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Table of Experts: Renewable Energy - Disruptions in status quo are creating fantastic opportunities

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From a business standpoint, why should business leaders care about renewable energy and the issues surrounding the industry?

Jeff Irish, vice president and general manager of SunCommon: There are a lot of reasons. If you're a human being living through what we're going through right now, I think you ought

to be wondering if things are changing around us in a way that we ought to be doing something about. But even if you're not, change is coming. The electric grid is going to be completely re-engineered and refashioned over the next 20 years. There are forces basically out of any individual's control right now that are going to cause that to happen.

The cost of solar and wind energy has come down so far, and there's a groundswell of interest in reducing our carbon footprint



and carbon emissions .And there's a growing need for resilience, even if you don't believe in carbon footprint and carbon emissions. And for a business person, solar offers all sorts of solutions. Cost control, resiliency, energy independence, good return on investment.

Stuart Bailey, senior electrical engineer, LaBella: There's now a quantum change in focus with the recent switch in the federal administration, even if people do try to roll back on changes put forward at a federal and other state levels. We're now moving forward with a cycle that will push us with climate change into the adoption of renewable energy in many more parts of our lives. It's only good, logical business sense for leaders to join and jump on the bandwagon now.

I concur with Jeff that this is also something socially responsible we need to do. There are many companies and many businesses that have been doing this for years – in small ways, maybe, but every little bit helps to try and move into the realm of renewable energy and move away from our abundant dependence upon fossil fuels.

Why is there so much opposition to the development of solar installations?

Bailey: A lot of us think, well, why should there be? It seems like a natural choice in many of our minds. Apart from politics, and I don't really wish to go there, I think it can be brought down to planning and people not understanding. Part of the work we do at LaBella for SunCommon and many other companies is not only the development and implementation, it's also education. It's education to show that in being socially responsible from cradle to grave, we're actually looking at this and not saying, OK, we're putting our all into solar energy and 35 years down the line, we won't be around, so don't worry, someone else can deal with that. But we're looking at this as a holistic approach and there shouldn't be as much opposition. At the end of the day, of course, there are going to be impacts and effects. But we're looking at these way more closely than we did our traditional energy sources.

Irish: I've been doing this for 20 years, and I call it being on the bleeding edge. Getting started in 2002 in solar, I've had my share

of discussions at planning board meetings and zoning board meetings. Some of the misconceptions, are genuinely based on lack of familiarity and the fact that solar is so new. I've had to stand up and explain that no, there will not be trucks coming day and night carrying the solar energy away. You will be able to sit outside on your back porch and enjoy a quiet evening, despite the fact that there's a solar generating station 500,000 feet away. As time goes on and people start to see more and more of these installations, they will become more and more comfortable with them. But there's certainly a role in carefully citing them and citing them well, so that they are a positive part of the community.

Why does solar make sense for businesses?

Irish: For all the reasons we've discussed already. It's a socially responsible thing to do. Early on, it's a good return on investment if a business customer can site solar, and many businesses can. Some cannot. But if they can site solar, it's a five- to seven-year cash flow, positive investment. It can return 300% of the initial investment over a 25-year life. It can give you predictability over a large portion of your future energy costs. And those are the things that, generally, all business people will understand.

Can renewable energy sources replace our reliance on fossil fuel sources?

Bailey: I'm often asked this question, and I'd love to say yes. But in all honesty, I've become more pragmatic. I started off as a super-optimist in my younger years, believing we could cover the deserts with solar modules and power the whole globe. I've not become jaded, but I've become more of a realist. I use certain figures and say we can reduce our reliance an awful lot. But we won't move away totally from fossil fuels in the nearest future.

There's been numbers bandied about, and I think a global number was around 20%. So, what do we do additionally? The big question is, can we ever move totally away from fossil fuels? Can we move into a different area, what are the other real alternatives, such as, dare I mention this – a nuclear option. Can we move to fusion? I hope in future generations there will be a fusion option that will be absolutely, super safe to use as one other option in addition to increasing renewable energy. Renewable energy in the future will

be not just solar. it will be our ability to store as well, and that will really push up the numbers.

What does the future of stored renewable energy look like to you?

