

FirstNet Tier II & III Utility / Electrical Cooperative Network Architecture, Planning and Auditing Recommendations

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The following response is written on behalf of Tri-County Electric Cooperative with the focus of highlighting the importance of electrical cooperatives across the United States participating as planning & auditing partners as well as becoming anchor tenants for the construction and use of the FirstNet Public Safety Broadband Network.

The following document highlights the current state of FirstNet, the opportunities for utilities / electrical cooperatives, technology and telecommunication solutions electrical cooperatives are undertaking right now that can be leveraged for the FirstNet architecture, and how electrical cooperatives in partnership with the FirstNet Board of Directors and State Governors can work together for statewide technology planning, auditing, and advocacy that represents a bottom up approach versus a top down planning approach.

FirstNet Overview

According to the 9/11 Commission Report, many of the first responders on September 11, 2001, lacked the ability to communicate with one another at the site in a situation where time was extremely limited. The performance of the nation's aging web of public safety networks, which often can't communicate with each other, is a matter of life and death.

More than a decade after that disaster, on February 17th 2012 Congress passed the "Payroll Tax Bill" formerly titled the Middle Class Tax Relief & Job Creation Act of 2012. Within the bill, Congress approved \$7 billion and the reallocation of 20 megahertz of spectrum airwave capacity, to try to deal with the inter-communication problem. The frequency is the 700 MHz "D" Block. The objective is to create a national public safety network capable of transmitting both voice and data, including videos and photos.

The organization created to manage and provide oversight of the 700 MHz "D" Block is FirstNet. FirstNet was created to serve as a not-for profit Public Safety Broadband Corporation. It's purpose is to oversee a nationwide network operation, tailored to meet the needs of local, state, Tribal, and Federal Public safety communities.

Unfortunately, major Telecommunication providers such as AT&T, Verizon, Sprint, T-Mobile, etc. provide basic connectivity only to public safety and utilities, yet prioritization of services is non-existent. FirstNet has recognized that now is the time to development a United States public safety and utilities telecommunications network that is independent of the traditional carriers. This new network will create true interoperability as well as protect the United States Utility Grid infrastructure that is dependent upon telecommunications.

Through the use of the newly released 700 MHz "D" Block in the United States and the creation of FirstNet public safety agencies, utilities and municipalities across the United States have a limited two year opportunity to create various types of 4G LTE statewide unified migration strategies. Such telecommunication infrastructure enables public safety agencies, utilities, and municipalities, to use various technologies such as fixed and wireless high-speed networks to ensure prioritization and interoperability of services. Utilities will be able to use such infrastructure for AMI, distribution automation, workforce mobility, LMR, connectivity, security, etc.

Through the creation of FirstNet, public safety agencies, utilities, and municipalities have been given access to the 700 MHz "D" block. This will allow the creation of an innovative / best practices development environment, where best of breed technology solutions are created. Such an environment allows public safety agencies / utilities the ability to create unique applications for their own internal use, while at the same time providing a platform to share such apps and best practices across the United States.

Current State of FirstNet

FirstNet will be in charge of designing, building and operating a single nationwide network in collaboration with a private sector operator that will be chosen through a competitive bidding process. The network must eventually operate on a break-even basis by charging public safety agencies enough money to cover ongoing expenses.

Congress inserted an opt out clause in the public safety portion of the bill for states that demonstrate their own ability to build a public safety network and connect it to the national network. To ensure interoperability of these networks, the bill creates an FCC technical advisory board to come up with interoperability standards. States that choose to build their own public safety networks can apply for grants if they can show that the networks meet the FCC's interoperability standards.

States will face difficult, time-sensitive questions in the months ahead about whether to allow FirstNet to build and operate the network on their behalf, or instead use a provision that allows them to opt out and build and operate their own portion of the national network while adhering to the federal standards set by FirstNet.

After FirstNet chooses a private sector operator, it will develop a blueprint and determine funding levels necessary to complete the segment of the national network to be housed within each state.

FirstNet Statewide Opt Out Provision

After receiving this information, the governor of each state will have 90 days to decide whether to opt out and take responsibility for building their own network, or to allow FirstNet to build the network using promised funding levels. States that opt out will have to demonstrate their ability to comply with a host of technical requirements and will receive less funding for constructing the network—and no funding for operating and maintaining it. They will also have to demonstrate technical and operational know-how and adequate funding capacity in order to secure a lease of the allocated spectrum.

There are concerns regarding the ultimate price tag of building, operating and maintaining the network, and who will bear any excess costs. The plan relies upon the assumption that the national network will be able to lean heavily on existing public and commercial infrastructure. Private providers will be incentivized through an agreement that allows FirstNet to lease excess network capacity to companies that partner with it to deploy the network.

