TECA
Tennessee Electric Cooperative Association
Your Touchstone Energy® Partner

October 21, 2015

Senator Mark Norris
Chairman
Tennessee Advisory Commission on Intergovernmental Relations
226 Capitol Boulevard Building
Suite 508
Nashville, TN 37243

Dear Mr. Chairman,

Please find enclosed a memorandum in regards to the study titled "Development and Deployment of Broadband." It is our hope that this information aids both the staff and members of the Commission as they work to complete the study of this important topic.

TECA is the service organization representing all the member-owned and cooperatively organized electric utilities in Tennessee. With over 86,000 miles of electric lines spanning approximately 75% of the landmass of the state, Tennessee's electric co-ops understand the requirements of building and maintaining wired infrastructure across densely and sparsely populated territories alike.

We look forward to helping the Commission understand this complex topic, and make policy recommendations that will improve the quality of life of rural Tennesseans.

Yours most truly,

David Callis
Executive Vice President and General Manager

Enclosures

DC:mk

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TECA Tennessee Electric Cooperative Association
Your Touchstone Energy® Partner

# MEMORANDUM

To: Tennessee Advisory Commission on Intergovernmental Relations

From: Tennessee Electric Cooperative Association

Date: October 21, 2015

Re: TACIR Study – "Development and Deployment of Broadband"

The Tennessee Electric Cooperative Association is pleased to provide the following information for the consideration of the Tennessee Advisory Commission on Intergovernmental Relations as a part of its study on the Development and Deployment of Broadband in Tennessee.

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## I. Introduction

The Tennessee Electric Cooperative Association ("TECA") is the statewide service organization dedicated to representing the interests of cooperative electric utilities. TECA's membership[1] includes the 22 privately owned, not-for-profit rural electric cooperatives that provide electric energy and related services to approximately 2 million people across roughly 75% of the landmass of the state.

Electric cooperatives were formed to provide reliable electric service to their member-owners at the lowest reasonable cost and are an integral part of the infrastructure fabric of our State. Electric cooperatives are privately owned, not-for-profit utilities owned by the consumers they serve. They are democratically governed and guided by a set of internationally recognized principles that foster inclusiveness and encourage concern for the community.[2] They have no stockholders or investors. Members of the community, who are chosen by their fellow co-op members in open elections, serve on boards of directors that set the co-ops' policies. In every sense, electric cooperatives represent the best interests of their local communities.

Electric cooperatives' need for broadband services is driven primarily by two purposes:

First, system operational needs and adoption of new technologies (often referred to as the Smart Grid) have led to increased need for robust communications facilities. In fact, the rural nature of co-ops across the nation has driven them to become leaders in deploying advanced communication and automation technologies to improve service, decrease outages, and help to control electricity costs for members. As the Federal Energy Regulatory Commission (FERC) found in its 2012 survey, co-ops lead the industry in the penetration of advanced meter infrastructure (AMI).[3] These advancements result in reduced costs (resulting in lower operational costs) and reduced outage times, both of which have immediate and tangible impact to the communities we serve. The ability to capitalize on the benefits of smart grid advancements, however, is dependent on excellent communications networks allowing two-way communications.

Second, in recent years a number of electric cooperatives in other parts of the United States have expanded their operations to provide voice, video and broadband services to their communities one of three ways: either directly, through wholly owned subsidiaries, or in partnership with third parties. In Tennessee, state laws restrict an electric cooperative's ability to provide these types of services. Therefore, electric cooperative investment in communications facilities has been generally limited to interconnection of facilities and internal communications needs.

[1] TECA's membership additionally includes Fayetteville Public Utilities as well as the North Georgia Electric Membership Corporation
[2] http://www.nreca.coop/about-electric-cooperatives/seven-cooperative-principles/
[3] http://www.ferc.gov/industries/electric/indus-act/demand-response/2012/survey.asp

## II. Overview

A map detailing the approximate footprint of the 22 electric cooperatives in Tennessee is included with this memo as Appendix Item Number One.

Electric cooperatives are important Tennessee corporate citizens that provide critical infrastructure while maintaining a service-focused approach to their work. All cooperatives are rooted in seven basic principles that guide every facet of a co-op's existence[4]:

1. Voluntary and Open Membership. Cooperatives are voluntary organizations open all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination.
2. Democratic Member Control. Cooperatives are democratic organizations controlled by their members (one member, one vote), who actively participate in setting policies and making decisions. The elected representatives are accountable to the membership.
3. Members' Economic Participation. Members contribute equally to, and democratically control, the capital of their cooperative.
4. Autonomy and Independence. Cooperatives are autonomous, self-help organizations controlled by their members.
5. Education, Training, and Information. Cooperatives provide education and training for their members, elected representatives, managers, and employees so that they can contribute effectively to the development of their cooperatives.
6. Cooperation among Cooperatives. Cooperatives serve their members most effectively by working together through local, national, regional, and international structures.
7. Concern for Community. While focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members.

Some key facts and statistics about Tennessee's electric cooperatives include:

- Over $4 billion of current investment in electric plant
- Over 86,000 miles of electric line in service
- 99.96% service reliability, even with outages caused by tornadoes, ice storms, and other extreme weather events
- Over 2600 employees across the state
- More than $63 million per year paid in ad valorem taxes
- Provide primary funding for economic development associations, programs, and essential incentives

[4] http://www.nreca.coop/about-electric-cooperatives/seven-cooperative-principles/

## III. History

The lack of broadband service in rural America today has a number of similarities to the unavailability of electricity to rural America in the 1930s and 1940s. Then, as now, the business case for capital-intensive investment in wired networks serving sparsely populated areas was difficult to make for a shareholder-driven company. When potential customer density was low, the payback period for building the infrastructure required to serve customers was simply too long to justify the initial capital investment. Then, as now, rural populations were being left behind as a revolutionary technological development changed the very nature of society and the economy all around them.

In response, rural electric cooperatives were created in the 1930s to bridge the electricity divide between urban and rural areas. In what has clearly been the most successful public-private partnership(s) in history, the Federal government incentivized the development of privately owned organizations whose purpose was rooted solely in providing a public service. Longer payback periods on initial infrastructure builds were acceptable due to the service-nature of the cooperative and the lack of a need to return dividends or profits to shareholders. As the electric cooperative industry began to grow and mature, capital became easier to acquire due to the extremely low default rates of loans made to co-ops. To this day, financial instruments connected to electric cooperative borrowing are viewed as some of the safest investments available to an investor.

This experiment proved to be extremely successful as universal electrification was accomplished completely and is now an expectation across even the most remote areas of our landscape. Today, the response of policymakers to the challenge of developing universal broadband has taken a different form, and universal access continues to elude our society.

However, electric cooperatives are positioned to be key players in bridging the digital divide. Deployment models that guarantee all Americans have access to excellent broadband service and the benefits it brings – i.e., telemedicine, remote education, small business creation and community-oriented economic development – are needed to avoid assigning second-class status to Tennessee's rural communities.

## IV. Electric Cooperative Needs for Communications

Consumption of electricity is unique from every other energy source we utilize due to one very basic technical limitation: Man lacks the ability to store electricity in utility-scale quantity. Coupled with the fact that electric energy is transmitted at practically the speed of light, electric utilities are required generate, transmit, and distribute electricity at the *exact* moment it is required. Stated differently, the electrons that power your home or business are being "manufactured" at the very same moment that you are consuming them.

Further, the power plants, transmission lines, substations, distribution lines, transformers, and other mechanical equipment that make up the electric grid are essentially all interconnected. An appropriate analogy would be that the power grid is like the world's largest jigsaw puzzle made up of millions of pieces, and if any single one of those pieces is not properly in place, the entire puzzle is incomplete.

In fact, the North American electric grid is sometimes referred to as the largest, most complex machine ever constructed by man.[5] The National Academy of Engineering ranked electrification the greatest engineering achievement of the 20th century (above other advancements such as the automobile, computers, telephone, and the Internet)[6] and summarized the importance of electrification as follows:

> *We mostly take the ready availability of electricity for granted, turning off the radio alarm in the morning, switching on the bedside lamp, pouring a cup of coffee from the machine that automatically started brewing it a few minutes before the alarm went off, tuning in to the morning news show on TV. Yet without the building of myriad power plants and the stringing of countless miles of wire, without the constant monitoring of the electric power grid and the juggling of supply and demand, that ready surge of electrons would not exist—nor would the modern world as we know it. Without a reliable supply of electricity, we couldn't use the lightweight, powerful electric motors that make elevators possible; without elevators, skyscrapers wouldn't exist—and the dramatic skylines of the world's major metropolises would be considerably more modest. Without a reliable supply of electricity, kidney dialysis machines and other life support equipment would be useless to the many patients who depend on them. Without electricity to power traffic lights, the commute to and from work would be mayhem—or maybe not. Without electricity to power automobile factories, we wouldn't have streets and highways full of automobiles either. Indeed, more than half the engineering achievements celebrated in this book would not have been possible without the widespread electrification that occurred in the 20th century, not only in the United States but also in other industrialized nations around the world.*[7]

Widespread availability of electricity is the achievement that made every other advancement in our quality of life possible — it is the linchpin of modern society. Until

[5] http://www.smithsonianmag.com/videos/category/history/the-largest-machine-ever-built/?no-ist#ooid=U3NW5zYjr-7fxKwl8OCaOR9JGybVd5Kg
[6] http://www.greatachievements.org
[7] http://www.greatachievements.org/?id=2988

recent years, this enormous machine largely operated on technology developed nearly 100 years ago.

While the grid is effective, it is often inefficient. Operation of the grid requires tremendous sums of human capital (along with the resulting risks of human error) and relies heavily on human intervention to avoid failures. Further, by the time electric energy is consumed, there are often tremendous losses when comparing the total quantity of energy produced to the amount consumed by rate-paying end-users. These losses occur due to the parasitic nature of necessary equipment, inefficient circuit design, construction errors, aging of equipment, wildlife- and weather-created disturbances in transmission and distribution circuits, and use patterns by end-use consumers — among many other causes.

The basic system of generation, transmission, and distribution of electric energy has not changed much, except in scale, until recently. Advancements in the power and size of computing and communications technology has developed new, increased, and advanced techniques to gather data and operate the grid more effectively and efficiently.

But much like electricity itself underpinning so much of modern society, the underpinning technology for the modernization of the electric grid[8] is telecommunications.

Included in this memorandum's Appendix as Item Number Two is a white paper titled "Telecommunications: the Linchpin for Smart Grid Success,[9]"prepared by the Cooperative Research Network detailing this fact.

Based upon a multi-year, $68 million study project conducted by the National Rural Electric Cooperative Association in cooperation with 23 electric cooperatives across 12 states (referred to as the Smart Grid Demonstration Project)[10], the white paper concludes that robust telecommunications capabilities are a base requirement for electric cooperatives to accomplish any of the following:

- **Advanced Metering**
  As the most readily available location for data collection about grid performance, replacement of legacy, analog electromechanical meters with modern digital meters that posses integrated communications technologies is crucial to the Smart Grid. Further, automated metering displaces the costs of human data collection and the inherent errors that accompany human meter reading and reduces the need for manual connections and/or disconnections for customers who are opening or closing their accounts.
- **Advanced Customer Programs**
  Electric consumers are demanding new and often real-time services from their electric utilities to help them save money and manage their energy consumption. Services such as prepaid energy, in-home use monitors and displays, and remote

[8] This memorandum utilizes the generic term "Smart Grid" to refer to the overall modernization of the electric grid.
[9] http://www.nreca.coop/wp-content/uploads/2014/07/TS_SGDP_Telecommunications_June-2014.pdf
[10] http://www.nreca.coop/what-we-do/bts/smart-grid-demonstration-project/

operation/management of appliances require always-on connection of electric utility assets.

