Path to Microgrid Success

Pilots to Programs: Developing Programs and Executing Contracts for Win-Win Microgrid Projects

A Conversation with John Lemire
Director of Grid Management at North Carolina's Electric Cooperatives
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Q: Welcome to the Voice of Experience: Microgrids for Resiliency podcast. Voices of Experience is a US Department of Energy advanced grid research division initiative to capture the experiences, insights, and lessons learned from utilities at the forefront of implementing emerging technologies. This podcast captures the key points of a virtual discussion recently led by John Lemire who is Director of Grid Management for North Carolina's Electric Cooperatives. John is with us to talk about pilots to programs, developing programs and executing contracts for win-win microgrid projects. Hi, John.

A: Hi, Marty. Thanks for having me on.

Q: Our pleasure. We would like to talk about, really quickly here, two major projects you've been involved with: one the Ocracoke Island microgrid on the North Carolina Outer Banks which, my understanding is, got started in 2017-2018 followed quickly by the Butler Farms Initiative in 2018. Tell us about those projects and how you got them off the ground.

A: Sure. The Ocracoke Island is a barrier island off the Outer Banks of North Carolina served by Tideland Electric Membership Corporation. Ocracoke Island's remote location leaves it vulnerable during weather events and isolated from central power generation resources. The electric service is set on a

radio line that includes 4 voltage changes and 2 underground cables. It became operational in February of 2017 and was installed in partnership with Tideland EMC. Looking at our resources in the load and the vulnerabilities, we took the microgrid components which include a controller, solar panels, battery storage, interconnected thermostats, water heaters controllers, and diesel generation, and tied those together to make an active microgrid. It's supports better power reliability for residents and visitors to the island. As a resource, it can be called upon during times of peak demand and respond when electric service is disrupted from an upstream outage or weather event.

Q: John, give us a quick idea on-- is it the whole population of the island that's in this or is there a subset of the island?

A: Yeah, so the island itself, because of its remote location, the microgrid can serve the entire island. Depending on the time of year, whether it's the residents who are there year round or during the tourist season, obviously the amount of load that is present on the island varies. The microgrid is meant to carry the island in itself in entirety.

Q: The Butler Farm Initiative-- tell us what part of the state it involves, and there's an intriguing bio-gas element to that. Why don't you tell us about that?

A: Sure, so Butler Farms is in Lillington, North Carolina which is served by South River Electric Membership Corporation. Butler Farms is a finishing pork operation, and the farm had existing generation with solar panels, with bio-gas generation, and with diesel. Through this partnership, the North Carolina's electric cooperatives brought a battery and a microgrid controller. The idea is that the microgrid can serve the farm during times when the grid is unavailable, but the neat thing about it is that there are 28 homes within a boundary that, given the conditions, the microgrid can be dispatched by South River EMC and provide power to those 28 homes from the components of the microgrid.

Q: Now, you're with an organization that serves 26 co-ops and has a footprint in 93 of the state's 100 counties with roughly 1 million customers. Tell us how you developed these programs and went about executing contracts for something that I would assume you have not had much historical experience; it was a new effort for you.

A: North Carolina EMC is the wholesale power provider for the 26 member-owned cooperatives in the state of North Carolina. This was truly a partnership where, with the concepts of microgrids being new, we wanted to learn and we wanted to investigate and grow in our experience. Our board adopted the policies that allowed us to move forward and develop these microgrids. Partnering with the host distribution co-ops and looking for locations where customers were looking for resiliency or they were looking to expand their environmental footprint or just looking for these win-win use cases, and so that's how our two existing microgrids came about, and the three that we have under development are as a result of working with our member cooperatives and with their member consumers to find locations where microgrids would benefit the grid.

Q: Now, you and I were chatting, and give us a lay of the landscape. You've got some large utilities in your state, notably Duke and Dominion. Do they have many, many more microgrids, or are they also, would you say, comparably just getting started with this?

A: I would say they are getting started. You know, in my discussions with them, there are some research facilities that they built to learn how microgrids operate. We're starting to see the investor-owned utilities looking to develop microgrids and to make them part of their portfolio as well.

Q: What would you say, looking back on the 2 projects that you've gotten your feet wet on have been the most difficult, challenging, unforeseen hurdles that you had to clear getting these 2 projects

off the ground.

A: Yeah, so I think the main focus is communications, designing what your use cases look like, and then implementing those and then what the ongoing support for microgrids looks like after commissioning. You know, the engineering, there's a lot of good partnerships that we've formed to deal with the engineering and with the installation, but I think in treading new water and developing new systems that there are going to be lessons that you learn that help you to move forward and to look back and say, you know, we did really good here, but we can tweak this and we can make it effective going forward for a program.

Q: Just top of mind here is a question that I have that these are fairly new efforts in your state and probably in most states right now. Does that make for a costly learning experience here in terms of negotiating contracts, doing it the first time before there are really templates and historical precedents to refer to?