Public and commercial infrastructure includes utilities across the United States, especially rural cooperatives in Tier II & III markets. Within the FirstNet Charter utility infrastructure, whether already existing and/or currently being built can be used as carrier infrastructure. Such entities are in a position to receive revenue for the use of their networks whether it is used for backhaul, last mile and/or co-location on existing towers and/or transmission / distribution poles.

Private providers that will be incentivized to fill in the gaps, should include Tier II & III utilities who are already in the process of upgrading and/or considering upgrading their telecommunication infrastructure and/or building modern 4G telecommunication networks for Grid Optimization, as well as providing broadband services to end-users as either a wholesaler to local exchange carriers, or direct to the consumer as a retailer in areas where there is a lack of broadband connectivity across rural America.

Utilities need to become advocates as to how they will participate in the nationwide build out, whether or not they accept federal funding as utilities existing telecommunications infrastructure can be used as part of the national network. Such infrastructure will be considered carrier services for the FirstNet network. Utilities can provide their infrastructure to the public safety network, yet in order for such infrastructure to be considered and used, it is imperative that utilities and cooperatives best interests are represented to Governors. Such representation can be provided by utilities and cooperatives who will represent the voice of Governors to Tier II & III utilities and cooperatives, as well as being the voice to Governors concerning their wants, needs and existing infrastructure that can be used for the national network versus having to build the entire network from scratch.

The Opportunity for Utilities

Utilities in the United States, especially in Tier II & III markets need to become advocates across their state and with their Governors on how they believe FirstNet should be built in their coverage areas, as well as how their infrastructure can be used. Within utilities, coverage areas awareness of FirstNet must be created to start building coalitions and partnerships as such entities join forces to ensure best of breed networks are built in their backyards.

There are several recommendations for utilities to consider regarding implementing telecommunications infrastructure right now for Grid Optimization that can be used later for FirstNet. There are also steps to be undertaken to create a coalition of local, state, tribal and federal stakeholders to gain support of other utilities in their own and surrounding States and to join forces to build the FirstNet network together.

Technology Steps

The first step is building high-speed wireless infrastructure throughout a utility coverage area through a combination of Point-to-Point and/or Point-to-Multipoint Microwave backhaul using both licensed and unlicensed spectrum in areas where fiber optics does not exist. Backhaul is the foundational key and first step to building a interoperable nationwide public safety network. Tri-County Electric Cooperative is building such as solution right now. Electrical cooperatives across the United States are also the key to achieving 99% of the total landmass.

The second step is deploying LTE (Long Term Evolution – 4G) as a last mile solution tied into the above-mentioned Point-to-Point Microwave and/or Point-to-Multipoint backhaul networks FirstNet will need to construction. Long Term Evolution (LTE) technology is the platform being used for the FirstNet network. Utilities can build LTE infrastructure for its own needs, in addition to WiMAX and/or WiFi networks that may have been built and/or are pre-existing. Utilities will be in a position to offer LTE services to public safety agencies in their coverage area that might not be able to afford building their own network.

It is important to understand LTE 700 MHz “D” Block being used by FirstNet is considered the last mile and can only be used by primary and secondary emergency responders. In order for last mile connectivity to work there needs to be a backhaul network in place. The backhaul network can consist of fiber optics and/or microwave point-to-point or and/or point-to-multipoint technology. Backhaul is required for all telecommunication networks regardless of FirstNet. As discussed earlier in this paper, utilities that are upgrading their existing telecommunications backhaul infrastructure and/or already have IP backhaul in place can make their networks available to FirstNet and in turn will generate revenue for utilities.

Also WiMAX and WiFi networks tied into high speed back backhaul can be used to provide last mile connectivity right now for utilities own internal use as well as provide community anchor tenets such as education, healthcare, municipal, business and consumer users broadband services. Doing so represents an immediate ROI for building or leveraging existing networks. As discussed earlier in this paper, the FirstNet 700 MHz “D” Block last mile frequency at this point cannot be used by such community anchor tenets other than the utilities own internal needs, thus making the case why WiMAX and/or WiFi networks in tandem with the FirstNet LTE 700 MHz “D” Block networks can work together versus utilities believing they need to chose one or the other. In conclusion, utilities are in a position to use both non-FirstNet networks and the FirstNet network together to provide wireless broadband across their coverage areas to generate revenue.

In the past Tri-County Electric, as did all utility / electrical cooperative providers, were forced under market demands to augment their power distribution model with the risk of advanced telecommunication platforms such as T1s, microwave, 3G Cellular, WiMax and now LTE. These platforms immediately began to challenge and burden the overall business objective of providing power with unavoidable higher cost of communication deployment's; plus the introduction of uncontrollable technology curves; and the requirement for high-salaried engineers that really have nothing to do with power. With the introduction of the State's PSBN now presents the opportunity for Tri-County Electric, as it does for all power Utilities, the chance to merge its communication needs with

one single, private, broadband provider that can administered to the direct needs of all that ride on its airwaves.