- **Changing Pricing Structures**
  The traditional billing models employed by most electric utilities do not reflect the cost structures that determine the utilities need for revenue largely because the technology to collect appropriate data was always cost-prohibitive. For electric cooperatives, where cost-recovery is the sole basis for ratemaking, this has at times resulted in vast inequities between types of energy consumers. Future billing structures that more accurately align costs with billing such as time-of-use pricing models require continuous communications between utility and end-point. With more ubiquitous advanced metering systems, modernization of pricing structures is becoming closer to reality.
- **Distribution System Automation**
  One of the most tangible improvements brought about by the Smart Grid is the reduction of physical labor and human intervention in the operation of the electric grid through improved Supervisory Control and Data Acquisition (SCADA) systems. For example, the resetting of a fuse and switch at one time required a utility employee to discover the problem and dispatch a technician to correct the problem. The technician would then drive to the general location of the problem, search for the fuse/switch that needed attention by the process of elimination, locate the location of the fuse/switch, physically correct the issue by replacing the fuse or closing the switch, and then drive back to utility office and report on completion of the task. With modern equipment, this scenario can be accomplished in less than one second.
- **Voltage Conservation/Line Loss Reduction**
  Through a combination of data received from advanced metering and new data endpoints inserted throughout a utility's SCADA system, utilities are better able to pinpoint locations where system voltage may be outside of design constraints. This data allows system operators to optimize the grid and minimize line losses, decreasing the need for wholesale power supply — which has both financial and, often, environmental benefits.
- **Demand Response**
  The typical electric cooperative in Tennessee spends between 70% and 80% of its entire revenue on wholesale power supply, and a significant portion of that power supply cost is based upon charges for peak-demand use. Unlike the typical residential bill, wholesale power billing is based upon the peak demand (or, capacity) that the customer requires — because this has significant impact upon the fixed assets the wholesale supplier is required to build and maintain so it can serve that demand for energy. With real-time data about energy consumption enabled by advanced telecommunications networks, local utilities are able to take actions to reduce peak demands. Like reducing line losses, these actions have significant financial and environmental benefits for society.
- **Energy Management/Distributed Generation/Energy Storage**
  Some of the largest changes to the electric grid are taking place at the end-point of the electric distribution system, often with equipment owned and operated by consumers rather than utilities (referred to as "behind the meter"). The most

> common example would be that of a consumer-owned solar panel — which is theoretically capable of producing energy at a location where the grid was originally designed to deliver energy. Further, some of these new technologies disrupt the traditional utility-consumer relationship by having the capability to change the consumption patterns of consumers, thereby altering the utility's need for wholesale energy at various times. An example of a common product that fits this description would be an Internet-connected programmable thermostat controlling a residential HVAC unit (the largest electric load of a typical home). Taking both these examples a step further, imagine 25,000 solar panel installations and an additional 25,000 thermostats that are aggregated and controlled (by permission) by a third-party to turn on/off in response to market conditions. Without real-time data about these thousands of new end points that impact operations of the grid, it becomes virtually impossible for utilities to maintain the "always-on" reliability of electric availability that our society has come to expect.

For a more-forward-looking viewpoint on how electric utility operations will require telecommunications capabilities, see Appendix Item Number Three, "A New Regulatory Model is Needed," by Doug Peters[11]. Mr. Peters concludes:

> "The [traditional] model is about to become obsolete because the need for large central generation assets will soon be forced into hibernation in favor of distributed generation and load management assets (which are emerging almost exclusively in the distribution space) that can easily mimic a central general asset (when aggregated). The proliferation of products and services that decentralize the electric utility industry cannot be dismissed or stopped (nor should they be). The industry, at least as I predict, will go through a painful and chaotic period as the need for central generation assets diminishes (and some will likely be stranded[12]) while the number of distributed assets increases."

Mr. Peters further surmises:

> "What the industry needs (and the nation) is a communication backbone to be layered into the grid that will allow those distributed assets (generation and load management) to be controlled just like central generation assets are today. Transmission operators need to "see" the distributed assets and using automated metering infrastructure (AMI) with its typical 15 minute interval data accumulated every 24 hours just ain't gonna get it done.
>
> "What will ultimately be needed is a fiber connection to each of those distributed assets and very complex software to control and coordinate those assets into the reliability-based grid we know today.

[11] https://www.linkedin.com/pulse/new-regulatory-model-needed-doug-peters?trk=prof-post
[12] Stranded assets is an industry term referring to equipment that is unused or abandoned before the end of it original payback period. As the electric industry requires large capital investments that are paid back over long periods (often 30+ years), a stranded asset is a significant negative financial consequence to changing market conditions or changing government regulations.

> "If this is true, then a new regulatory model that intentionally facilitates the build out of that fiber network is only logical."

It is clear that telecommunications capabilities will be as important to the next 100 years of the electric utility industry as steam power was to the first 100 years.

## V. Electric Cooperative Views on Adequate Connectivity

It is difficult to determine the full extent of broadband availability across the state because reliable mapping does not exist. The Federal Communications Commission ("FCC") and the United States Department of Commerce National Telecommunications and Information Administration ("NTIA") have attempted to provide such a resource through the National Broadband Map.[13] And while it is the best resource currently available for determining the penetration of broadband access, it suffers from a lack of specificity that overstates the availability of broadband resources.

In short, the map is based upon census-block-level data. Therefore, if a single location inside a census block reports having a particular broadband resource, then the entire census block is presumed to possess access to that particular resource, thereby overstating access. The map is, at best, a "best-case scenario," and all conclusions based upon the map's data should be considered in this context. The research that TECA and its partners will discuss in this memorandum assumes the FCC's current benchmark transmission speeds for broadband as the minimum for adequate connectivity. These speeds are defined at 25 megabits per second during download and 4 megabits per second during upload. It is our belief that this is an appropriate standard for today's typical residential user.

However, this standard will not remain adequate for long as technologies continue to change and consumer utilization of the Internet exponentially increases. Most electric utilities utilize analytical tools to study their needed infrastructure investments over very long time horizons. This is because the useful life of electric distribution equipment can often exceed 30-40 years. Rooted in this experience, it is our belief that building any communications network to only meet, rather than exceed, today's broadband standard is both inefficient and shortsighted. Any policies recommended by TACIR to address broadband availability must encourage the construction of networks that vastly exceed the current standards.

Lastly, it is the belief of TECA that TACIR should focus its efforts on the deployment of wired broadband. While wireless broadband is a technically viable product, we see several limitations that would, when applied to the rural broadband problem, exacerbate rather than cure the digital divide. First, is the issue of data caps. Any broadband internet access service that contains data caps that are materially dissimilar from urban broadband products creates an immediate disadvantage for rural citizens and businesses. And due to the physical limitations of radio spectrum, we find it unlikely that any wireless broadband product will have similar data caps.

Second, it is our belief that the speed, capacity, and latency requirements on internet services demanded by the public will continue to increase. Again, wireless broadband has technical limitations that create inequities with wired networks. In order to future-proof any networks developed through programs or incentives designed by TACIR, we suggest those networks should be designed as fiber-to-the-premise installations.

[13] http://broadbandmap.gov

## VI. Electric Cooperative Views on Wired Infrastructure Deployment

Electric cooperatives have over 75 years of experience in wired infrastructure deployment, particularly in rural and low-population-density areas. Our professionals are experts at planning, designing, siting, and constructing wired networks (both aerial and underground). More importantly, we understand how to build networks that are subject to stringent safety and design codes and will perform in the harshest environments 24 hours a day, 365 days per year.

Given this vast experience, TECA is happy to help the Commission or its staff by arranging meetings with experienced professionals from our cooperatives or any other technical experts to research the specific requirements of building a complex network of poles and wires that this study may require.

We would also offer some general thoughts and research on wired infrastructure deployment here in this memorandum that we believe will be helpful for the purposes of this study.

***Customer Density is the Primary Consideration in Broadband Deployment Decisions***

Generally speaking, the costs of deploying a wired network are not difficult to determine. While a complete explanation of the steps required in building any network is outside the scope of this memorandum, it is accurate to say that any number of organizations, companies, or consultants could formulate such a plan.

What is clear from history is that actual costs are only part of the overall equation. For the many years that rural electrification eluded the United States, there was little argument about what it would cost to build-out the electric grid into the far reaches of the countryside. The investor-owned power companies, in fact, studied and discussed plans to do so. However, their plans required rapid payback of those costs so that shareholder returns could be realized quickly, as is expected of any publicly traded company.

Decisions to expand electric service and the resulting large capital expenditures were represented by a fairly simple equation and decision:

- Total cost of construction (capital cost) ÷ *total number of customers* = Cost-per-customer
- If cost-per-customer over a *specified period of time* was sufficiently less than total revenue (profit margin), service would be extended

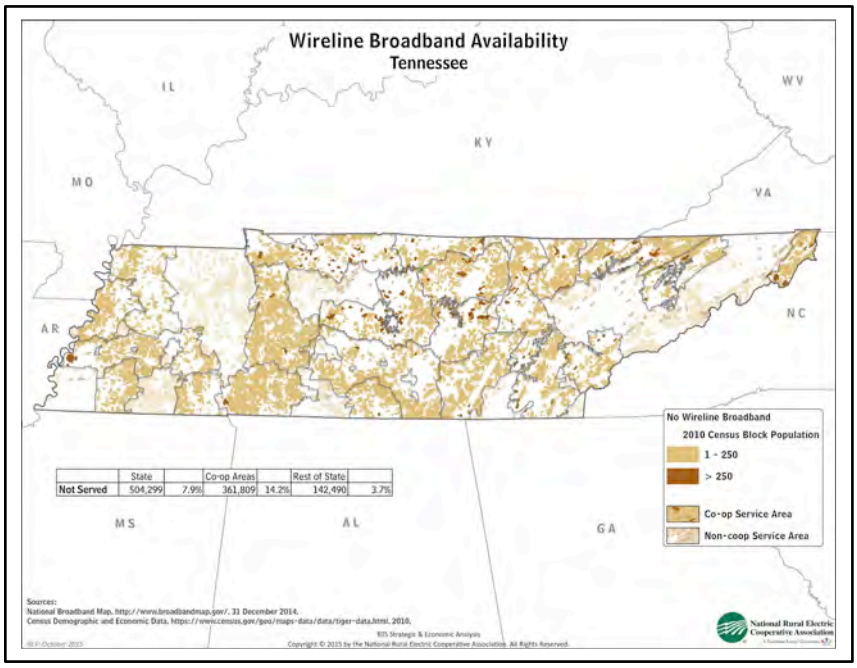
While there were other cost factors inherent in the equation (line extension reimbursement requirements, for instance) worthy of discussion, the primary variables were total number of customers and the required payback time (italicized above). In other words, customer density and required payback time were the key factors in the decision to deploy new lines.

Given the low population density of rural America and the inability to significantly alter customer density, when this equation was applied to rural electrification decisions, the cost-per-customer became exorbitantly high, and investor-owned companies generally declined to enter those markets. This was a rational decision, given the ownership model and return-on-investment requirements their shareholders demanded. However, these decisions did not advance the societal goals set forth by elected officials so new models were sought.

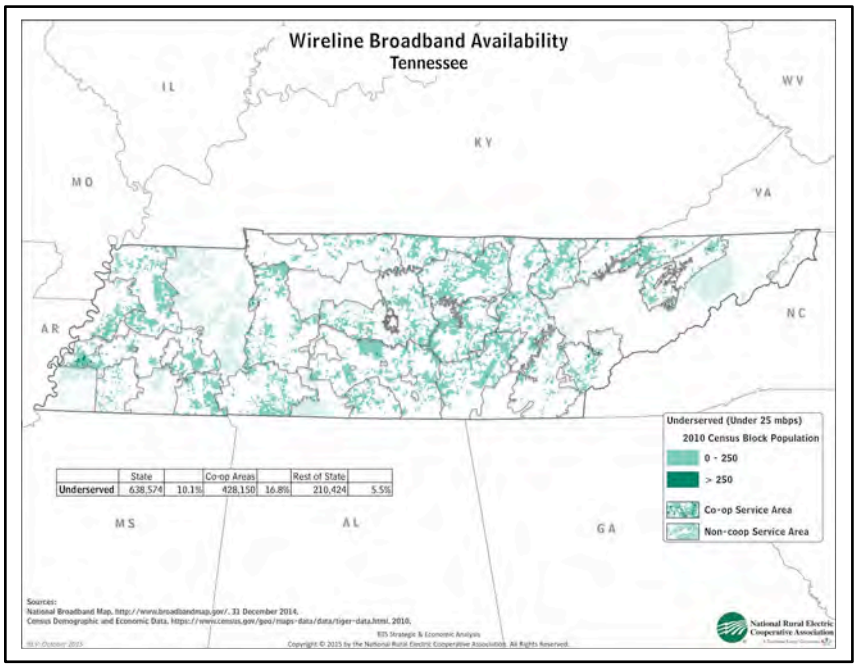
The great achievement of rural electrification was to develop a financing model that lowered capital costs through standardization of engineering and design and, more importantly, amortized the payback of capital costs over a long period so that the annual cost-per-customer was lowered to a level that was sustainable. Coupled with the fact that the cooperatives that utilized this financial model were required to be nonprofit entities, cost-per-customer was driven even lower, and universal electrification was achieved. This was accomplished without direct government ownership of the utilities themselves and with minimal taxpayer investment.

While the purpose statement for this study calls for research into the factors that affect specific costs of deploying broadband, TECA would argue that this approach is incomplete. We believe the key to universal broadband deployment rests in developing a financial model that overcomes the drawbacks of low population density.

