now shifted to that there's a general recognition to the point that Ofgem, the U.K. Regulator has just published an important request for comment with what they're calling a digital spine for the U.K. power networks and so I think there's a recognition that along with the hardware that needs to happen with decarbonization and the building of obviously renewables and storage and transmission and networks is we also need the communication, end-

to-end communication background and computational analysis that's going to allow us to manage the grid of the future and that what I'm pleased with is that that is no longer not in the collective as part of the conversation. It's becoming at the forefront and certainly in Australia it is because we ran into real problems. In U.K. it is because the regulator recognizes that information transparency is going to be critical, and I think in the U.S., people are beginning to have these discussions, too. And what we need to do is bring this together and get a collective understanding of what this platform will look like; what it needs to do and how important it's going to be to have an approach that makes it really easy for third parties to connect to the system.

Q: So, give us a sense of the timeframe you see this platform's creation. Is it going to happen in years, decades? And will it be constructed piecemeal? Will there be big pieces created first? What's the staging involved and how long will it take?

544

A: You know, pieces of it are already here. There's projects already in place so there's projects going on around the world that are different elements of what is going to be necessary. For example, in Australia there's several projects; one's called Project Symphony; one's called Project Edge that have built out some of the infrastructure for integration of distributed energy

resources as a matter of necessity because solar, rooftop solar is such a prevalent portion of the grid here that we need to harness these resources to make sure that they are not as the...I love the term that the U.K Regulators, that they're not "powercitic" on the grid but actually a good component of running a much more effective power system, so that's being done here. Other organizations are already putting in some of the communications that if you go to Digitec and company Enterex is already working on putting in some of the communications network so they're there. What I think needs to happen is we need to have a common, as we often find in our industry we saw with Smart Grid, everyone used the term, everyone had a different definition, is how we come up with a One, common understanding that having visibility of communication and the ability to make sure that we can easily install electric vehicles' charging stations everywhere and it works the same and the grid is ready. We can think about when we electrify homes and put in electric hot water heaters, how these resources can be used; the APIs are the same, that we all have a really good strong understanding of that and the regulatory rules are set up and the market rules to take full advantage of it that we do that with joint understanding and approach as opposed to what often happens in this industry, it happens in silos and fragmented and it takes

too long. That's why I'm excited about the option sort of leadership coming up with this is our vision; we'd love your thoughts on it. But it is a vision that could be universally applied and now we have to sort through how to deal with the different regulatory structures that we all have to live in.

Q: So, who should be the lead on that in the United States? Should it be FERC, the Department of Energy? Should it be the Independent System Operators? Who would get this rolling in a big way?

830

A: Well, I think the Department of Energy because of the IRA and because of their recognition of the role of virtual power plants and the desire around electrification can play a really important role in helping define what this looks like and I've been reading with interest some of the discussions coming out of the lone program office about BPPs and their importance and so I know Jigar Shah and I know each other from New York. We've been talking about transactive grids for a really long time so I think as everything, it's both the structure of the organization and the people in it can make a big difference and I think the people at the DOE are recognizing this, so I think they can take a big leadership role. Certainly, FERC has an important role,

particularly as it relates also to the ISOs, and the state regulators have critical roles.

Q: So, I was going to ask you to focus on that give your state chops and what you did in New York. It's fragmented, the sophistication and the capabilities and what will it take to get every state involved and do we need every state involved?

A: I think every state needs to understand the importance of information, connectivity, communication, and in order to take full advantage of driving efficiency in the grid. I mean, one of the...as well as you have hardware on the system that allows us to do things like dynamic line ratings so that we can take maximum capacity of the existing system as well as building new ones so I think every state should be really aware that we now with digital tools, can drive efficiency which results in lower prices to consumers as well as better resiliency at the edge of the system because we have better connectivity. Nobody should like look at this and say, "I don't want that." But why, why would you rather have an inefficient system? Let's have an efficient system as we can so I think that we need to do that. Where I think NUREG can come in is really helping working with the federal government to say well how do we have a common view towards this? And then also, we have different agencies, like entities like RAP who can say well, what's the regulatory structure that needs to change so

that utilities as they think about digitalization aren't economically penalized because of regulations so we have this sort of this bias towards capital? How do we break some of these logjams that are a function of last century regulatory constructs that are maybe no longer relevant or as useful to drive outcomes as we need to do when we're talking about a much more digitalized system that is less about hardware and is much about software and efficient operations. So, I think we need to...DOE can have a big role sort of defining, what does this look like, what are we really talking about, and why, what's the use case for consumer benefit? FERC can say well how do we make sure that the markets are aligned in this way and they've done a lot in 2022 and DER and they make it work. And then I think the states can start saying, well, there's nothing in it, it's like we would have never built the Internet if every state had a different way of thinking about the Internet, so how do we do this in such a way that we drive efficiency and if we do that, the value of course, is that from a manufacturing side and from a cost side if everyone looks at it as a common approach, that drives down costs and that it also helps get to scale so I think all those pieces, the duty of course in a country like the U.K. where it's all based on one regulator, it's a lot easier. In the U.S., because we're so fragmented, it's hard, but I think it's a conversation



that shouldn't be seen as anything other than consumer-oriented because what we're talking about is how do we make the transition occur in such a way that is the most economically efficient for consumers and drives innovation because we're leveling the playing field around information, and that's the heart of a good transition.