The concept of out-sourcing the communication needs of the Utilities is not new. Such outsourcing strategies have been tried in the past with commercial carriers, and although the commercial carriers are in the business of telecommunication specifically, they do not have the same alignment of business philosophies. In short, it's not only that the technical aspects have to integrate and interoperate, but the entire ecosystem of the business case has to align. In this case the carriers are in the business of selling subscriber based services through their telecommunication networks; where as an Electric Co-op is, primarily, only using its telecommunication platform to support its primary business objective of selling power. Thus, it has been the tradition that such relationships, although started with good intentions, end with utter disgrace or chaos where one part is reaping the benefits over another.

Somewhere along the way the Utility market realized it had to build a private network to sustain its own requirements of providing power, but now unforeseen events are limiting that strategy as well. With the shortage of spectrum the Utilities, as are others in the vertical markets, are being forced to consider alternatives, but reality is starting to set in that the market forces are against them and that the expenditures of the past, to sustain their own private communication needs, will increase dramatically across the board. These new platforms are so complex that they require a business case in itself to achieve suitable results. But an opportunity presents itself... the State Public Safety Broadband Network.

The State PSBN is only a sub-set of the much larger National Public Safety Broadband Network. This network has the business philosophies that align perfectly with those of the Utilities market. In essence it's not about sustaining subscriber on the network to generate revenue; it's about sustaining a vital lifeline of critical communications to protect critical assets of our great nation – one of those assets being our electrical grid.

The State has been mandated by the Federal Government to use LTE (Long Term Evolution) broadband access as its primary tool for communications for Public Safety. The Federal Government's decision stems from the alignment, and necessity, for the Public Safety Broadband Network to use consumer based commercial carrier technology that is off-the shelf capable and that has a proven track record with a sustained foreseeable future. This technology has the potential to ultimately replace all known wireless platforms and will cover 99% of the geographic landmass of the United States. It will also be the primary tool for First Responder communications.

Since the introduction of this effort there are those that pursue the hope that because this platform aligns with the commercial carrier market, which is deploying the exact same technology, that it would somehow provide an advantage to building the Nations Public Safety Broadband Network. But, given the nature of the technical hardening requirements, and the federal requirement of "self-funding" capability, it is becoming infeasible for the carriers to sustain a viable business model of revenue collection. Thus the same issue that the Utilities faced in the past, that of alignment of business objectives, still presents an unwinnable situation today...and for the foreseeable future. The only viable solution is a private solution. This is exactly what someone was thinking when they originally put the legislation together to build a separate broadband network for Public Safety.

Tri-County Electric Cooperative has similar demands in its requirement for broadband technology and it also has an opportunity before them. It's inherent that such technology must support, for the long-term, its deployment of sub-station and electrification communications; to include it's mandated SMART Metering program by the Department of Energy. The original intent of the Utilities Industry was to utilize a broadband technology that was prevalent, and being pushed by industry vendors, as a viable solution that meets those demands. In the more recent past the technologies of 4G and WiMax were being advertised by the vendors to all of the Utility market as the technology that will win the broadband market over.

As per the requirements for FirstNet it must cover 99% of the geographic landmass of the United States (including 6 territories), which equates down to 99% of Oklahoma as well. In order for the FirstNet to achieve such coverage it will be essential to utilize as many internal State resources as

it possibly can. Tri-County Electric Cooperative desires to become a poster child for all cooperatives across the United States as their FirstNet business case and technology roadmap that was recently created can become the ideal model. It is recommended that the FirstNet Board of Directors conduct several pilot projects, as Tri-County Electric Cooperative would like to become the first pilot project for United States cooperatives. Tri-County Electric Cooperatives unique location and coverage area has many of the characteristics that represent what the majority of electrical cooperatives will have to face in network design and buildout in respect to population and rural areas.

Building such a solution and pilot project and/or utilizing already existing telecommunication infrastructure, will allow utilities the ability to use advanced telecommunication infrastructure for their own needs, i.e. AMI, Distribution Automation, Substation Automation, Workforce Mobility, Cyber Security, Physical Security, etc. and business operations. It will also provide the ability to potentially generate income by allowing utility members to have access to high-speed connectivity versus using third party telecommunications providers who either offer limited speed Internet accesses and/or might not be able to offer high-speed connectivity in areas where there is no wireless connectivity due to being located in a remote areas. Revenue can also be immediately realized by offering backhaul connectivity to wireless telecommunications carriers who require such capacity.