Based on our research (full-size maps available in the Appendix as Item Numbers 7-10 and 12), it is clear that population density is the key driver in today's availability of broadband internet access services. First, let us examine the location and number of Tennesseans who do not have access to any broadband internet access service today based upon the population of the census block in which they live:



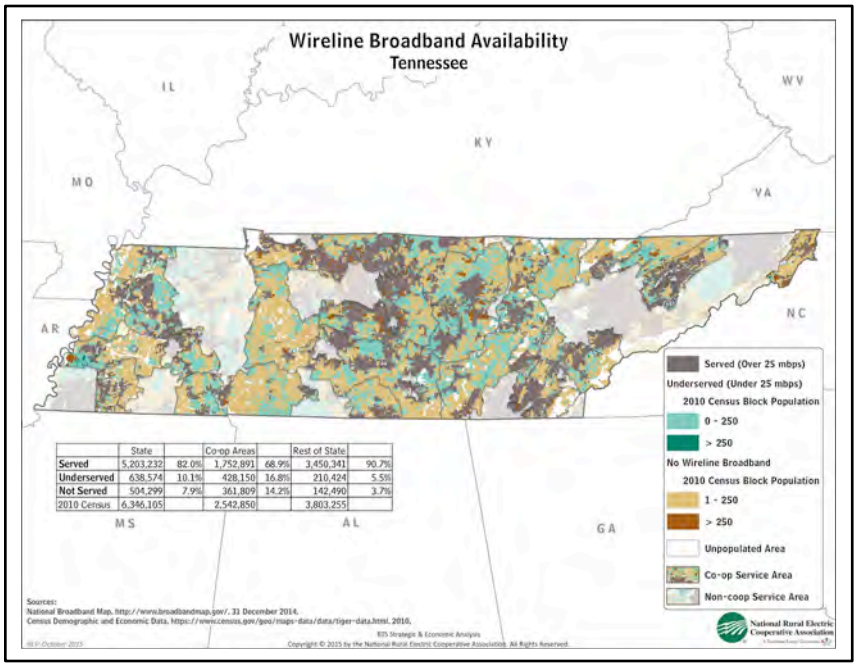
What we see is that of the over 500,000 Tennesseans who have no wireline broadband service, the vast majority live in census blocks that have a population of less than 250 persons. Further, almost 72% of these individuals are served by an electric cooperative. Next, let us examine the location and numbers of Tennesseans who that do not have access to adequate broadband internet access service (service less than the 25/4 mbps standard) today, also referred to as "underserved":




Once again, we see a high concentration of underserved areas inside the footprint of electric cooperative service areas: over 67% of the total. You can visually determine that only a tiny minority of the underserved locations is inside a census block of greater than 250 people.

When you combine these two data sets with a map of where adequate broadband internet access does currently exist, the resulting map clearly shows an urban/suburban versus rural digital divide in Tennessee. The dark grey areas (representing adequately served areas) are primarily the densely populated cities, towns, and suburbs. Of great concern to electric cooperatives, our members are clearly disproportionately unserved and underserved.

Of the areas served by municipal electric providers and Appalachian Power, 90.7% of the population is adequately served. But of the areas served by electric cooperatives, only 68.9% of the population is adequately served. Stated differently, of the 1,142,873 persons in Tennessee who lack adequate Broadband service, 70% live in communities served by an electric co-op.




| | State | | Co-op Areas | | Rest of State | |
|---|---|---|---|---|---|---|
| Served | 5,203,232 | 82.0% | 1,752,891 | 68.9% | 3,450,341 | 90.7% |
| Underserved | 638,574 | 10.1% | 428,150 | 16.8% | 210,424 | 5.5% |
| Not Served | 504,299 | 7.9% | 361,809 | 14.2% | 142,490 | 3.7% |
| 2010 Census | 6,346,105 | | 2,542,850 | | 3,803,255 | |

We reiterate that this research is a "best-case scenario" as it based upon the flawed data of the National Broadband Map (see the earlier discussion on page Six, *Electric Cooperative Views on Adequate Connectivity*), and the actual degree of broadband deployment/penetration is much lower than depicted.

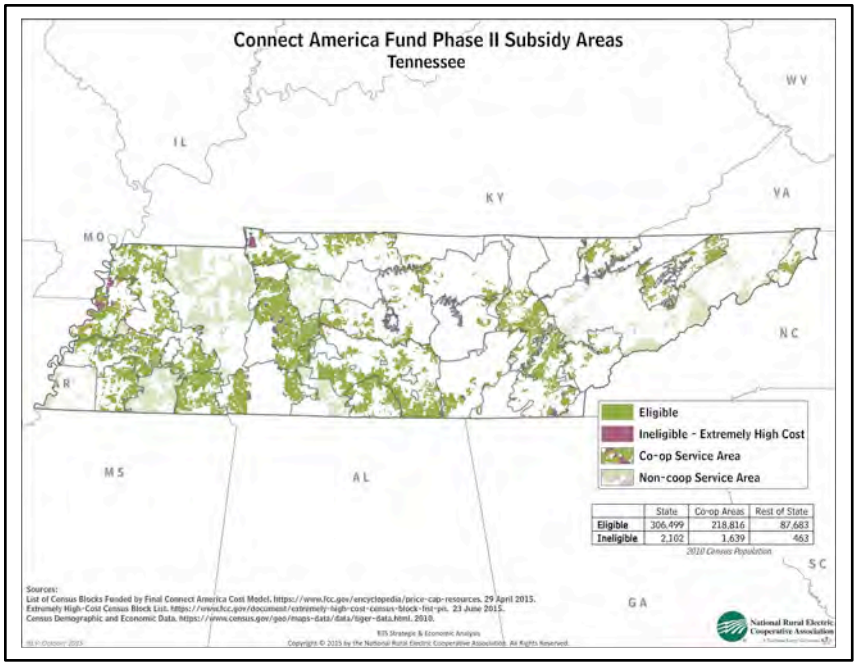
This data clearly demonstrates a strong correlation between population density and the existence of adequate broadband internet access services. When coupled with a basic understanding of the return on investment, it is easy to understand why the primary internet providers in our state have been unable (or unwilling) to achieve universal broadband build-out.

The federal government has attempted to facilitate the build-out of broadband primarily through one method: the subsidization of broadband providers through cash payments based upon a calculated amount that is intended to bring profitability to "high-cost" customers. For a complete description of federal grant programs that provide funding for broadband expansion, please see Appendix Item 11. This type of support is intended to "fill the gap" between operations and profits. It requires significant analytical averaging and assumptions about cost structures, which we believe are prone to error.

Further, this type of subsidization prioritizes ongoing support, rather than subsidizing the large capital outlays for new and expanded plant that (coupled with low population density) that make it unlikely for these entities to invest their limited capital to serve these high-cost areas. Despite over $11.5 billion of these types of subsidies, of which electric cooperatives in Tennessee have received none, the United States continues to grapple with how to provide universal broadband. We believe this model has failed. See below for a table showing how this funding has been disbursed.

| | Price-Cap Carriers | Telecom Cooperatives | Electric Cooperatives | Tribes and Public Entities[14] | Other[15] |
|---|---|---|---|---|---|
| | | | | | |
| Connect America Fund Phase I | $3.51 billion | -- | -- | -- | -- |
| "Frozen" High Cost Support | $810 million | $10.4 million | -- | -- | $1.23 billion |
| RUS Community Connect | -- | $28.9 million | $1.99 million | $29.4 million | $88.1 million |
| RUS BIP | $164 million | $764 million | $128 million | $135 million | $1.04 billion |
| NTIA BTOP | -- | $163 million | $13.8 million | $2.04 billion | $1.27 billion |
| Rural Broadband Experiments | -- | $17,420 | $3.05 million | -- | $96.4 million |
| **TOTAL** | **$4.48 billion** | **$967 million** | **$147 million** | **$2.2 billion** | **$3.73 billion** |
| **SHARE OF TOTAL** | **38.9%** | **8.39%** | **1.27%** | **19.1%** | **32.4%** |

Please note, this table does not include the recently announced grant amounts for the Connect America Fund II, which will provide another $9 billion to virtually the same entities that have received the previous subsidies.[16] Of this, three telecommunications companies will receive nearly $30 million per year for the next six years for operations in Tennessee[17]. Once again, these locations closely mirror the electric cooperative footprint in Tennessee.




[14] Includes municipalities, public utility districts, universities, and other government organizations.
[15] Defined as all other entities not already accounted for in the table, including commercial corporations, limited liability companies, and other private associations.
[16] https://www.fcc.gov/document/connect-america-fund-phase-ii-funding-carrier-state-and-county
[17] http://www.timesfreepress.com/news/business/aroundregion/story/2015/aug/27/att-gets-nearly-428-million-uncle-sam-expand-rural-broadband/322143/

## VII. Pole Attachment Concerns

***Historical Considerations***

In 1978, Congress acted to attempt to speed deployment of cable television service. Among other initiatives, Congress provided for federal regulation of pole attachments under the belief that artificially reducing pole rental rates would encourage build-out of the nascent cable industry. It gave the FCC jurisdiction over rates, terms and conditions for cable lines attached to investor-owned utilities' poles. Recognizing the unique, locally directed governance of electric cooperatives, Congress exempted them from these pole attachment provisions (and did not disturb that exemption when it reauthorized the Telecommunications Act in 1996).

During the original debates in 1978, Congress clearly expressed an interest in preserving a balance of state vs. federal authority, stating:

> "The Committee considers the matter of CATV pole attachments to be essentially local in nature, and that the various state and local regulatory bodies which regulate other practices of telephone and electric utilities are better equipped to regulate CATV pole attachments…. It is only because such state or local regulation currently does not widely exist that federal supplemental regulation is justified."

Congress further recognized an important distinction for electric cooperatives when it stated that:

> "cooperatively owned utilities, by and large, are located in rural areas where often over-the-air television service is poor. Thus customers of these utilities have an added incentive to foster the growth of cable television in their areas … pole rates charged by municipally owned and cooperative utilities are already subject to a decision-making process based on constituent needs and interest."[18]

That statement is as true today as it was in 1978. Today's electric cooperatives are similarly motivated by their consumers' desire for broadband and other advanced services. Therefore, cooperatives in all 50 states remain exempt from FCC regulation of their pole attachments. This is appropriate for a number of reasons.

First, In order to maintain 501(c)(12) cooperative tax-exempt status, cooperatives must charge cost-based rates for their services, including pole attachments. Often, cooperatives charge rates that do not fully recover all of their costs, especially considering that pole attachments reduce the useful life of poles and frequently cause operational and/or safety problems. If a uniform rate were to push attachment rates lower than actual costs, as the FCC's standardized formula has done for investor-owned utilities, electric co-op consumers would wind up being forced to transfer the increased costs caused by cable, broadband and

[18] S. Rep. No. 95-580, 95th Cong., 1st Sess. 17-18 (1977) (emphasis added)

telecommunications corporation attachments into the electric rate base — causing an increase in electric bills and a transfer of revenue from nonprofit electric utilities to some of the largest and most profitable companies in the world.

Second, the local, democratically elected boards of directors of electric cooperatives are ultimately responsible for ensuring that the integrity of the cooperatives' distribution lines and poles are maintained. This local regulation, by the very people who live in each co-op's service territories, ensures that that the co-op can facilitate the deployment of cable, telecommunications and broadband services while simultaneously protecting the critical infrastructure that brings essential power to every facet of our community.

***Tennessee's Unique Electric Utility Landscape***

In most states, there are three types of electric utilities: investor-owned, municipal, and cooperative. The primary differences in these utilities lie in their ownership structure, use of margins (revenue – expenses = margins), and the identity of the primary regulator of each entity.

| | **Ownership** | **Use of Margins** | **Regulatory Body** |
|---|---|---|---|
| Investor-Owned | Shareholders, publicly traded | Return of profit to shareholders | State Public Service Commission |
| Municipal | Local government entity | Reinvested into utility operations or transferred to government's general fund[19] — Nonprofit | Local government entity |
| Cooperatives | Member-Owners (users of the service) | Dispersed to member-owners or reinvested into utility operations — Nonprofit | Self-Regulated |

Owing to the Tennessee Valley Authority Act of 1933 and the subsequent purchase of the assets of the Tennessee Electric Power Company, today the state of Tennessee contains no investor-owned electric utilities (except for Appalachian Power, a subsidiary of American Electric Power, serving the City of Kingsport). TVA itself serves as a generation and transmission utility, providing wholesale power to approximately 150 cooperatives and municipal utilities across seven states.