Q: Recently it was covered in the media about the fact that there's a lot of renewable energy projects in the wings here in the United States. They just can't get approved and built because of transmission bottleneck. How would digitization address that and help speed that along?

A: I'm so glad you asked me that question. Think about it. If we had better information—this is something that we did in Australia in terms of creating a digital twin of the power system and it's a lot of work and countries like the U.S. need to be in to this so that they can upgrade the tools, is the idea that if you do this and you have you digitalize the grid and you can have now a real operating twin, how the system is not only working today but how it will work, because that's what we're modeling and we use cloud-based computing which is a lot faster. Then, what happens when someone wants to interconnect to the system and we can provide the right security bases and they can now see what will happen on the system when they connect, you can set the

protocol on what's going to be required in order to make sure that you don't err the system when you do connect, and then when you come in with your application, you can use your own engineers to say we used the model of this system, what will happen when we do connect and now we can demonstrate that when we do connect we're not going to create a problem on the system because that's a lot of what's holding things up is you have to model that you're connecting into a power system and you're not going to impair it, and if it looks like you need to invest in some sort of resources you can do that as part of your application, we can speed it up. So, another way of thinking about it rather than just using the system operators and utility engineers, third party engineers can get the same information. They don't have to debate about what's the source of truth, there's just one truth; this is what will happen. We know what the protocol is and here's how we're meeting it could totally expedite things and then the other piece of course, is when physical transmission is required, you can also have third party say well, we're going to put some money into this because this is our asset that we're trying to get online so then you can start unlocking other models. I liken it to think about what Google Maps has done for our economy in terms of information transparency and how many great businesses were constructed because we created transparency, or the Internet

itself or any other platform, digitalization of the grid can provide us these tools so that it's just not one small group that's looking at it and we provide the end and the information becomes more transparent and of course, the inevitable question is, how do you protect cyber security? Well, you can do that by containing who can get access and what credentials, and we do that all the time so, I think we can get there but yes, having better information, having a single source of truth, having a model that everyone believes in so you now have a board of models, all will make it significant difference in how we get this done faster.

Q: Well, I'll tell you, the concept of having a single source of truth in these crazy times is very appealing. Maybe we could apply it to our political and social reality as well.

A: Yes, that would be nice, too, if it's truly true.

Q: This would be a nice time to ask you ask you about an article that was in *The New York Times* this weekend about a massive green hydrogen project being planned in Australia where they're going to put solar and wind out there and create the equivalent of a third of the grid need of Australia to clean up mine production. How big is that and how excited are you by that project?

A: It's hugely exciting and I have the benefit of being on a board here, Squadron Energy which is actually owned by Andrew Forrest who is also the CEO of Fortescue Metals and he, the ambition in Australia has around creating, using green hydrogen as a mechanism as one of the tools to create green steel and green cement is fantastic and the advantage that Australia has is that it's a country that has some of the best wind and solar resources and of course, land to do it so the fact that we can produce goods here and Australia has aims to be a hydrogen, green hydrogen superpower is great because this is what we're all talking about. This is a country that a lot of its economy was built on extraction including coal extraction and staying in energy through the creation of green energy is an alternative is extremely exciting and a great way of thinking about how the transition can be and can generate economic growth as well as obviously protecting the natural environment. So, it is really exciting and I, what I love is the optimism. This is again one of the reasons this is exciting about companies like X, is you have to have this level of ambition and willingness to dig in and get it done and that's what they're trying to do.

Q: Well, it really is transformative when you think of the kind of extracting companies that we always thought were the bad guys be terminal leaders in this transformation that they get it,

forget about morally; they get it economically, they see the economics of it.

A: That's right, that's right and you know, I think part of one of the things that we need to do is, we need to make sure that as we're thinking about the transition, every geography will have different ways to get there and some will have better advantages than others just on how, for example. You can't really do what Australia's doing in a country like Indonesia where there's hundreds of millions of people in a small area but if you could produce it here then of course, the rest of the world can benefit because now you have essentially free electrons producing green steel.

Q: But if you do it in Australia, why couldn't you do it in Morocco or...?

A: Other countries, like that?

Q: Other countries with a lot of open space with lot of sun...