Irish: I think it's starting to become very clear. It's going to be lithium-ion batteries. Over the last 20 years we've done hundreds of storage systems and were using lead-acid. It became apparent about five years ago that that technology was going to be obsolete. Lithium-ion was emerging and it's being driven by electric vehicles. We sell the Tesla Powerwall battery, and it's the exact-same cells that are in their electric vehicles. As the electric vehicle industry drives down the cost of storage, it's going to increase naturally the ability to deploy storage into the residential, commercial and utility-scale energy generation spaces.

It's coming just in the nick of time because we've known for decades that solar alone, and probably even combined with wind, couldn't really penetrate more than about 5% of electricity generation. Otherwise, it starts to cause problems for the grid. That's because solar and wind are going to generate electricity when the weather and the sun allows them to, and they're not going to do it otherwise. That doesn't necessarily line up with when we want to use electricity. That's why storage is the answer. Storage combined with solar and wind is the winning combination, and it's coming just in the nick of time.

Can you give a few other examples of future trends of renewable energy?

Bailey: We're looking at mass energy storage systems. I see us looking into storage, but in different dimensions of not just containment in lithium-ion, but flow storage systems, and potentially other areas of pump gravity feed. We need to do that because we're reaching an extent on solar and wind. We're also looking, as everybody else is, at green hydrogen. Fuel cell development is already massively underway.

You'll see these being rolled out in a larger way, probably, in the next 10 years. The growth in hydrogen has its issues. But in looking at future trends, at the moment, the majority of them are still open.

It's just that wind and solar, along with backing them up using storage, have been the most developed.

What issues are currently restricting connection of substantial solar power to our electrical systems?

Bailey: Apart from planning and dealing with local, state and maybe federal issues, it's the infrastructure of our distribution and transmission systems. Taking an example of New York State, we've been proponents of solar power and moving ahead rapidly in line with the guidance of the state government as well as NYSERDA. Development has been fantastic, and many opportunities have been explored. The utilities though, are trying to upgrade their systems to make them more resilient, and that's a longer process. We've been successful with opportunities to introduce renewable energy downstream on feeders, however, there are issues on the distribution and transmission systems on the state's transmission network where we're beginning to get pockets or areas of the system which are becoming overloaded or soon will be.

Irish: Maybe we can put some simple numbers on it that most non-engineers could understand. Most of the lines or substations you see running down the road are roughly five megawatt feeders. And as soon as you start to put more than five megawatts say, of solar, under those feeders, you now have the potential that if the solar runs at full power at noon, it could start to cause reverse power flow up the feeder and back into the substation. And the electric grid was never designed for that. There's a need to redo that and to get that work done. It's a lot of work and it's going to cost a lot of money. And it's going to have to be done by utilities that are not used to that scale of change as fast as it needs to come.

Are you optimistic that that will happen?

Bailey: Oh, I have to remain optimistic. I'm in this business. I'm optimistic that there are ways to address this. Again, this is another situation where energy storage systems can make a difference. What we have to do is make the distribution system, and to an extent the transmission system, more resilient to stand up to this. What we need on a system, and what the electrical utility companies need, is a load to balance against the generation. But what we're doing as people move into renewable energy and, say,

energy efficiencies, we're talking to people about reducing their electrical load, which in a way is compounding the effects because load balances out against generation and that enables you to give a nice, balanced system of AC power. So I always remain optimistic. I'd like to see the utilities turn their minds now to really pushing forward with all of this. They're looking for cooperation from the state and the solar industry in meeting their goals as this transition gathers pace. It's a bigger, wider picture where we can all contribute greatly.

What technology person, group or story has you most excited for the future of sustainable energy in New York state?

Irish: I have two. The first one comes out of the state of New York. The Climate Leadership and Community Protection Act was absolutely groundbreaking leadership nationwide, almost globally. It is basically instructing the state to move to almost complete electrification within the career and lifetimes of all of us – at least I certainly hope so. That's huge. That came out about two years ago, around July of 2019. And I'm seeing activity all over the place that's being stimulated by that – at the grassroots level, the development level, investment level of business and industry in the state. There was a conference in Brooklyn about a month before the act was signed into law. Some representatives from state government stood up and they said, yeah, this is about resiliency. Yes, it's about climate change. But it's also about making New York the most attractive place to invest and do this work. And I think that was brilliant. And I think it's going to work out.