Further, and perhaps more importantly, the Tennessee Valley Authority Act of 1933 also rested complete regulatory authority over these 150 TVA-supplied distribution utilities with TVA as well. Congress recognized this jurisdiction again when it passed the Public

[19] http://www.publicpower.org/about/index.cfm?navItemNumber=37583

Utility Regulatory Policies Act (PURPA) of 1978[20]. The Tennessee Regulatory Authority (Tennessee's version of a Public Service Commission) only regulates a single electric utility with any significant presence in the state, the previously referenced Appalachian Power in Kingsport.

Therefore, the electric distribution utilities in Tennessee (both municipal and cooperative) function in an environment unlike any other in America.

When applied to the issue of pole attachments, this unique makeup of utilities across the state can easily skew data and create dissimilar comparisons if not treated properly. For instance, it is common to hear the argument from the cable industry that Tennessee has higher average pole attachment rates than its neighboring states. This is misleading.

Consider that in a hypothetical (yet, typical) state, roughly 50% of electric consumers would likely be served by an investor-owned utility, 30% by cooperatives, and 20% by municipal utilities. In that state, roughly 50% of the electric utility poles (and the resulting attachments, if any) would be governed by the FCC's ratemaking authority, and those poles would reflect roughly the same rental price. The remaining 50% of electric utility poles would not be calculated in this manner and would more accurately reflect the utility's costs — generally resulting in higher attachment rates.

Stated more succinctly, the average pole attachment rate for this hypothetical state would be made up of a 50/50 ratio of FCC-regulated vs. non regulated rates. In Tennessee, however, the ratio would be closer to 1/99 and thereby skews the average rate higher due to the dissimilar makeup of regulatory schemes.

Further, investor-owned utilities generally serve much more densely populated areas than cooperatives and therefore have higher concentrations of attachments to their poles resulting from the higher concentration of cable/Internet services in those same more densely populated areas (see the discussion on customer density in Section VI of this memorandum). Therefore, a higher percentage of the inputs that make up the average occur in the FCC-regulated environment — skewing that average downward.

Simply put, comparing average pole attachment rates of Tennessee versus other states is an "apples-and-oranges" comparison.

***TACIR's Previous Study Conclusions***

At the request of the legislature, TACIR completed a comprehensive study of pole attachment issues in March 2007. A copy of that report, *Analysis of Pole Attachment Rate Issues in Tennessee,* is included in the Appendix as Item Number Four.

While some of the specific data used in the report may now be somewhat dated, there is

[20] §17, 16 U.S.C. §2602, http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/PURPA_2009.pdf

virtually no difference in the underlying assumptions and arguments that TACIR considered at that time. And as you will see on page 21 of the report, TACIR did not recommend state regulation of pole attachment rates:

> "As there is no theoretically ideal rate or rate setting method applicable to pole attachments, any particular regulation of that rate is not recommended."

We believed that conclusion was proper at the time it was reached and continue to believe it is the correct recommendation today.

***Previous Legislative Study Committee Report***

On December 12, 2012, a study committee of the Senate Commerce and Labor Committee met to further consider the issue of pole attachments in Tennessee as a result of Senate Bill 3277. The study committee took no specific action but did issue a report of the proceedings.

This report is included in the Appendix as Item Number Five, and we strongly encourage the TACIR staff and members of the Commission to fully review pages 16-46 for a comprehensive overview of this very complex topic.[21]

***Tennessee Attorney General's Opinion***

In response to regulatory activity in Kentucky as well as proposed legislation in Tennessee, in 2013 the Tennessee Attorney General was requested to provide an opinion to the following question:

> *What, if any, jurisdiction does the State of Tennessee have to regulate the pole attachment rates, terms, and conditions of electric distribution utilities in Tennessee that purchase electricity from the Tennessee Valley Authority ("TVA") in light of the TVA's position, based on the TVA Act, 16 U.S.C. SS 831 et seq., that it is the "exclusive retail rate regulator for the distributors of TVA power" and that its "oversight over the pole attachment rates of these distributors is sufficient"?*

In Opinion No. 14-20, dated February 19, 2014, and titled "State Regulation of Pole Attachment Rates of TVA-Supplied Electric Cooperatives," the Attorney General answered this question of Federal vs. State jurisdiction.

The opinion concludes that TVA regulatory jurisdiction would preempt any state legislation or regulatory activity, assuming TVA "assert(s) its discretionary control over the rates and revenues of its distributors in a manner that directly affected pole attachments." TVA has

[21] Note: Pages 47-55 largely relate to the specific legislation that was under consideration at the time and is no longer considered a viable option (see *Tennessee Attorney General's Opinion* below); therefore, that particular content is not germane to TACIR's current study. Further, for the sake of brevity, the section of the committee report that contains the March 2007 TACIR *Analysis of Pole Attachment Rate Issues in Tennessee* has been omitted as this particular content has already included in this memo as Appendix Item Number Two.

asserted its discretionary control. William D. Johnson, the TVA's President and Chief Executive Officer, stated to the Executive Director of the Kentucky Public Service Commission (KPSC) in a letter dated February 14, 2014:

> "TVA requires each distributor to charge a pole attachment fee that ensures full cost recovery so that no unfair burdens are placed on the electric ratepayers. … TVA respectfully submits the [KPSC's] continued forbearance from regulation of the rates and services of TVA distributors is both justified and appropriate."

A copy of the Attorney General's Opinion, the TVA letter, and a letter from TECA to the Tennessee Lt. Governor and Speaker of the House are included with this memorandum in the Appendix as Item Number Six.

It is the opinion of TECA that all regulatory authority relating to this topic rests with the Tennessee Valley Authority, an agency and instrumentality of the United States Government, and any legislation or regulations created by the State of Tennessee would be pre-empted by TVA's authority.

## VIII. Pole Attachment Commentary and Observations

### ***This Study's Outline/Scope Is Flawed***

In the Research Plan that outlines TACIR's study of this topic, the following statement is listed on page three as the seventh bullet under "Step One. Define the Problem" (emphasis added):

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

There are six incorrect presumptions inherent in this question, each underlined separately above. We examine each below.

**First:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

While it is accurate to characterize a payments for rental of pole space as a "rate" that is charged an attaching party; a description this simple ignores the nature of the payments. Attaching parties make cash payments to pole owners as a form of compensation for the *additional costs the pole owner incurs due to the existence of the attachment*.

As was discussed under the heading "Tennessee's Unique Electric Utility Landscape," the ownership status of Tennessee's electric utilities further requires an understanding that the vast majority of pole owners in Tennessee are non-profit entities that are required by their regulator to recoup *all* of their costs. Since it would be impractical to charge attaching parties the actual costs on a pole-by-pole basis, pole owners will preform various methods to develop a pole rental price that most accurately reflects those costs in aggregate.

(Note: This is the primary reason for the variability of pole attachment rates in Tennessee, often stated to be a problem for attaching parties. The state's vastly differing geography and topography create differing levels of actual costs for pole owners. For example, the cost to set a pole into the ground is much higher in the rocky limestone of Middle Tennessee, than in the soft delta of West Tennessee.)

Therefore, these payments are more similar to reimbursements.

**Second:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

The outline tasks the study to compare pole attachment charges of municipal and cooperative electric providers in Tennessee to the charges approved by FCC regulations. This is not possible, as the FCC has never "approved" the pole attachment charges of a municipal or cooperative electric provider. It lacks the regulatory jurisdiction to do so, for good reason, and Congress reaffirmed that limitation in its authority when it last reauthorized the Telecommunications Act in 1996.

**Third:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

The outline tasks the study with comparing pole attachment charges of municipal and cooperative electric providers to those approved by regulatory entities in other states. Such a comparison would be based upon dissimilar information as each state has a differing ratio of regulated vs. unregulated utilities (see the section above titled *Tennessee's Unique Electric Utility Landscape*). Any evaluation of validity of pole attachments in the state of Tennessee must stand on its own merits, not be skewed by inaccurate comparisons with other states composed of different types of entities subject to differing regulatory structures.

**Fourth:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

By asking if deployment of broadband is either encouraged or inhibited by pole rates, the question presupposes that the answer is one or the other. In reality, there is a third option.

We believe that pole attachment rates have no significant effect on the deployment of broadband services (the section below titled *Pole Attachment Rate Incentives and FCC-Style Regulations Do Not Generate Increased Broadband Deployment).*

**Fifth:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

By omitting the word "what" from the beginning of the phrase "the role the state should play," the question presupposes that the state should play some role at all. In reality, there is a second option that the state should play no role in this issue.

**Lastly, and perhaps most impactful:**

> Compare the pole attachment rates that broadband providers pay to municipal and cooperative electric providers in Tennessee to those approved by the FCC and by regulatory entities in other states and determine (1) the extent to which wider deployment of high-speed broadband is being encouraged or inhibited by rates in Tennessee and (2) the role the state should play in reducing high pole-attachment rates to encourage broadband deployment.

By using the phrase underlined above, the study is tasked to find ways to reduce pole attachment rates to encourage broadband deployment. We must first ask the question, What is the definition of high (relative to what standard)?

Further, this instruction negates any need for a finding of section (1), "determine the extent to which wider deployment of high-speed broadband is being encouraged or inhibited" because the later section (2) assumes that reducing pole attachment rates would encourage rather than inhibit.

Based upon a simple reading, it is clear that the intent of the entire text under the seventh bullet of "Step One. Define the Problem" is written to influence the research staff and Commission to adopt a predetermined conclusion. However, during two decades of debating pole attachment rate issues, we have yet to see any discernable, measurable, or quantifiable evidence that pole attachment rates inhibit broadband deployment.

In fact, the evidence we provide below leads to a vastly different conclusion.

***Pole Attachment Rate Incentives and FCC-Style Pole Attachment Regulations Do Not Generate Increased Broadband Deployment***

There are numerous arguments and demonstrations of fact that show that pole attachment rate incentives are not a significant driver in broadband deployment. The following examples are submitted for the Commission's consideration:

First, electric cooperatives understand that pole attachment expenses constitute a very small portion of the cost of broadband deployment, and efforts to lower these expenses do not actually promote expansion of service. These facts have been discussed frequently by the Utilities Telecom Council (UTC), which is a trade association representing the interests of electric, gas, water, pipeline, and other critical infrastructure companies that own, manage or provide telecommunications services in support of their core business[22]. In recent formal comments to the FCC, UTC estimated that pole attachments constitute as little as 1% to 2% of the overall cost of deploying broadband[23]. UTC further commented:

> "What is evident is that reduced pole attachment rates have failed to accelerate broadband deployment in rural unserved areas or to reduce broadband prices for consumers[24]."

Second, in 2008, the General Assembly passed the Competitive Cable and Video Services Act, which created the ability for cable and video service providers to receive statewide franchise authority and made other significant changes for cable and telecommunications companies. During the debate, significant attention was paid to the issue to how this law might affect the expansion of broadband services across the state.

To address this issue, the law contained an incentive that would allow a 50% pole attachment discount to any attaching party seeking to expand its services into historically unserved areas[25]. This discount would be 50% of the rate as it existed on January 1, 2008, and the discounted rate would be in effect until July 1, 2018.

To our knowledge, since its inception, no attaching party has sought to take advantage of this discount anywhere in Tennessee.

While the large telecommunications companies may speak of multi-billion-dollar investments in their networks in recent years, it is clear that the entire sum of these investments has taken place in areas that were previously served. This attempt to incentivize through pole attachment rate incentives has resulted in exactly ZERO broadband expansion.

Third, as electric cooperatives have negotiated pole attachment agreements with attaching parties, there have been numerous opportunities to discuss the effects of pole attachment

[22] http://www.utc.org/about-utc
[23] http://apps.fcc.gov/ecfs/comment/view?id=60001066182
[24] http://apps.fcc.gov/ecfs/comment/view?id=60001066182
[25] Tenn. Code Ann. § 7-59-316 (c)

rates on these investment decisions. One instance in particular illustrates the point particularly well[26]. During a dispute over renewal of a pole attachment agreement in 2014, a large electric cooperative in Middle Tennessee allowed a vice president of one of the world's largest telecommunications companies to attend the co-op's board of directors meeting. The telecommunications executive presented a request for a lowered pole attachment rate.

