

Keeping the
lights on with
dedicated LTE



ERICSSON

Southern Linc and Ericsson partner to build the first highly reliable dedicated LTE network in the United States

A case study of how Southern Linc, the wireless communications network backed by the strength and reliability of Southern Company, transitioned to a highly reliable LTE network while meeting strict security requirements

Introduction

Utilities face a dramatic business and technological transformation. Power, communications, transportation, infrastructure and even public safety have become interconnected and interdependent through the intelligent grid. To adapt and thrive, utilities need to examine their roles while ensuring their grids remain secure and reliable.

Most utilities have some sort of fixed network in place today. More and more of them are realizing that they can be more efficient and best positioned for the future, as well as serve their customers better, if they move to an LTE network. This case study examines a utility that came to that realization early—and, in fact, became the first in the United States to deploy a highly reliable LTE network.

About Southern Linc

Southern Linc, a wholly owned subsidiary of Southern Company (NYSE: SO), is an Atlanta-based regional wireless carrier offering network coverage in metro and rural areas of Alabama, Georgia, southeast Mississippi and northwest Florida. In 1996, Southern Company, a vertically integrated electric and gas company serving nine million customers, realized that it needed wireless communications across its electric utility footprint when responding to significant weather events.

The Southern Linc network was designed to provide continuous private communications throughout the electric utilities' operating areas, and was strengthened to perform during emergencies. Southern Linc went live with its network in 1996 and has been serving the voice needs of Southern Company's four local power companies ever since. The original Southern Linc network was a Motorola iDEN system bundling multiple communication options, including push-to-talk (PTT) two-way radio, cellular service, wireless Internet access, wireless data, and text and picture messaging, into one hand-held device.

Significantly, the Southern Linc wireless network is digital, covering approximately 127,000 square miles across the Southeast while conforming to utilities' stringent security requirements. There is no known scanner that can intercept communications over the Southern Linc network—a critical factor for many customers who must transmit confidential information using their Southern Linc wireless devices. The company's customer base is comprised of businesses, governments and consumers.





Responding to change

"We established the original Southern Linc network back in 1996 just in time for the Atlanta Olympics. And that network is still running today," says Southern Linc CEO Tami Barron. "For 22 years, it has served us very well. But as you can imagine, the network we originally established to provide push-to-talk services has morphed and evolved. Today, it now serves more than 20,000 significant SCADA devices that help control the electric grid in the Southeastern United States. The iDEN technology, which was a proprietary network from Motorola, is a narrowband technology, and it is really very limited in terms of the ability to meet the security requirements that are important in today's world."

The search for a better option

Rather than find workarounds or incremental improvements to their existing network, Barron and her team at Southern Linc decided to upgrade their network to something new and different. "In making the decision on what technology would replace our existing iDEN network," Barron recalls, "we evaluated numerous options. At the end of the day, it was a pretty clear choice that LTE was the platform that was going to be accepted and adopted internationally."

An LTE network promised to fulfill the requirements they needed in terms of bit rate, latency and coverage, could be deployed effectively in their large coverage footprint, and, best of all, could be built for mission-critical needs. Southern Linc would be converting tens of thousands of SCADA-type devices from the iDEN and Multiple Address Systems (MAS) networks, spread over more than 200,000 miles of transmission and distribution lines, with more than 3,700 substations. The ability to operate all of them securely was absolutely necessary.

Another consideration was Southern Linc's available spectrum. "It is critical that we maximize use of the spectrum available to us," noted CEO Barron. LTE technology allows more flexible channel sizes (1.4MHz and 3MHz) and could be deployed using Southern Linc's licensed spectrum in the 850MHz band.

Why Ericsson was the clear choice for Southern Linc

Southern Linc issued an RFP and evaluated several different vendors. "It's a very robust and rigorous process," says Barron. "And Ericsson was the one that shook out at the top for a few reasons." The fact that Ericsson could produce a turn-key product was the first factor that convinced the Southern Linc team. Another was that Ericsson had experience operating in a 1.4MHz environment—something few other candidates could say. Yet this was a very important skill, since the company would have to continue running its iDEN network for the three or four years during the transition to LTE. Ericsson also had proven background operating in an intelligent grid environment globally, also crucial to Southern Linc's business.

Alan McIntyre, Engineering and RAN Manager for Southern Linc, was particularly impressed by Ericsson's long history of supplying radios, with a very long mean time between failures, "That was very important because we are mounting the electronics on the tower, so we wanted a very reliable solution," McIntyre points out. Ericsson also offered both inter-chassis redundancy within each core node as well as geo-redundancy between the core networks in Birmingham and Atlanta.

Most of all, adds Barron, "We had confidence in Ericsson as a company—in Ericsson's name and brand—and felt we could rely on them to meet the needs of Southern Company and Southern Linc in building this network. We believed from a total cost perspective, with the abilities that Ericsson brought to the table, that it was the best solution for us."

Rollout and challenges

Working together with the customer, Ericsson replaced the iDEN network with a complete RAN system as well as with evolved packet cores. This ensured that Southern Linc had all the functionality of push-to-talk, cellular messaging and data. In addition, says McIntyre, "We're adding IMS so we have the ability to do voice over LTE, voice over Wi-Fi and messaging—both picture messaging and video messaging."