What's your second most exciting thing for you with regard to the future of sustainable energy?

Irish: It's actually a company that I think is really driving things in a strong way, and that's Tesla. They started out in electric vehicles a decade or so ago. They basically pioneered the space and the company still has, as of this summer, 71% share in electric vehicles. They almost created the industry, and now the entire auto industry is going to follow. And that's a wonderful thing. I think we're about to see electric vehicles taking off. Tesla's doing the same thing in storage, using those cells that they put in the electric vehicles, in residential Powerwall batteries and utility-scale batteries. And recently they started to do it with a thing called the Tesla solar roof,

which is basically a roofing shingle system where some of the shingles are active and generate power, and some of them do not. And those things are all going to involve leadership. Every home needs a roof. Every home does not need a solar system bolted onto it. But you have to have a roof. So, if you can make roofs that generate power, it's the end game when it comes to residential energy generation.

Are there particular institutions that are taking the lead?

Bailey: I'm excited to see the number of schools and colleges that are doing this as a way to educate as well. We're particularly pushing on with P-12, K-12 programs and supporting NYSERDA's efforts to talk about solar to groups. The Queensbury Union Free School District has had solar on their buildings for years. They're all about using this to reduce their consumption in buildings to try to achieve net zero through use of renewable energy. So not only are we helping and advocating them, we're also saying, well, this is part of what the state government wants to do with the STEAM and STEM programs. So use this as an education, a learning tool, to educate our younger people who then go home and speak to their parents and say, wow, we're going to have solar on our school. That just stimulates and catalyzes people into thinking more about using renewable energy and moving away from the standard gas or oil supply.

Can you tell us about your most difficult or challenging project, and maybe your most satisfying project?

Bailey: Some of the most challenging projects continue to be challenging. It's not really design as such, it's the ability to really develop a solar installation that will satisfy a planning board plus the area that it's located in. I would say that there are certain areas where we do everything we can to meet local planning laws, but we can get pushback. Again, I hop back on education and advising people that this isn't going to be an eyesore that we all have to open our minds a little bit wider than they already are and designers will implement many recommendations to blend arrays into the local environment.

We're all behind landfills as great reuse of land. But they come with their challenges in that there are steep slopes and there's limited

cover above the actual physical capping on top of the landfills. Those are just two examples. They have their physical challenges as much as anything, but they are moving rapidly as a great reuse of land.

Any particularly satisfying projects come to mind?

Bailey: A small one that I can recall recently was a development in Ontario County that was primarily for the use of an affordable housing association. It was a benefit not only for its reduction in carbon support of our renewable energy, but it was directly feeding into what the state's trying to do now in providing a cheaper energy source to affordable housing groups and disadvantaged communities or areas of low- to middle-income. That project went quite smoothly on our side for design, and the end product primarily benefited a group that needed lower energy costs as much as anybody else.

Irish: We've been pushing new products and implementing new products and new technologies for 20 years now. Every time we take something new that's come into the solar or storage space and successfully deploy it, it gives me excitement as an engineer and as a business person in seeing that we've now proven something that we can widely deploy.

There's a string of satisfying projects. But a couple of things that have happened in this last year as we started to deploy the Tesla Solar Roof, was the fact that these roofs don't look like solar systems that generate power. It's amazing. That is the type of product that's going to change the residential industry.

On the storage side, we have some projects going on now where we've run into this problem that Stuart and I talked about earlier, where even at the residential level, you can't put more solar onto the lines outside the home, because of the danger of back feeding the grid. And the utility can't change quick enough to allow us to do it. So we're actually starting to deploy solar systems with storage that are zero export, meaning they will not export to the grid. Instead, they'll just save up all that excess energy they make during the day, put it into batteries, and then run off the batteries until maybe 2:00, 3:00, 4:00 in the morning, whenever. It's completely harmless to the utility and doesn't require the utility to

make any changes at all. It's economically feasible and makes sense because of the innovation that's occurred in storage.

What is the commercial sector's place in the clean energy future?