In conclusion, utilities are faced with three considerations, regardless of technology considerations, as to whether or not they should start building their telecommunications infrastructure right now or wait. Consideration one is enhancing and/or building their telecommunications backhaul networks right now. Consideration two is building last mile connectivity whether unlicensed and/or licensed spectrum using frequencies such as the 2.5 GHz right now in conjunction with consideration one, with the ability to eventually migrate to the "D" Block. Consideration three is using the 700 MHz "D" block through FirstNet when it is made available for last mile connectivity, yet the spectrum can only be used by primary and secondary emergency responders and still requires backhaul connectivity.

There are also pro's and con's to consider. Utilities who wait and do not become FirstNet advocates will be told how to use limited funding in two years if there is any money available. Utilities who do not wait and start building their telecommunication infrastructure right now and become FirstNet advocates will be able to build their telecommunication networks tailored to their unique needs as well as create an immediate ROI by making such networks available to FirstNet in two years as well as generating revenue immediately from other entities within their coverage areas.

Advocacy Recommendations

It is the responsibility of utilities to educate and encourage collaboration among first and secondary responder policy makers and practitioners, to create the support of building the FirstNet network together across every state. It is critical to inform, educate and consult with policy makers and practitioners in support of statewide interoperability FirstNet initiatives. This includes applicable Federal and State initiatives, mandates, requirements, guidelines and efforts related to interoperable communications. It is also critical to foster collaboration among disparate Federal, State and local partners.

Outreach Tactics

To accomplish the goals of this plan, Local, State, Tribal and Federal stakeholders must proactively employ tactics that will most effectively communicate fundamental messages and information as follows:

Meetings and Gatherings – Federal, Regional and Statewide meetings, conferences, workshops, exercises and other collaborative events allow organizers to share information about the benefit of, and the methods that can be used to achieve, interoperable communications. These occurrences must be promoted to appropriate stakeholders in order to encourage attendance and participation. Likewise, attendance from a diverse group is needed to ensure that stakeholders of all disciplines and from various organizations are receiving critical information to support their efforts.

Traveling to communities and meeting with stakeholders (both large and small, urban and rural) as well as Federal & State Meetings as well as interacting with Federal and State Agencies, including

tribal nations is one of the best ways to understand the challenges facing the United States diverse jurisdictions in their efforts to advance interoperable communications.

Making Personal Contact - One-on-one and follow-up meetings with interested parties who may benefit from interoperable communications are also useful tactics for communicating information among stakeholders. Individuals may also be contacted through telephone calls in particular, to handle preliminary discussions prior to travel to remote areas.

Utilizing Electronic Resources - Electronic tools should be utilized to reach large and distant audiences whenever possible. Electronic contact methods such as email and email distribution lists should be readily employed, and Internet resources—websites, blogs and electronic bulletin boards—should be employed as instruments for disseminating information.

States should begin updating their communications plans to incorporate broadband technologies and ensure that statewide interoperability governing boards include the appropriate state and local representatives as well as partnering with utilities, cooperatives and local exchange carriers. Broadband technologies are different in many ways from traditional public safety radio communications and offer new opportunities. For instance, states may be able to leverage other broadband initiatives under the purview of chief information officers (CIOs) for public safety purposes. In the coming weeks, the NGA Center for Best Practices will announce plans to provide states with technical assistance surrounding implementation of public safety broadband.

Next Steps & Recommendations

Tri-County Electric Cooperative is ready to serve the FirstNet Board of Directors. In addition, Jack Perkins, CEO of Tri-County Electric Cooperative has indicated his desire to serve as a potential FirstNet Advisory Board Member that could potentially represent the voice of electrical cooperatives across the United States.

Tri-County Electric Cooperative, with William Hadala serving as Telecommunication Subject Matter Expert and Project Manager / Leader, has begun constructing the Tri-County Electric Cooperative advanced telecommunication network as outline in this response as well as started the process of interacting with the State of Oklahoma and various federal, state, local and tribal nation communities in respect to its participation with FirstNet. Over the next few months Tri-County Electric Cooperatives FirstNet outreach tactics will expand across the United States to enlist the participation of other electric cooperatives.

It is also recommended that Tri-County Electric Cooperatives FirstNet planning activities should be reimbursed out of the \$135 million dollars allocated to the State. It is also recommended that if other electrical cooperatives join forces with Tri-County Electric Cooperative's or desire to participate with FirstNet individually on their own, that all FirstNet planning, auditing and advocacy activity fees that are incurred should also be reimbursed. Such FirstNet / electric cooperative planning activities represent a ground up approach that should be much appreciated by State Governors for their own Statewide FirstNet planning process in order to capture the true needs of the State versus a typical top down planning approach.

Now is the time for utilities to act. If not now, then when...