In Southern Linc's prior "life" in the iDEN world, everything was fully integrated, with Motorola supplying everything from the network to the application to the handsets. In the world of LTE, however, all the pieces are handled separately. "Ericsson has done a really good job at helping us figure out how to integrate those disparate pieces," Barron comments. Ericsson helped the company work with other vendors on handsets as well as the application for push-to-talk.

"We had quite a few challenges" in rolling out the new network, recounts McIntyre. The first was the narrow spectrum, forcing them to use a 1.4MHz channel. "To make it more unique with our spectrum," says McIntyre, "we have narrowband public safety licenses that are immediately below our band. We worked with Ericsson quite extensively to develop filtering technology both in the radio and in an external filter so that we would not interfere with public safety, which was very important. Ericsson's collaborative approach was great and we came out with a good solution."

From Ericsson's perspective, the Southern Linc project was also a change from its usual business with traditional service providers. "We approached it as we always do, with our expertise in wireless networks," says Amy

McCune, Head of Customer Unit Regional Carriers for Ericsson North America. "That is what Ericsson does as our core competence—we build wireless networks. We committed to build Southern Linc the best 3GPP LTE network we possibly could, to meet not only their wireless needs, but the added complexity of the utility regulations and standards."

"Ericsson actually learned a lot of lessons as part of the Southern Linc deployment," adds GS Sickand, Head of Technology, Customer Unit Regional Carriers for Ericsson North America. "We had a rocky start but we learned very quickly. We aligned with Southern Linc's requirements for a real utility deployment. If you spoke to them today, I think they would tell you that Ericsson knows how to deploy networks for utilities." Relying on an LTE-only network also presented a challenge for Southern Linc, especially on the VoLTE side. Ericsson also worked closely with Southern Linc to find devices that would work with their LTE-only network.

A third challenge, according to McIntyre, was in the very nature of any large construction project: They are usually slow out of the gate. They found that some service providers simply did not provide the quality they needed. Here, too, "Ericsson really came in and worked with us very collaboratively to address that," says McIntyre. Ericsson created a Southern Linc-specific training program for service providers.



After a groundbreaking achievement, what comes next?

Southern Linc has achieved a truly groundbreaking accomplishment in creating the first highly reliable LTE network in the United States. It marks Southern Linc as a leader. It also sets a new bar for the entire industry. Utility companies are now evaluating what they're going to do with their networks. LTE networks will enable them to be more efficient and cost effective, while serving their customers and their operating companies better. Ericsson's McCune asserts that "this is the first of what we believe will be many in the industry. We see ourselves as a leader in this space and excited to talk about the work we did with Southern Linc."

What comes next for Southern Linc and Southern Company in this LTE environment? LTE provides Southern Linc with a platform to significantly grow its business, especially in relation to the Internet of Things. Of course, continuing to support voice is important and critical—because when customers' lights go out, utilities want line crews rolling in without delay.

"A true partnership"

One of the cornerstones of Ericsson's approach to the Southern Linc LTE project, according to Ericsson's Amy McCune, is Ericsson's combination of technical expertise with a commitment to their customer. "We helped Southern Linc reduce complexity in their network and ensured that they were able to serve their customer, Southern Company, as well as external customers, in a much more efficient way.

"They have put in a tremendous amount of work to create the first operational highly reliable LTE network in the United States. We certainly see ourselves as an integral part of their success. The relationship has evolved to a true partnership in the best definition of the term," says McCune.

Barron echoes this sense of her company's relationship with Ericsson: "We are, first and foremost, part of an electric and gas company; we are not a traditional carrier model at all. Ericsson has done a really good job at helping Southern Linc embrace this new technology and understand the nuances of an LTE environment. Ericsson has helped us garner learnings, insights and strategic vision into where we're heading, from future uses of LTE to what 5G might look like in a utility environment."

Meeting expectations...and then some

Today, Southern Linc has devices controlling the electric grid on the network, working 24/7. "We really had a good test last September when Hurricane Irma went through the state of Georgia," recalls McIntyre. "The LTE network withstood the hurricane and its aftermath really well. It proved the design of the network and gave us assurance that we built a mission-critical network."

Southern Linc reports multiple benefits since the solution became available. Data speeds with iDEN's narrowband technology were very limited. LTE provides much more capability to run other applications than they ever had in the past. In addition, LTE will enable a wide variety of utility use cases from push-to-talk to grid operations to control and metering, all supported by LTE's security, reliability, resiliency, low latency, priority and preemption built into the network.

"The LTE network is a great platform from which we can grow and add functionality and feature sets," says McIntyre. "I look at LTE as a base, a foundation on which we can grow down the road."



Southern Linc's CEO Tami Barron concludes with even bigger ideas:

"We have a vision of being a utility of utilities. We now have truly significant core capacity, which we could leverage for other utilities who are situated similarly to Southern Company. And thanks to Ericsson, we have expertise in managing the smart grid using a wireless network that we can leverage for the benefit of all electric customers across the country. That's kind of a big vision of where we hope to head as Southern Linc, and I think Ericsson can help us move in that direction.

"If and when we get to a 5G environment, we're going to rely heavily on Ericsson to help us figure out what that looks like for us."

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York. www.ericsson.com