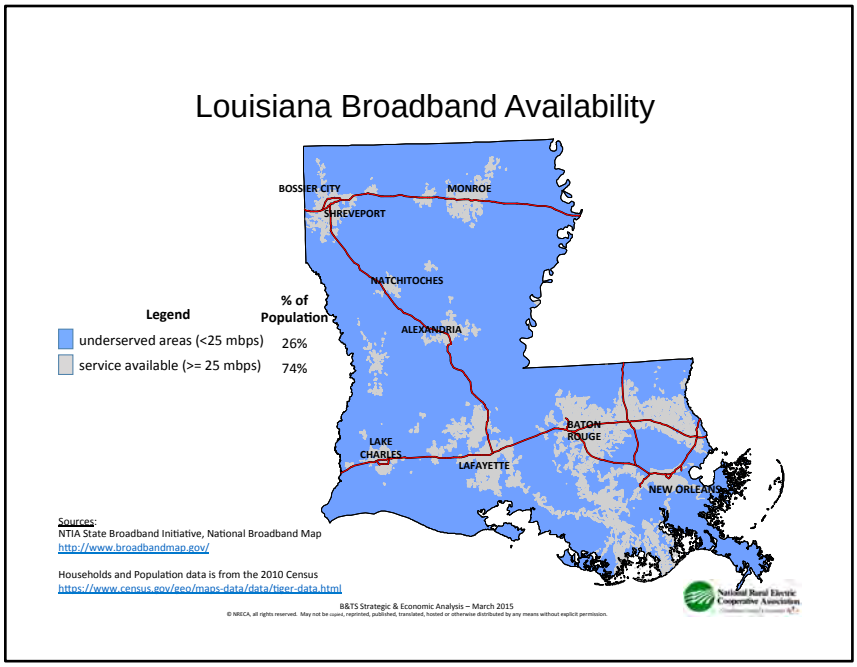
During the presentation, a member of the co-op board asked the vice president about the company's plans to expand their services to more of the co-op's membership and specifically asked what pole attachment rate would allow the large telecommunications company to extend those services. The reply was telling. The vice president answered that the large telecommunications company would not extend its services further into the co-op's rural areas even if the pole attachment rate were zero.

Lastly, recent research on broadband penetration demonstrates no causality between increased availability of broadband and the "FCC-style" of regulating pole attachment rates. It is difficult to make direct comparisons of broadband deployment to pole attachment rates as divulging individual utilities' pole attachment rates in mass could be construed as attempts to foster collusion and lead to antitrust claims against the utilities. Therefore, to demonstrate the lack of causality, let us consider the penetration of 25 mbps broadband service in three states: Louisiana, Arkansas, and Tennessee[27]. These states will serve as proxies for three differing regulatory strategies:

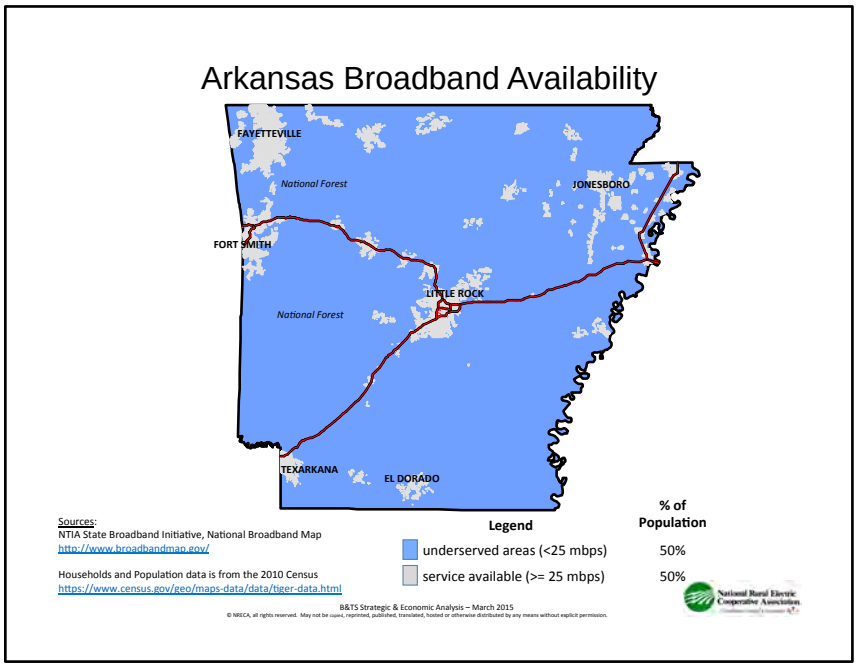
- Universal state enforcement of FCC-style regulation (known as reverse pre-emption)
- A mixture of FCC regulation and state non-regulation
- Universal non regulation by the state

Louisiana is a state that has chosen to enforce the FCC guidelines intended for investor-owned utilities on its utilities that are exempted by Federal law, i.e. reverse pre-emption. Therefore, virtually all pole attachments across Louisiana conform with the FCC-style regulation, and rates are generally considered to be low by the attaching community. Virtually all of the landmass of the state is underserved by adequate broadband, and 26% of the population does not have access to 25 mbps broadband services.

[26] Identities of both parties are intentionally omitted in this memo. However, representatives of the co-op are willing to discuss the details of the meeting with TACIR staff or Commission members upon request.
[27] Data is based upon "best-case scenario" National Telecommunications and Information Administration (NTIA) broadband mapping. Actual statistics are believed to be lower than shown (see section V *Electric Cooperative Views on Adequate Connectivity*). Maps and statistics prepared by National Rural Electric Cooperative Association, Arlington, VA. Maps are also available in the Appendix as Item Number Thirteen.

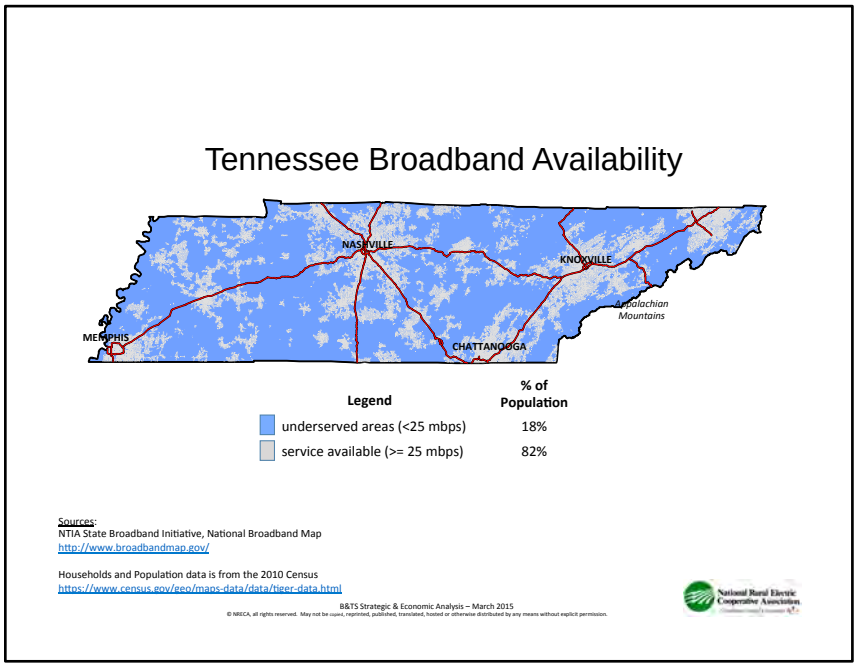



In Arkansas, once again, the vast majority of the landmass appears to be underserved, and 50% of the population lacks access adequate broadband. This is a state where the highly populated areas are primarily served by investor-owned utilities (which are subject to FCC pole attachment regulation), and the rural areas are primarily served by rural electric cooperatives. The rural electric cooperatives' pole attachment agreements are not regulated by the state.[28]




[28] As of the date of this analysis.

Because of the lack of investor-owned electric utilities, Tennessee has relatively few poles subject to FCC-style regulations. Therefore, it is widely regarded by the attaching community as having high pole attachment costs. If the theory that high pole attachment costs deter broadband deployment were true, then one would expect the data to show lower availability of adequate broadband. In fact, the opposite is true. Tennessee has greater geographic and population percentage (82%) access to adequate broadband than either Louisiana or Arkansas.



## IX. Conclusions

Electric cooperatives are crucial providers of critical infrastructure across the state, and the provision of near-universal broadband internet access services is essential for the modernization of the electric grid and the future vitality of Tennessee's rural communities. We applaud TACIR for studying this important topic and wish to reiterate the following important conclusions:

- Much like the provision of electricity in the 1930s, facilitating the build-out of universal broadband service is an important societal goal.
- Electric cooperatives are private institutions, not owned or operated by government.
- Electric co-ops are nonprofit and service-oriented.
- Electric cooperatives need advanced broadband internet access services to enable the "Smart Grid" and continue to modernize the provision of electricity.
- Electric co-ops in Tennessee are heavily restricted by state law from providing retail broadband services.

- The current speed standard for broadband internet access services will only be adequate for a short time.
- Any government funded/incentivized investments should focus on fiber-based technologies.
- Customer density is currently the key driver in broadband deployment decisions.
- Universal broadband build-out will not be achievable without financial models that overcome the drawbacks of low customer density.
- Broadband is heavily subsidized today, and those subsidies have not brought about universal access.
- Electric cooperative member-owners are disproportionately unservered or underserved by broadband.

- Pole attachment expenses do not inhibit broadband deployment.
- Comparing Tennessee's pole attachment rates to the FCC formula is misleading.
- TACIR has previously recommended not regulating pole attachment rates.
- Regulatory jurisdiction of pole attachments in Tennessee rests with the Tennessee Valley Authority, not the State of Tennessee.

## X. Appendix

*Item Number One*

*Electric Cooperative Footprint in Tennessee – As of 2015*

*Item Number Two*

*"Telecommunications: the Linchpin for Smart Grid Success" by Eric Cody, Cody Energy Group*

CRN Cooperative Research Network

# TechSurveillance

## Telecommunications: the Linchpin for Smart Grid Success

BY **ERIC P. CODY,** CODY ENERGY GROUP
JUNE 2014

*This article highlights one of the major areas of technology research during NRECA's Smart Grid Demonstration Project, and is part of a series of articles relaying the events and lessons learned in this groundbreaking effort. The full series may be found at www.nreca.coop.*

### TELECOMMUNICATIONS ENABLES THE SMART GRID

Few utilities considering a Smart Grid solution initially appreciate the technology's heavy reliance on a robust and reliable telecommunications system.[1] In fact, communications infrastructure plays a unique role in the sweeping, industry-wide shift to distribution system automation, remote monitoring of distribution assets, and the dramatically increased information flows that come with Smart Grid technology. Information flows parallel electron flows throughout the system. Monitoring data must often be available in near real-time, and the number of information gathering and control points grows exponentially. Think of it as a photo album containing snapshots being replaced by a full motion, interactive video that runs continuously and never ends. A fully-implemented Smart Grid generates a data volume that is between 10,000 and 100,000 times larger than traditional utility operations. An electric cooperative's ability to realize the business benefits of the technology, therefore, depends on its communication system's ability to transmit and receive these data reliably day in and day out. Communications is the fundamental enabler of the Smart Grid.

Six electric cooperatives participating in NRECA's nationwide Smart Grid Demonstration Project (SGDP) were followed closely as they upgraded

**THE SIX PARTICIPATING COOPERATIVES**

Adams Electric Co-op
Clarke Electric Co-op, Inc.
Corn Belt Power Cooperative
Delaware County Electric Cooperative
Owen Electric Cooperative, Inc.
Washington-St. Tammany Electric Cooperative

[1] The terms "Communications" and "Telecommunications" are used interchangeably within this article.

NRECA A Touchstone Energy® Cooperative

communications to handle the expanded functionality and information traffic that came with their individualized Smart Grid deployments. The case studies that resulted contain insights and lessons learned that are especially valuable within the electric cooperative community:

- Rural areas served by electric co-ops lack universal coverage by cellular or fiber optic communications;
- Radio signal strength can be spotty or nonexistent;
- Telecommunication costs are typically higher because of distances involved; and
- Service area terrain can interfere with line-of-sight communications systems.

Needless to say, telecommunications cost is often a major factor. These case studies are a good starting point for any electric co-op intent upon overcoming these inherent challenges (see related SGDP report, "**Communications: The Smart Grid's Enabling Technology**," for more details).

Four technology sets enable the Smart Grid:

- Advanced metering infrastructure
- Meter data management systems
- Supervisory Control and Data Acquisition (SCADA)/Distribution Management Systems (DMS)
- Telecommunications

Electric cooperatives participating in the SGDP demonstrated that telecommunications is fundamental to the other three enabling technologies. It is the critical foundation upon which the house is built. For these co-ops, and likely for the majority of their peers throughout the electric cooperative community, upgrading existing communications is a challenging exercise that requires a long-term planning framework, informed assumptions about future business applications taking advantage of Smart Grid capabilities, and measured decisions about the right level of technology investment in communications capability and capacity. What cooperatives have today, and what many will still have tomorrow, is a hybridized communications infrastructure made up of a diverse set of communication technologies which must be skillfully integrated and managed. Given all this, the stakes are high and the consequences of poor planning are likely to be significant.