Irish: The commercial sector in New York has struggled and continues to struggle a bit. When we're talking about this space of small businesses and in-between small businesses and then the larger community solar systems, we make a lot of systems that make sense for customers, but it's not easy given the current regulations that we're dealing with. I sit on a group called the Interconnection Policy Working Group with the Department of Public Service, and we're trying to push those issues. We should have a lot more commercial solar in New York. We need to have a lot more commercial solar. But it's going to take some regulatory change if we're going to catch up other states.

Bailey: One point that's come up is the ability to enable commercial properties or commercial groups to look forward to ways of being self-sustaining and almost generating their own electricity and use it. I'm not saying go totally off grid, but you use the grid as the reserve rather than the other way around and so you have solar and storage, to a bigger extent, to offset your consumption. We need to move into that area in a commercial scale.

Are there any developments we haven't talked about yet today that will enable us to enhance the use of renewable power sources?

Bailey: Based upon what everybody saw in the previous winter in Texas with the storms and going offline, can we move into developments of renewable energy where people have smart grid, micro-grid type systems – systems almost being self-contained and self-sustained. Whether they be solar or some form of wind and fuel cells, a combination of some of these parts that enable a group or community or a business to become resilient.

As much as we're trying to roll back or temper the effects of climate change, people need that resilience. Every time you see these effects, they're impacting water supply, heating supply and much more but it always has that element of electricity and energy.

Making ourselves resilient to it is part of the development of what we already see.

How does innovation drive this adaptation of these solar renewables?

Irish: Technologies are all starting to come together at a real inflection point. We've got solar and wind that are now cheaper ways to make electricity than coal or oil or natural gas. We've got energy storage, which has come down in costs and is now viable at the residential level, the utility scale, and everything in between. And that's only going to improve with the growth of EVs. And then we've got the digitization of everything. The Internet of Things is going to allow artificial intelligence to control the generation, the storage, the load, and make it all work instantaneously because that's how it has to work.

Here's the lesson I tell every young person: The next 10, 15 years are going to be as big for renewables as it was when the internet came and disrupted everything. When cell phones and smartphones came and disrupted things. The electrification of transportation, the electrification of heating and cooling. It all means disruption. It also means huge opportunity.

How can individuals and communities help to reduce the effects of climate change through the use of renewable energy and energy reduction? And what's in all that for us?

Bailey: If individuals can look to their own – not only use of renewable energy, but also their reduction in energy consumption – that's a great first step. I began in energy efficiency before renewable energy, and it was steamrolled into me that energy reduction is our main point. In our lifetime, we need to look at things we have done. Take lighting, for example. Most of us have been through the age of tungsten filament, we've all been through fluorescent. It wasn't that long ago that fluorescent was touted as being the finish to it all. And now we all live in the age of LED, an electronics-driven systems. We're partially reducing usage there, but now it can also include things like timing of use of your air conditioning.

Individuals can start at home and then drive that into the community. We already have great communities of advocates. From the local level, a lot of villages, towns and counties are really there. It's the communities and the individuals within the community that should implement something as simple as a couple of EV charging stations. There are many routes to go down.

You ask what's in it for us? Our overall reduction in carbon emissions and our reduction in energy should benefit everybody financially. At the end of the day, everybody looks at the immediate dollar signs. They don't look at it over its lifetime and lifecycle. Millions of people just believe it's the right thing to do for the planet and our future generations.

Irish: Communities can do everything they can to make it easy to deploy the systems. State government has a role in that as well. And as I said earlier, what's coming is going to be so big to the electric grid and to where we get our energy. It's going to be analogous to what happened to the computing industry when Apple introduced their computers in the late '70s, when IBM came out with their PC in November of '81, when AOL came out with their service in 1995, and when Apple came out with the iPhone in the mid 2000s. Those were huge disruptions that created fantastic opportunities. Sustainable energy is in the exact same spot right now. And it's going to be just as dramatic.

What one thing do you want to leave our audience with today concerning sustainable energy?

Irish: There is a gigantic period of disruption coming in, and a period of business opportunity, prosperity and opportunities for everybody. So let's get on them.

Bailey: It's dynamic, and it's not finished. And everybody can be involved with it. Everybody can contribute and we will reach better levels than we are at currently. We haven't been the best guardians in the past. And I think with sustainable energy, I see the younger generations contributing and bringing some really, really positive results through its use.