A: Yeah, that's a great question. I think the benefit that we had is that we had willing partners who understood that this was new territory, and so the contract negotiations did take some time, but I think we all got some value out of that. I think what the key is, especially because we're working with member consumers on the distribution co-ops, is to talk to them first and hear what it is that they want out of doing a microgrid project or what's important to them and then tailoring the contracts to meet their needs and to meet the needs of the North Carolina's electrical cooperatives.

Q: That's interesting. What's been your sense of how these member cooperatives, these 26 members of yours and the 2 specifically involved in Ocracoke and Butler Farms, how they've matured and grown and really transformed their relationship with the customer as they explore these new capabilities?

A: I think what's been amazing is that our member cooperatives both for the ones that are hosting our microgrids but also the

ones under development have really, as they've engaged with their member consumers, they've been listening out for opportunities. We've got another agriculture project where the customer wanted sustainability, and so we are building solar and storage on their property to meet their needs. We've got two residential microgrids, one that's more reliability and resiliency focused and one that is more environmentally-sustainable focused. Our members though, in conversations with these customers, heard what they were wanting to do, and they approached them and brought in the North Carolina's electrical cooperatives in this partnership, and we were able to tailor an offering and essentially develop these microgrid projects to meet their needs and, again, create a win-win for everybody.

Q: North Carolina is known in utility circles as a state with quite a bit of depth in engineering skills. You've got the research triangle there. You've got IOU utilities with a lot of engineering experience going way back. Has that made it easier, do you think, to bring these projects on, or do you think what you've learned and started could be replicable in just about any state?

A: I think both. I think we have some great partners here in North Carolina, as you mentioned, in the research triangle park. You know, we could not have done these projects without our partners. As we've learned and as we've continued to grow, there are other vendors that are coming into this space, and other companies are gaining experience. Part of our process is to learn, ourselves, so that we can grow but then to also document our lessons learned in our use cases and to share those with the other cooperatives and to share those with others. One of the reasons why we did this Voices of Experience was to talk through our lessons that we learned and to share those with others. I mean, that is one of the principles of a cooperative is education and teaching others.

Q: On that point, have you received a lot of queries from other utilities and co-ops around the country specifically tied to developing these microgrid programs and executing the

contracts?

A: We do. We talk to our peers all the time, and there are questions that they have on how did we develop our microgrid program and talking through the lessons learned just as much as we ask them and we learn from them on projects and developments where they might be ahead of what we're doing.

Q: You mentioned on the outset that beyond these two, what you have in your hip pocket now, there are 3 under development. Can you talk a little bit about the 3 and how it's going to take you into new challenges and new kinds of experiences?

A: Yeah, absolutely. The first project that we are in our final stages of construction is the Heron's Nest Project which is down at the coast which is on Brunswick EMC system. This is a sustainable neighborhood where the developer put in solar and storage at the front of the neighborhood, and we are bringing in a microgrid controller, we are going to be able to support that neighborhood in times when the grid might be unavailable. The builder is building these homes energy efficient and had already planned to put rooftop solar and smart thermostats and water heater controllers in, so again, this idea of a sustainable neighborhood in looking at green energy sources, bringing in a microgrid controller and the automation with the host co-op just seemed like a natural fit. We are expecting that to be in service at the middle of 2020. The next one is Rose Acre Farms which, again, is with Tideland EMC. They are a huge agriculture facility who have a sustainability goal. They have on-site, back-up diesel generation, but in looking for their sustainability goals with their supplier, we talked to them about putting solar plus storage on their property. We're working out the contract with them to help them meet their sustainability goals. We're going to bring in a microgrid controller as well so that we can use the solar and storage to support their facility which will also help optimize the diesel fuel costs that they have. We're hoping that that will be online by the end of the year. The final project that we're working on is a resilient neighborhood called Eagle Chase, and

that's with Wake EMC. Again, the builder was building this resilient neighborhood and is marketing it as a resilient neighborhood. Wake EMC is going to be bringing in two propane generators at the front of the neighborhood. The North Carolina co-ops are going to bring in a battery and a microgrid controller. Again, this brings the resilience aspect to this neighborhood so that, in the case of outages, the neighborhood can be self-sustaining and be powered off of the microgrid assets. We're hoping for this one to be in service the third quarter or fourth quarter of 2020.

Q: Great. John, really my last question is-- you've done two. You have three in development. Do you see this ramping up and gaining speed and seeing dozens being deployed, let's say, in the next five to ten years?

A: I think that that's a great question, and I think that I would love to see more microgrids to be developed. We recognize that microgrids are an important component of our energy tool kit. It allows us to work with our member co-ops to find these win-win opportunities to meet their members' needs. It's also an important educational resource, so looking to the future, we hope that there are other opportunities where these microgrids will fit in to the mix of what we're wanting to do.

Q: Great. Thanks for joining us today, John.

A: Thanks, Marty.

Q: Thank you for listening to the Voices of Experience: Microgrids for Resiliency podcast. For more information on the Voices of Experience initiative, please visit SmartGrid.gov. I am Marty Rosenberg, energy journalist and host of this series.