## WHAT SMART GRID REQUIRES FROM COMMUNICATIONS

The wide range of Smart Grid functions electric co-ops are implementing has profound consequences for the utility communications system. The SGDP looked at a number of these key business functions, each of which was studied and is being profiled in a *TechSurveillance* article:

- In-home displays/web portals
- Demand response over advanced metering infrastructure (AMI)
- Prepaid metering
- Interactive thermal storage
- Smart feeder switching
- Advanced volt/VAR control
- Conservation voltage reduction (CVR)

How does telecommunications support these applications? The utility communications system retrieves current metering data for display on member web portals. It enables signaling of meters for demand response programs and helps verify load reductions. It transmits connect/disconnect orders directly to meters—a key aspect of PrePay programs. And, the system allows feeder switches to communicate

and coordinate with each other and to reroute energy flows when overloads and faults arise, often without manual intervention. Many electric cooperatives do not implement all available features at the same time, electing instead to phase them in. This can result in excess telecommunications capacity for periods of time. The need to upgrade communications as these Smart Grid functions are deployed proved to be a complicated process, requiring diligent planning and design of a new communications architecture for some project participants. Moreover, their planning had to allow for new and unanticipated applications down the road. These realities make planning for communications technology a serious business.

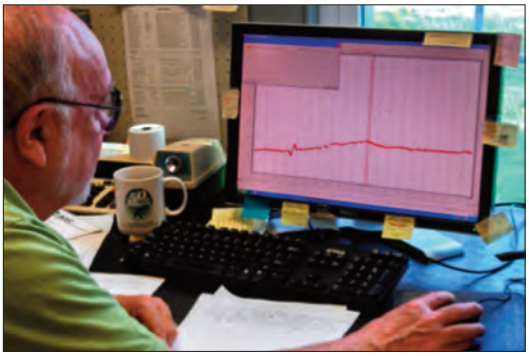


**FIGURE 1: Delaware County Electric Cooperative's Assistant General Manager, Wayne Marshfield, makes use of the HMI/SCADA (human machine interface/supervisory control and data acquisition) system, now integrated with DCEC's AMI system.**

The technology migration from a limited capability, automated meter reading (AMR) system to a more fully functioned, advanced metering infrastructure (AMI) was also experienced by some of the participating electric co-ops. Such changes almost invariably precipitate upgrades in communications technology (see sidebar below for one electric co-op's experience), often requiring the patching together of multiple communications technologies to insure 100 percent coverage.

## CHALLENGES ELECTRIC CO-OPS FACE

Study participants faced a number of business and technical challenges as they upgraded communications to meet the needs of their Smart Grid deployments. Not the least of the challenges associated with technology selection is the sheer number of potential technologies to choose from: microwave, spread spectrum radio, fiber optics, cellular, leased telephone lines, power line carrier, etc. The list of available options is too lengthy to include here and is constantly changing, as communications

**New York's Delaware County Electric Cooperative (DCEC) sums up the experience:**

"At the core of DCEC's project was an upgrade of our legacy AMR system to a fully supported AMI system. Data rates for the reporting or "back haul" of information from the AMI substation and data point collectors required an upgrade to Internet-based (Internet Protocol or "IP") service from dial-up telephone service, which had provided reliable back haul service for the legacy AMR system for more than ten years. Given the rural nature of DCEC's service area, IP service options and coverage were limited at most sites. As a result, DCEC resorted to using four different methods to obtain the required IP service (DSL, public cellar telephone network, fiber optic to Ethernet, and satellite service), depending upon specific locations."

*(Comments and observations of team members compiled by Paul De Andrea, P.E., DCEC's Engineering & Technology Manager)*

It can be difficult to measure the benefit of communications, since its value is indirect and it supports multiple functions.

The availability of excess communications bandwidth—the capacity of a line or circuit to carry additional data—incentivizes cooperative engineers and planners to consider new functions.

technology is a moving target. Integration with existing communications systems is also a challenge. Participating co-ops systematically navigated the technology choices and minimized risk through careful pre-installation testing (see related article on Washington St.-Tammany Electric Cooperative's stress testing of its Smart Grid communications design before deployment, as part of the **CRN TechSurveillance series on the SGDP**). Cost was always a key consideration during the project. Other factors influencing participants' decisions included recommendations from other co-ops, ownership vs. leasing, familiarity with the manufacturer or system, compatibility with legacy equipment, and adaptability of the communication system to local topography.

Measuring the business value of communications is often difficult. Communication does not directly create value to the cooperative or to members. Its value is indirect. Communication enables the Smart Grid functions that create the value. Beyond this, it can also be difficult to associate value with communications' enabling role because a single communication system can support multiple functions. For example, one radio network can support both prepaid metering and demand response and this makes calculating the Return on Investment (ROI) on the communications investment difficult.

Considerable uncertainties exist as to how communications assets can be further leveraged in the future. The availability of excess communications bandwidth—the capacity of a line or circuit to carry additional data—incentivizes cooperative engineers and planners to consider new functions. Iowa-based generation and transmission (G&T) Corn Belt Power Cooperative was left with a small slice of excess capacity after its communications upgrade. The cooperative uses it to read substation meters and allows its member distribution co-ops to take advantage of it to read customers' meters. Louisiana's Washington-St. Tammany Electric Cooperative on the other hand is considering options to monetize its excess fiber capacity.

### COMMUNICATIONS PLANNING, DECISION MAKING, AND INVESTMENT

The SGDP case studies focused on communications pointed out some important realities. Planning for investments in communication infrastructure and technology change is complicated but necessary. Accordingly, a significant part of the project report is devoted to defining communications requirements for current and future applications and explaining how to create a ten-year Communications Plan (see related CRN SGDP report, **"Communications—the Smart Grid's Enabling Technology,"** Section 3, for details). Such a technology plan contains both business objectives and technical details sufficient to assure cooperative management that investments in communications technology are both necessary and cost-effective for members, in addition to meeting critical operational needs. **Table 1** provides a sample of what might typically be contained in such a plan.

Caution needs to be exercised by electric co-ops when making decisions about Smart Grid communications. For example, it can be risky to implement a system that utilizes power line carrier (PLC) communications, as the very limited bandwidth and high error rate of this technology make it difficult to achieve many of the goals of the Smart Grid. Copying another co-op's communications scheme can be problematic as well. A neighboring co-op may not have the same business goals and may not have done their homework with respect to appropriately sizing their communications network. In short, technology solutions are not always directly transferrable.

**TABLE 1: Typical Communications Infrastructure Requirements**

| # | Application | Typical File Size per Session—Bits | Typical Latency Required or Desired | Reliability Target | Preference for Private versus Commercial | How Frequently are Data Typically Sent? |
|---|---|---|---|---|---|---|
| 1 | Backhaul of PLC-Based AMI from Substations | 1,000 meters/substation 1,000,000 bits | 60 seconds | 99.9% | Private | Once per day to 4 times per day, depending on vendor |
| 2 | Backhaul of Fixed Wireless-Based AMI from Collector Locations | 1,000 meters/collector 1,000,000 bits | 15 to 30 seconds | 99.9% | Private | Every 15 minutes to hourly |
| 3 | Modern Distribution SCADA | 4,080 bits for DNP3 over IP | 150 m | 99.9% | Private | Every 2 to 5 seconds |
| 4 | Feeder Distribution Automation: Control Applications | 4,080 bits for DNP3 over IP | 1 second | 99.9% | Private | Every 5 to 10 seconds |
| | Feeder Distribution Automation: Monitoring Applications | 4,080 bits for DNP3 over IP | 5 seconds | 99.9% | Commercial | Every 10 to 60 seconds |
| 5 | Direct Transfer Trip Distribution Relay Protection | 800 to 2,400 bits | Must be <2 seconds to as fast as 3 ms | 99.9% | Private | By exception |
| 6 | Mobile Workforce Management (MWM) | 1,000 to 10,000 | 10 seconds | 99.9% | Commercial | Once every 5 to 15 minutes |
| 7 | VoIP across a Private Network | Assume about 80 kbps of TCP/IP bandwidth for each simultaneous call. | | | | |

## FUTURE DIRECTIONS

The research into communications technology associated with the SGDP indicated three key directions for future work:

- First, a methodology and practical guide is needed for electric cooperatives to systematically and objectively judge options for communications upgrades. Section 3 of the **SGDP Communications report** contains a wealth of useful information and practical guidance along these lines.
- Second, regulatory reforms are needed to ensure that electric cooperatives have access to communication technologies that can meet their needs and the economic development needs of their members and the communities they serve. Access to broadband is one such need—currently, major telecommunications providers avoid areas with low customer densities, yet electric cooperatives are not permitted to install broadband and sell excess bandwidth to others to help recover the cost. Section 4 of **the report** describes some of the policy changes that need to be considered to improve access to the telecommunications technologies Smart Grid requires.
- Finally, advances in communication technology are needed to fully meet the often special requirements of electric cooperatives operating in rural areas with topographies that cannot be overcome by existing line-of-sight and other communication technologies. CRN is following with interest certain technologies under development that may hold significant potential for electric co-ops. These are also discussed in Section 4 of **the report**. ■

PREVIOUS VIEW

## ADDITIONAL RESOURCES

Cooperative Research Network. **"Communications: The Smart Grid's Enabling Technology."** November 15, 2013.

### About the Author

**Eric Cody** is a consultant who has spent more than fifteen years working with NRECA, CRN, statewide associations and individual electric cooperatives on technology planning and management issues. He has over three decades of experience with electric utilities and a dozen years as an officer of several New England Electric System companies, including vice president of IT. Eric holds a bachelor's degree from Amherst College and a master's degree from Harvard University, where he specialized in energy planning and policy analysis.

### Questions or Comments

Submit a question or comment through the easy to use CRN online **feedback form**.



PREVIOUS VIEW

*Item Number Three*

*"A New Regulatory Model is Needed" by Doug Peters, Managing Director of Technical Services at the Tennessee Valley Public Power Association*

*Posted to LinkedIn on October 14, 2015*[29]

**A New Regulatory Model is Needed**

It seems obvious to me that the Regulatory Model that has served the electric utility industry, and really the nation, so well for so long has just about outlived its usefulness. The model as it exists was designed to spur significant capital investment in central generation assets and the transmission and distribution systems necessary to transport the energy from those assets to end use customers. The model provided for "guaranteed" rates of return on those investments in exchange for reliability, power supply planning and the obligation to serve. To my way of thinking, there is no greater achievement in the course of all human endeavors than the build-out of the grid that was made possible by the regulatory model described above (and legislation like the Rural Electrification Act). For those of us that have been in the industry for more than 5 years, this is the world that we know and love and letting it go is not something we really want to do.

But let go we must.

The model is about to become obsolete because the need for large central generation assets will soon be forced into hibernation in favor of distributed generation and load management assets (which are emerging almost exclusively in the distribution space) that can easily mimic a central general asset (when aggregated). The proliferation of products and services that decentralize the electric utility industry cannot be dismissed or stopped (nor should they be). The industry, at least as I predict, will go through a painful and chaotic period as the need for central generation assets diminishes (and some will likely be stranded) while the number distributed assets increases. Belt in tight if you're in the power supply planning or load forecasting business.

Instead of reacting to the daily load curve, technology exists today that allows it to be proactively managed and proactive management will offer cost efficiencies and environmental improvements not previously thought possible or considered (and that dwarf the improvements of energy efficiency).

So … now is the time for utilities to invest in load management (which comes in many forms) and put in place the long-term capability for the load to compete with generation. I am not saying that central station assets will go away. My observation is that micro-grids are not going to happen anytime soon. I am saying that we can now manipulate both sides of the equation … and we should begin investing in that capability.

[29] https://www.linkedin.com/pulse/new-regulatory-model-needed-doug-peters?trk=prof-post

What the industry needs (and the nation) is a communication backbone to be layered into the grid that will allow those distributed assets (generation and load management) to be controlled just like central generation assets are today. Transmission operators need to "see" the distributed assets and using automated metering infrastructure (AMI) with its typical 15 minute interval data accumulated every 24 hours just ain't gonna get it done.

What will ultimately be needed is a fiber connection to each of those distributed assets and very complex software to control and coordinate those assets into the reliability-based grid we know today.

If this is true, then a new regulatory model that intentionally facilitates the build out of that fiber network is only logical.

To this end, I would like to suggest that non-traditional benefits be incorporated into the regulatory discussion today and into the model tomorrow. I believe the benefits to economic development, healthcare and education made possible by ubiquitous fiber and the world-class broadband it makes possible must be incorporated into our thinking and future plans.

