



ENERGY EVOLUTION

Solar, wind and demand for efficiency alter the power landscape.

The energy industry in the Carolinas is evolving rapidly. North Carolina has become a leader in the Southeast for solar energy. The grid is being modernized. Even the way buildings are designed and retrofitted is progressing to meet changing energy needs and requirements. Our round table participants are intimately familiar with the changes taking place in the energy business.



The discussion was moderated by David Doctor, president & CEO of E4 Carolinas. Support was provided by UNC Charlotte's Energy Production and Infrastructure Center (EPIC), Duke Energy Corp., SunEnergy1 and General Microcircuits Inc. UNC Charlotte's EPIC hosted the event. The transcript was edited for brevity and clarity.

THE CAROLINAS HAVE NEARLY 1,000 ENERGY COMPANIES OF ALL KINDS. IS THAT DIVERSITY A BLESSING OR A CURSE?

BOWMAN It is a great place to have a utility in an environment where you have so many players in the energy sector. Working with what we've been given here in North Carolina makes Duke Energy one of the leading utilities in the nation. We've got fabulous universities.

We have competing interests. I think that brings about innovation. We've got a broad manufacturing base that is focused on reliability and low-cost energy. We need to continue to focus on that, because in North Carolina, on a hot humid day we use a lot of energy in this state.

WHAT ARE SOME CHALLENGES, ESPECIALLY AS THE ENERGY INDUSTRY CHANGES TO INCLUDE RENEWABLES AND DISTRIBUTED SYSTEMS?

CHERRY We've seen some local governments question solar-energy installations — they're not sure about it. They have questions, and they don't know what it is. Not only do you have to have your eye on what's happening at the state level, but you also have to focus on the local level, because those folks are the ones that have the codes, and they have to talk to the neighbors. As we develop new technologies, like electric vehicles and energy-storage systems, that's going to be another wave of the same conversation we're seeing now at the local level.

NWADIKE SunEnergy has grown tremendously since its inception. However, we have seen areas where there has to be [more] growth. The [Trump solar panel] tariff affected us. It slowed down the developers building at that time.

ENERGY ROUND TABLE

**KENDAL BOWMAN**

vice president,
regulatory affairs,
Duke Energy Corp.,
Raleigh

**DIANE CHERRY**

strategic director,
North Carolina
Sustainable Energy
Association, Raleigh

**VIRGIL COX**

dean, engineering
and industrial
technologies, Gaston
College, Dallas

**DAVID DALTON**

president and CEO,
General
Microcircuits Inc.
(GMI-MFG),
 Mooresville

**MIKE MAZZOLA**

director,
UNC Charlotte's
Energy Production
and Infrastructure
Center (EPIC)

**MEGHAN MCDERMOTT**

co-owner,
architectural engineer,
High Performance
Building Solutions,
Charlotte

**LINDA NWADIKE**

project manager,
SunEnergy1,
 Mooresville

MAZZOLA We're doing all this stuff that is not optimal. It's not even close to optimal. How can we do this in a way that satisfies disparate interests in our society? In the Southeast, we have a lot of culture so we have to also be true to that as well. I think the public universities in the Southeast can and should think about those social and policy things from the standpoint of how we're going to grow it and make it work.

THERE HAVE BEEN SOME RECENT STUMBLES IN THE ENERGY INDUSTRY. IS THE INDUSTRY CONTRACTING IN THE CAROLINAS, OR EVOLVING?

BOWMAN I absolutely think it's an evolution. I don't think it's contracting. We still use lots of energy every day. I think we're getting more efficient about our usage, conservation and energy-efficiency programs, and the advances in technology. As technology evolves, the energy industry is going to evolve too. I think it's an exciting time to be in the energy industry. We're transforming as these game-changing technologies are developed. We saw the wave of solar in this state. We're now talking about battery storage and electric

vehicles. I think we're just getting started. It's an exciting time.

DALTON We basically have a grid out there that was built in the 20th century; we're now in the 21st century, and it needs to be totally revamped with today's digital technologies.

CHERRY There are a couple of things that are important. One is to make sure that policy and regulation keep up with change, because the states that are on the cutting edge for some of these industries have policies and regulations in place that recognize changes. The other thing is that we have a lot of large energy consumers that want to go 100% renewable. For example, the wind project in Pasquotank and in Perquimans counties that went to Amazon, that's 100% powered by the wind.

NWADIKE As the years go by, new technologies are coming up, more efficiency is coming up and we're going into energy storage as well. Adaptability is really the great word to utilize because we don't know what tomorrow will hold. We just have to adapt to it and keep moving forward.

WILL CHANGES CONTINUE AT THE SAME PACE?

MAZZOLA We want to transform the energy economy. We're not just adapting to some technology changes that are kind of cool. We want to change something much more fundamental to the human condition and the progress that we now enjoy. Others aspire to have that access and grow their economies and have the same kind of human condition that we enjoy.

If we're going to change the energy economy, we've got to make sure we don't screw it up because it's too crucial to where we have come as a species and where we want to go. Distributed generation is that transformational aspect. Energy storage is going to [facilitate] far greater penetration of renewable energy than is technically possible at this moment.

Politically [in places such as Germany], the policy is ahead of what can realistically be accomplished to have reliable electricity at an affordable price that keeps the economy moving. That's our biggest challenge in transforming the energy economy.

The solution is probably the hardest one I can imagine but also the most ex-

citing to work on from the standpoint of educators. It's going to happen with the adaptability and incredible innovation of the students that haven't even come to our institutions yet. We're going to do that through the most incredible evolution of electronics-based energy-management systems.