A: That's right.

Q: And potentially wind.

A: That's right.

Q: If not necessarily tied to an extraction industry, it could be done for other purposes, right?

A: That's right and so you could perfect the capabilities and then you can produce it, certainly green hydrogen other places

and that could help with fertilizer, cement, some of the really hard Scope 2 and Scope 3 decarbonization that needs to occur and so learning how to do it and with the willingness to show that you can take a mining which nobody ever thinks of those although if you've ever been to those mines, they are highly sophisticated but basically as early technology adopters but they're looking at this because they recognize that this is the hard stop that we need to start getting to.

Q: So, in the last few minutes, let me take you back to a timetable when you talk about digitization of the grid and you say it's already happening in pieces, is there a tipping point at where you think you're going to be on the downward slope of really achieving great things, and how long will it be here in the United States? Let's focus on the United States.

A: Yeah, I think what's going to happen in the United States and similar to what we saw in Australia but for different reasons, I think we're going to see a tipping point in the next decade of around EVs and so we have to get the charging infrastructure up there and probably a similar tipping point around electrification and so within that, in order for that to work we need to build a digital piece out and that's not going to be, we're going to build it and then it's just going to sit there. We need to build the first pieces of it and I think the

elements of that are there and we just need to combine them and put them together so I think we have an opportunity to be actually with a bit of vision to get this done within the next five years, at least the first components. One of the organizations I work with through ARMA is Energy Web Foundation and they've built actually a big piece of this already in Australia and in Europe and so, we can move too, quickly. It's not as always, I don't think just technology issues. I think technology can move and it will continue to grow in sophistication. It's really getting the vision and regulatory framework set up and I think we have the momentum behind us now in many parts of the U.S. where people are saying, "Look, we're not going to be able to implement the policies because we don't have the capabilities," and so that's creating the urgency to get it done and I'm optimistic that in the next few years we can pull it all together and at least have the first components built and then go from there, and I think this is an area frankly, of course, I feel like the U.S. should play a huge leadership in and our challenges, the need to get all the various regulatory bodies to be speaking the same language and moving in the same direction.

Q: So, I would be remiss if I didn't ask you when you peek in on New York State and see how REV has been playing out, what pleases you the most and what surprises you the most?

A: Well, what I'm really excited about New York is their ambition continues to grow and the desire to move in the leadership continues to be there. Their movement towards New York around storage is great. Offshore wind is fantastic. That people continue to drive the need to think about leadership in terms how in a northeastern country like this we need to look at electrification in order to achieve our goals and so recognizing that One, they need to continue to lead. Secondly, leadership is not enough; you need to put money behind it. Greenbank has been highly successful. And third is that the policy objectives and goals need to survive multiple administrations because you need that continuity that that's there.

Q: Are they, in fact?

A: Yeah, I think they are, I think they are. I think Governor Hochul has sort of upped the ante again and so I don't think there should be any question on anyone's mind that New York wants to lead in decarbonization and demonstrate that a northeastern state can use electrification and can use good policy to drive positive outcomes for consumers. I'm also extremely excited that they just announced part of their policy is to start looking at



what I thought was really important as we look at price and that no one in New York should pay more than six percent of their income for energy so recognizing that in order for the transition to occur successfully and maintain what one would call social license, two things need to happen: electricity needs to continue to be reliable, a system, energy needs to continue to be reliable and affordable because otherwise, nothing else will work and the fact that New York has seen this as a solutions that need to recognize that all this has to occur but that you can get there with the right touch in policies is fantastic.

Q: So, the last question I want to ask you, Audrey, is summing up, you've seen what has happened in New York State, what you wrote and how it's playing out. You've seen what a leading, innovative company like Google's doing on sustainability fronts. You've been on both sides of the Pacific now, you see the Australia experiment versus the U.S. experiments, and you're cognizant of everything that's happening around the world. Are you optimistic about dealing with climate change and getting our energy system where it needs to be?

A: Yeah, you know, Marty, I also have the edge and pleasure of also be sitting as a member of board of trustees of Rocky Mountain Institute and 60% of Rocky Mountain Institute's work is in the global south who is also rushing to try to make sure

they're transitioning well. We use the term there of 'applied hope' which I love and it sort of comes out of Amory Lovens thought processes of one is applied facts: always look at the facts. But also, we're at a point now of where we've crossed the Rubicon I think of recognizing that this is the direction we need to go for now we need to put together the systems that get us there so yes, it's going to be super hard but we've won a lot of the wars already and now we just need to get on with it, and I think that's...I'm very optimistic we'll get there and excited we'll get there and I don't think we have a choice so we have to, right?

Q: So, on that note, thank you very much, Audrey, for chatting with us. It's always a pleasure and let's check in again.

A: Okay. Thanks for the opportunity, Marty.

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