As justification, I offer the following points.

**One:** Only fiber can provide the communication path to millions of distributed assets and allow for those assets to be managed under the extremely rigorous conditions of the bulk electric system (with any degree of future-proofing).
**Two:** This country will not fully exploit its economic capabilities nor be able to truly compete in a global marketplace without universal world-class broadband.
**Three:** The efficiency and effectiveness of our education and healthcare systems would be exponentially improved by world-class broadband.
**Four:** With all due respect to the telecom companies today, only electric utilities have the resources necessary to build and maintain a fiber network that encompasses the entire country.
**Five:** EPB of Chattanooga. I will leave it to the reader to investigate the extremely positive impacts made possible by its fiber-based control system and the benefits of its world-class broadband. There are other local power companies in the Tennessee Valley that are making similar impacts on their respective communities, but allow me to use EPB as the overall representative of that group.

The build-out of a fiber network is currently very difficult to justify on near-term benefits to the electric system alone. I am suggesting that a much longer and broader view needs to be incorporated in the regulatory model if we are ever to truly begin creating the "smart grid".

I believe the only thing that can rival the electric grid in terms of human achievement would be the availability of world-class broadband at every home and business in this country. (My logic … universally available electricity and world-class broadband will

power all other achievements. There will be no cure for cancer without world-class broadband powering the Internet and there is no Internet without electricity.)

I suspect this seems like a pipe dream to some … but so did making electricity universally available at the turn of the 20th century. While I don't have it clear in my head what the new regulatory model should be, I am convinced that one exists and that we are leaving untold benefits on the table because it hasn't emerged yet.

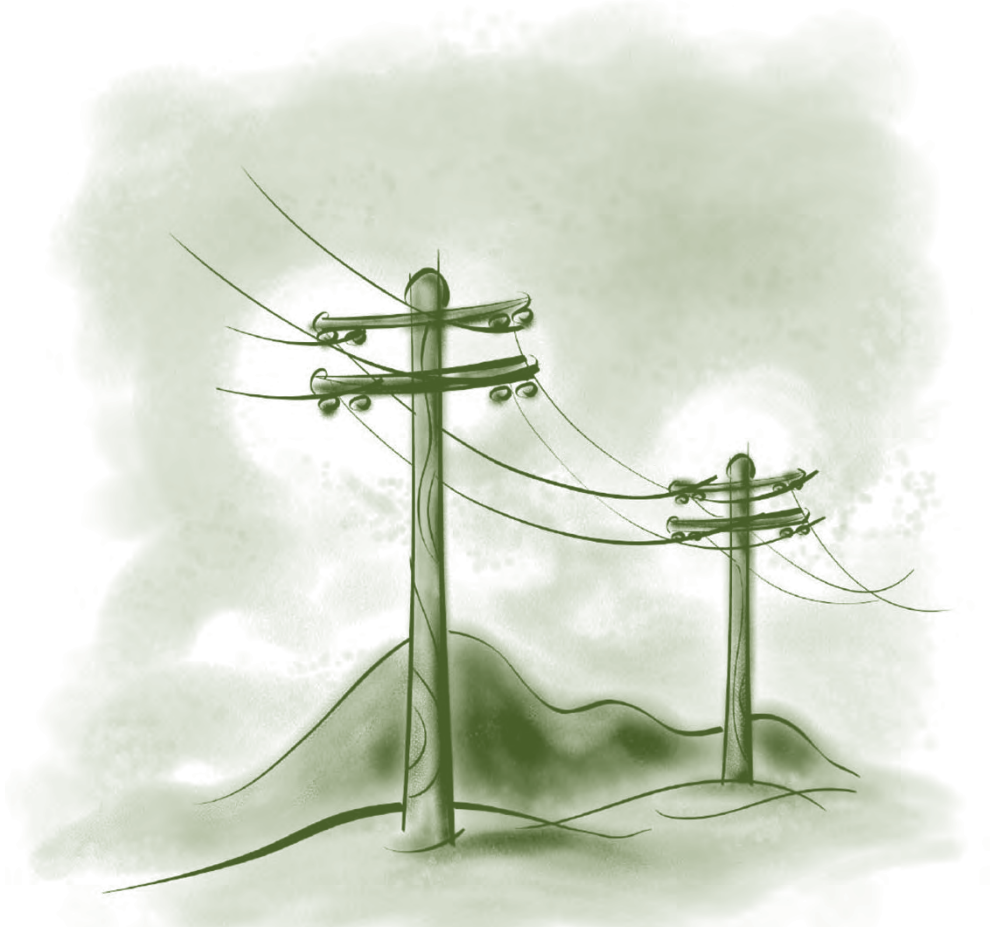
The Smart Grid does not begin with smart meters. The Smart Grid begins with fiber.

*Item Number Four*

*Analysis of Pole Attachment Rate Issues in Tennessee – Tennessee Advisory Commission on Intergovernmental Relations, March 2007*

Complete document provided separately from this memorandum.

# Analysis of Pole Attachment Rate Issues in Tennessee



Submitted by Commission without Comment

March 2007

Tennessee Advisory Commission on Intergovernmental Relations
www.state.tn.us/tacir

*Item Number Five*

*Senate Commerce and Labor Committee Report*

Complete document provided separately from this memorandum, except for pages 57-132 which are redundant with Appendix Item Number Two.

**JACK JOHNSON**
**SENATOR**

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**Senate Chamber**
**State of Tennessee**
NASHVILLE

**CHAIRMAN**
**COMMERCE AND LABOR**

**VICE-CHAIRMAN**
**STATE AND LOCAL GOVERNMENT**

## STUDY COMMITTEE REPORT

SB 3227 by Kelsey

On March 28th, 2012, the Senate Commerce, Labor and Agriculture Committee sent Senate Bill 3277 to a study committee to meet over the break. Pursuant to that motion, Chairman Johnson appointed Senators Tracy and Tate to serve with him on the study committee which met December 12, 2012.

Senate Bill 3277 by Kelsey addressed the long-disputed mechanism by which one company can attach their lines to the poles of another company. Under current law, the attaching party must obtain permission from the owner of the pole and pay a rate set by the pole owner.

The bill as originally drafted required that pole owners must allow attaching parties to attach to their poles at just, reasonable and non-discriminatory rates and created a procedure which allowed the attaching parties to negotiate or arbitrate agreements between their companies and the pole-owning companies.

Under the bill, the pole-owning company could only deny a request to attach where there was insufficient capacity for reasons of safety, reliability and generally applicable engineering principles where it would not be feasible to reengineer the structure. If it could be remedied by reengineering the facilities, then the reasonable and actual costs must be paid by the requesting party.

The bill also created a process whereby a neutral third party who would be responsible for resolving rate disputes among the negotiating parties. The original draft of the bill gave this responsibility to the Tennessee Regulatory Authority. There were concerns with this as a valid option and later amendments contemplated either the Courts as an option or an Administrative Law Judge.

The Committee met on December 12, 2012 and heard testimony on the issue. While the study committee took no formal action, Chairman Johnson encouraged all sides to work toward finding a mutually-agreeable solution. At the direction of the Chairman, this report has been prepared with information provided by the various interest groups. Additionally, this report contains a 2007

**23rd District**
**Williamson County**

*Item Number Six*

*Attorney General's Opinion and Supporting Documents*

TECA Tennessee Electric Cooperative Association
Your Touchstone Energy® Partner

TMEPA
Tennessee Municipal Electric Power Association

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February 20, 2014

The Honorable Ron Ramsey
Lieutenant Governor and Speaker of the Senate
State of Tennessee
301 6th Avenue North
Nashville, TN 37243

The Honorable Beth Harwell
Speaker of the House
State of Tennessee
301 6th Avenue North
Nashville, TN 37243

Cc: The Honorable Jack Johnson
Chairman, Senate Commerce and Labor Committee
The Honorable Pat Marsh
Chairman, House Business and Utilities Committee
The Honorable Art Swann
Chairman, House Business and Utilities Subcommittee

Governor Ramsey and Speaker Harwell,

We write to you today to communicate critical information in relation to Attorney General's Opinion No. 14-20, *State Regulation of Pole Attachment Rates of TVA-Supplied Electric Cooperatives*, a copy of which is enclosed. The Opinion confirms that the State of Tennessee is preempted from regulating the pole attachment rates, terms, and conditions of electric distribution utilities in Tennessee that purchase electricity from the Tennessee Valley Authority (TVA). Attorney General Cooper concluded, "If the TVA were to assert its discretionary control over the rates and revenues of its distributors in a manner that directly affected pole attachments, regulation by the State would likely be preempted."

The TVA has made exactly that assertion in a letter filed with the Kentucky Public Service Commission (KPSC). William D. Johnson, the TVA's President and Chief Executive Officer, in a letter dated February 14, 2014, to the Executive director of KPSC stated:

> "TVA requires each distributor to charge a pole attachment fee that ensures full cost recovery so that no unfair burdens are placed on the electric

> ratepayers. … TVA respectfully submits the [KPSC's] continued forbearance from regulation of the rates and services of TVA distributors is both justified and appropriate."

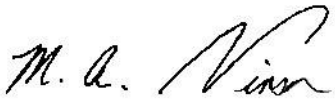
A copy of Mr. Johnson's letter is enclosed. General Cooper did not have access to Mr. Johnson's letter as Opinion No. 14-20 was prepared, and Mr. Johnson's direct assertions of TVA's requirements are not referenced in the Opinion.

The same analysis applies to legislation considered by the Tennessee General Assembly. Any State regulation, legislative or otherwise, that affects "rates for electric power or their ability to comply with their agreements with the TVA" (Opinion p. 1) is preempted. In March 2007, the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) submitted a report entitled "Analysis of Pole Attachment Rate Issues in Tennessee." In that report TACIR concluded, "particular regulation…is not recommended." More pertinently the report concluded, "if pole attachment revenues fall, then eventually rates to (utilities) end use customers must rise." Given that essentially all legislative attention paid to this issue has concerned efforts to reduce pole attachment rates charged to attaching parties, it is certain that any potential State regulation of the issue would fail the Attorney General's standard for preemption.

We trust that this information provides additional guidance to you as these topics are brought before the General Assembly. It is the position of our respective associations that the entire field of regulation regarding rate and service practices of TVA distributors is reserved to the TVA, an agency and instrumentality of the United States of America.

Whenever we can be of service to you, please do not hesitate to contact us.

Yours most truly,



David Callis
Executive Vice President
and General Manager
Tennessee Electric Cooperative Association

Mike Vinson
Executive Director
Tennessee Municipal Electric
Power Association

Enclosures

TECA Tennessee Electric Cooperative Association

Your Touchstone Energy® Partner

STATE OF TENNESSEE

# Office of the Attorney General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ATTORNEY GENERAL AND REPORTER

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LAWRENCE HARRINGTON
CHIEF POLICY DEPUTY


February 20, 2014

The Honorable Pat Marsh
State Representative
G-19A War Memorial Building
Nashville, Tennessee 37243

Dear Representative Marsh:

Enclosed is the attached opinion per your request. Please let us know if you have any further questions. As always, we appreciate your assistance and cooperation.

Yours very truly,

ROBERT E. COOPER, JR.
Attorney General and Reporter

Enclosure

STATE OF TENNESSEE
# OFFICE OF THE ATTORNEY GENERAL

February 19, 2014

Opinion No. 14-20

State Regulation of Pole Attachment Rates of TVA-Supplied Electric Cooperatives

## QUESTION

What, if any, jurisdiction does the State of Tennessee have to regulate the pole attachment rates, terms, and conditions of electric distribution utilities in Tennessee that purchase electricity from the Tennessee Valley Authority ("TVA") in light of the TVA's position, based on the TVA Act, 16 U.S.C. §§ 831 *et seq.*, that it is the "exclusive retail rate regulator for the distributors of TVA power" and that its "oversight over the pole attachment rates of these distributors is sufficient"?

## OPINION

Regulation by the State of the rates, terms, and conditions of pole attachments of the TVA's distributors is not, currently, clearly preempted by the TVA Act, provided that State regulation does not affect either those distributors' rates for electric power or their ability to comply with their agreements with the TVA. If the TVA were to assert its discretionary control over the rates and revenues of its distributors in a manner that directly affected pole attachments, regulation by the State would likely be preempted.

## ANALYSIS

Tennessee is unique in that almost all electric power consumed in this state is generated by the TVA, an agency and instrumentality of the United States, and is either sold directly by the TVA or distributed through a number of municipal and cooperative utilities. Because these utilities purchase from the TVA all of the electric power that they distribute, they are subject to the TVA's regulatory authority. Pole attachment fees are those fees charged by utilities for the right to attach wires and other equipment directly to the electric poles that the utilities own and maintain.