DALTON I've been in the business for 28 years, and the parts that we used 28 years ago had a life cycle of anywhere from 10 to 15 to 20 years. Products that we're now building probably have a life cycle of two to four years. That's how rapidly it's changed. It used to be that folks would develop the product and sell the product. Now, they're selling the solution. Our most successful customers are actually going to a larger entity, and they're finding out what the problem is and what the issue is. They're collaborating to come up with a solution. They're not trying to force their ideas.

I see innovation every single month in my operation. I never know what's going to walk through the door or come via email. There are a lot of bright minds out there. There are more to come. You've got to constantly be able to adapt.

BOWMAN I think that as we are transforming industry, we have to transform our policies and regulations to match. You don't want to end up in a situation where the cost becomes so exorbitant that everybody can't afford to pay for energy. I think you've got to keep up with your policy and regulation as you're transforming the industry.

CHERRY Customers want access to their data. Large client companies want to have 100% renewable, and people still want to have low-cost energy — and it has to be affordable, because we have an 18% poverty

level. All of that has to come together. How do you have a system that allows us to get there? You skate to where the puck is going to be. That's where I see policy and regulation moving.

MCDERMOTT One of the challenges, besides policy and regulation, is people need to understand that the way they build, coupled with the renewables, whether it's solar or wind together, is



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DAVID DALTON
General Microcircuits Inc.

what is going to get them to zero or lowering their energy usage. A lot of times we see people putting solar on a building that's horribly inefficient — they haven't updated it since 1960. They still have pneumatic controls. One of the challenges is getting them to under-

stand that they [need to] fix what they're using now and then add the renewable, whether it's solar or wind, onto it. But they need to fix the built environment before they add all this shiny new technology.

HOW ARE COMMUNITY COLLEGES KEEPING UP WITH CHANGES SUCH AS THE DEVELOPMENT OF BATTERIES, ELECTRIC CARS AND SOLAR?

COX We end up facing three different groups.

There are industrial people, who need to know what to do, when to do it, how to do it safely and why it's being done that way so that they can deal with the daily change. An industrial graduate has to be on focus, ready to hit the floor.

We have an engineering-technology track, who need to know the science and technology behind why it's being done [a certain] way so they can participate and communicate in words that mean things to other people. They have to be adaptable.

At the full engineering level, we have a track that's handled at the four-year institutions. You've got to be able to take disparate information which doesn't seem to connect, pull it together and make sense out of it. And for most engineers, to explain much of what's happening, that may involve simultaneous differential equations.

We've tried to set things up so that now the student starts in the industrial area and completes an associate degree. East Carolina and Appalachian State universities now have programs that will take those industrial-level programs and take them all the way to a bachelor's degree.

Part of our problem is that we're not getting enough students coming in who have the expectation

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DIANE CHERRY
NCSEA

of being able to get a job once they complete. Somewhere along the line, we're not connecting our industrial and mid-tech needs with the population that's available.

We try to keep our equipment as up-to-date as possible through donations from companies, and we try to create adaptability within our students. We make a change, oblige them to solve a problem and move on. Technology is changing so fast, we're not able to stay at the leading edge. We can prepare [students] to be ready for that when it drops in their lap — they've got the knowledge and skills to be able to keep up with it.

THE CAROLINAS HAS ONE OF THE LARGEST CONCENTRATIONS OF UNIVERSITIES ENGAGED IN ENERGY RESEARCH. DOES THE AREA GET THE RECOGNITION IT DESERVES?



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MAZZOLA It's difficult for me not to bump into somebody in the energy space who hasn't passed through Charlotte, because Duke Energy is headquartered here. And Duke Energy is the largest investor-owned utility in the country. Duke has built a great business and franchise here that provides leadership in many respects.

We have some great small businesses here that are path-breaking in certain key areas like remodernization. I've been meeting with those companies, because some of them have been spun out of EPIC or because of our great efforts to try to expand start-up opportunities here. In their current cohort, there is the largest number of energy startups, I think, in their history. They need support from larger companies. Our Duke friends have already taken up the challenge.

A large graphic featuring a photograph of a red brick building with a central white portico, likely a UNC Charlotte building. The sky is blue with some clouds. The EPIC logo is overlaid on the left side, and the UNC Charlotte logo is in the top right. Text is overlaid on the right side of the image.

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- Recycling 75% of N.C. produced coal byproducts
- Second state in the country for solar installations



Allowing those new companies to [gain] customers in the future is probably our biggest challenge. How do we do that?

BOWMAN We recently hosted a forum in Charlotte for local and diverse suppliers to come and engage with Duke Energy. As we start embracing grid modernization and hiring, whether it's line technicians or engineers or accountants, we want to be able to use those assets that are right here in the Carolinas. We want to hire the local and the diverse suppliers right here in North Carolina. We do want to reach out and engage with that great pool of resources in our state.

ARE THERE OPPORTUNITIES TO TAP INTO GLOBAL MARKETS? IS THE ENERGY INDUSTRY WORKING THE AVAILABLE CONDUITS?

CHERRY A lot of times it's daunting to figure out exactly where you want to go to make connections and where you could find a company that can make business deals with other members. Sometimes it's a little bit overwhelming, just to see all of the places that you could end up going. I think that's part of the issue — trying to sift through the volume of places and trying to find the ones that are the most fruitful.

DALTON We're very, very close to Latin America and to Africa. There's an opportunity if we go beyond the borders. Groups from other parts of the world have come here to Charlotte and Raleigh to meet. Folks are finding us. It's an opportunity to find collaboration. The other thing we have is infrastructure. North Carolina is poised. We understand the world is flat. There is a huge economy out there. We just have to take advantage of it. ■



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KENDAL BOWMAN
Duke Energy



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