The question whether the State of Tennessee may regulate the rates, terms, and conditions of these pole attachment fees in the face of the TVA's regulatory authority is a question of preemption. The TVA, for its part, has asserted that it "is the exclusive retail rate regulator for the distributors of TVA power," that "the TVA does have oversight responsibility for the pole attachment fees of . . . distributors of TVA power to ensure consistency with the wholesale power contract," and that the

TVA "requires that a distributor recover its full costs associated with the pole attachment and not place any unfair burdens on the electric ratepayers by ensuring a full recovery."[1]

Preemption under the Supremacy Clause, U.S. Const., art. VI, cl. 2, takes one of three well-identified forms. Congress may preempt state law expressly or by implication. Express preemption occurs when a federal law includes a preemption clause that clearly withdraws specified powers from the states. *Jones v. Rath Packing Co.*, 430 U.S. 519, 525 (1977). There are two types of implied preemption, field preemption and conflict preemption. Field preemption occurs when a federal statutory scheme is so extensive and detailed that it leaves no room for supplementary state regulation. *Hillsborough County v. Automated Med. Labs, Inc.*, 471 U.S. 707, 713 (1985). Conflict preemption may occur when it is impossible to comply with both the federal law and the state law, *Florida Lime & Avocado Growers, Inc. v. Paul*, 373 U.S. 132, 142-143(1963), or when state law stands as an obstacle to the accomplishment and execution of the federal law's purpose. *Hines v. Davidowitz*, 312 U.S. 52, 67 (1941).

The TVA Act, 16 U.S.C. §§ 831 to 831ee, does not expressly preempt state regulation, and it contains nothing that specifically addresses pole attachments. Implied preemption, however, may be another matter, as the TVA Act does confer broad discretion on the TVA Board of Directors in the exercise of their authority to sell surplus power in accordance with the Act's established policies. *See* 16 U.S.C. § 831i.

> [T]he Board is authorized to include in any contract for the sale of power such terms and conditions, including resale rate schedules, and to provide for such rules and regulations as *in its judgment* may be necessary or desirable for carrying out the purposes of this chapter, and in case the purchaser shall fail to comply with any such terms and conditions, or violate any such rules and regulations, said contracts may provide that it shall be voidable at the election of the Board.

*Id.* (emphasis added). The purposes of TVA's power sales are set forth as follows:

> It is declared to be the policy of the Government so far as practical to distribute and sell the surplus power generated at Muscle Shoals[, Alabama] equitably among the States, counties, and municipalities

[1] *Petition of the Kentucky Cable Telecommunications Association for a Declaratory Order That the Commission Has Jurisdiction to Regulate the Pole Attachment Rates, Terms, and Conditions of Cooperatives That Purchase Electricity from the Tennessee Valley Authority*, No. 2012-00544, Order, at 6, 7-8, (Ky. Pub. Serv. Comm'n, June 28, 2013) (quoting Jan. 24, 2013 letter from Cynthia L. Herron, Dir. of Retail Regulatory Affairs for TVA) The Commission relied on these statements to rule that it lacked jurisdiction over pole attachment rates, but on August 6, 2013, the Commission granted rehearing of that decision, and the case is currently pending.

> within transmission distance. This policy is further declared to be that the projects herein provided for shall be considered primarily as for the benefit of the people of the section as a whole and particularly the domestic and rural consumers to whom the power can economically be made available, and accordingly that sale to and use by industry shall be a secondary purpose, to be utilized principally to secure a sufficiently high load factor and revenue returns which will permit domestic and rural use at the lowest possible rates and in such manner as to encourage increased domestic and rural use of electricity. . . .

16 U.S.C. § 831j.

"[T]he setting of 'resale rate schedules' [in § 831i], limited only by the provision that they not violate the 'purposes of this Act,' is a clear and broad grant of discretion to the TVA Board to set power rates at the consumer level." *Ferguson v. Elec. Power Bd. of Chattanooga,* 378 F.Supp. 787, 789-90 (E.D. Tenn. 1974); *see also 4-County Elec. Power Ass'n v. Tennessee Valley Auth.*, 930 F.Supp. 1132, 1137 (S.D. Miss. 1996) (recognizing "TVA's having been granted by Congress full discretionary authority with respect to setting rates"). The ample authority cited in these cases demonstrates Congress's intent to grant the TVA broad authority with respect to its power sales. *See McCarthy v. Middle Tenn. Elec. Membership Corp.*, 466 F.3d 399, 406 (6th Cir. 2006) ("Courts have acknowledged that the TVA Act accords the TVA a great amount of discretion in its contractual relations with municipalities.") (internal quotation marks omitted).

The TVA Board exercises its discretion primarily through its contracts with distributors for the sale of power, and the TVA Act has been held to preempt state law where the state law conflicts with the TVA contracts. In *McCarthy*, for example, the United States Court of Appeals for the Sixth Circuit considered whether the TVA Act preempted a Tennessee statute, Tenn. Code Ann. § 65-25-212, that required electric cooperatives to refund excess revenues by making patronage refunds or reducing electric rates. The Court noted first that courts are barred from reviewing the terms of TVA's contracts with its distributors, 466 F.3d at 405-06; it then concluded that state-law provisions like Tenn. Code Ann. § 65-25-212 are preempted because they invade the area of control over distributors granted to the TVA.

> The contractual provisions that prevent the Cooperatives from distributing patronage refunds were created within the TVA's authority to set "resale rate schedules" pursuant to § 831i, because "determinations about the level of rates necessary to recover the various costs of operating TVA's power system, as well as the terms and conditions of TVA's power contracts, . . . are part of TVA's unreviewable rate-making responsibilities." *4–County,* 930 F.Supp. at

> 1138; . . . . To the extent that Tennessee law imposes additional constraints on the TVA's authority, it is preempted by the TVA Act's express grant of discretion . . . .

*Id.* at 407. The court further concluded that its preemption holding extended to the cooperatives' enforcement of the terms of the TVA contract. *See id.* (quoting *Millsaps v. Thompson*, 259 F.3d 535, 538 (6th Cir. 2001)) ("federal law preempts state law 'when a state law stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress'").

On the other hand, there is a general presumption against preemption, particularly in areas traditionally subject to state authority. "In preemption analysis, courts should assume that the historic police powers of the States are not superseded unless that was the clear and manifest purpose of Congress." *Arizona v. United States*, 132 S.Ct. 2492, 2501 (2012) (internal quotation marks omitted). "[T]he regulation of utilities is one of the most important of the functions traditionally associated with the police power of the States." *Arkansas Elec. Coop. Corp. v. Arkansas Pub. Ser. Comm'n*, 461 U.S. 375, 377 (1983).

In addition, Congress has expressly preserved the states' authority to regulate pole attachments. In 1978, Congress enacted the Pole Attachment Act, 17 U.S.C. § 224. "In that act, Congress empowered the Federal Communications Commission ("FCC"), in those states in which access rates were not already regulated, to determine 'just and reasonable' rates a utility could charge cable companies for access to its poles, ducts, conduits, and rights-of-way." *Gulf Power Co. v. United States*, 187 F.3d 1324, 1326 (11th Cir. 1999). A state may regulate pole attachments in the place of the FCC as long as it certifies to the FCC "that . . . it regulates such rates, terms, and conditions; and . . . in so regulating such rates, terms, and conditions, the State has the authority to consider and does consider the interests of the subscribers of the services offered via such attachments, as well as the interests of the consumers of the utility service." 47 U.S.C. § 224(c)(2).

The Pole Attachment Act does not apply to "any person who is cooperatively organized," 47 U.S.C. § 224, "[b]ecause the pole rates charges by municipally owned and cooperative utilities are already subject to a decision making process based upon constituent needs and interests." S. Rep. No. 95-580, at 18 (1977), *reprinted in* 1978 U.S.C.C.A.N. 109, 126. Nothing in the Pole Attachment Act, however, precludes state regulation of the pole attachment rates charged by electric cooperatives. As Tennessee's electric cooperatives are themselves creatures of state law, the State has the inherent authority to regulate their pole attachment rates.

Resolution of the preemption question, therefore, turns on whether the TVA has exercised its broad authority over the rates and revenues of its distributors so as to foreclose regulation of pole attachment rules by the State of Tennessee. The

TVA contracts that this Office has had the opportunity to review do not contain any language that directly addresses pole attachment rates.[2] The TVA has asserted that it does have oversight responsibility for pole attachment fees, and based on the authorities discussed above, any provision in a TVA contract expressly addressing pole attachment rates would preempt state law.[3]

It could also be argued that state regulation of TVA distributors' pole attachment rates is preempted even in the absence of express language addressing pole attachments or other direct involvement by the TVA in pole attachment rates. The TVA's broad authority extends as far "as in [the TVA Board's] judgment may be necessary or desirable for carrying out the purpose of [the TVA Act]," 16 U.S.C. § 831i, and it must be acknowledged that the setting of pole attachment rates is at least to some extent related to the setting of rates for the sale of electric power. Utility poles themselves "clearly are an essential part of providing utility service. Because cable television operators use the same poles that are used to deliver electric and telephone service, abuses by cable television operators potentially could disrupt such service." *Louisiana Cablevision v. Louisiana Public Service Comm'n*, 493 So.2d. 555, 558 (La. 1986). As to rates, "[t]he primary purpose of a pole attachment tariff rate is to provide an appropriate level of revenue contribution towards the total electric revenue requirement, for which the municipality's electric ratepayers would otherwise be completely responsible." *In re Determine Pole Attachment Rates for Municipal-Owned Poles*, No. 06-E-1427, 2007 WL 1387930, at *3 (N.Y. Pub. Serv. Comm'n. May 9, 2007); *see also In re Meade County Rural Electric Cooperative Corp.*, No. 2010-00222, 2011 WL 585043, at *3 (Ky. Pub .Serv. Comm'n. Feb. 17, 2011).

Nevertheless, effect must be given to the general presumption against preemption of state regulation, particularly in this area of utility regulation and particularly where Congress has recognized, in the Pole Attachment Act, the states' traditional authority. In the absence of direct regulation by the TVA Board of pole attachment rates, therefore, regulation by the State of Tennessee of the rates, terms, and conditions of pole attachments would not be clearly preempted by the TVA Act, provided that the specific form of regulation adopted by the State does not

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[2] This Office has viewed contracts produced in the proceeding before the Kentucky Public Service Commission, *see, e.g.*, Power Contract Between Tennessee Valley Authority and Pennyrile Rural Electric Cooperative Corporation, Apr. 7, 1982, produced in Ky. Pub. Serv. Comm'n. Case No. 2012-00544, Nov. 14, 2013. The Office has not viewed any of the contracts between the TVA and its Tennessee cooperatives and recognizes that the contracts produced in the Kentucky proceeding may not be identical in all respects to the contracts in effect in Tennessee.

[3] In the pending Kentucky proceedings, the Public Service Commission granted rehearing "on the issue of whether TVA has, or does exercise, jurisdiction over the pole attachment rates of the TVA Cooperatives." *Petition of the Kentucky Cable Telecommunications Association for a Declaratory Order That the Commission Has Jurisdiction to Regulate the Pole Attachment Rates, Terms, and Conditions of Cooperatives That Purchase Electricity from the Tennessee Valley Authority*, No. 2012-00544, Order, at 3 (Ky. Pub. Serv. Comm'n, Aug. 6, 2013).

affect either the distributors' rates for electric power or their ability to comply with their agreements with the TVA. If the TVA were to assert its discretionary control over the rates and revenues of its distributors in a manner that directly affects pole attachments, regulation by the State would likely be preempted.

ROBERT E. COOPER, JR.
Attorney General and Reporter

JOSEPH F. WHALEN
Acting Solicitor General

JONATHAN N. WIKE
Senior Counsel

Requested by:

The Honorable Pat Marsh
State Representative
G19-A War Memorial Building
Nashville, Tennessee 37243

TECA Tennessee Electric Cooperative Association

Your Touchstone Energy® Partner

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

February 14, 2014

Mr. Jeff Derouen
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
Frankfort, Kentucky 40601

Dear Mr. Derouen:

This letter is in regard to pending administrative litigation before the Kentucky Public Service Commission (the "Commission") styled *Petition of the Kentucky Cable Telecommunications Association for a Declaratory Order that the Commission Has Jurisdiction to Regulate the Pole Attachment Rates, Terms, and Conditions of Cooperatives That Purchase Electricity from the Tennessee Valley Authority*, Case No. 2012-00544. TVA has been following this proceeding since you contacted Cynthia Herron, TVA's former Director of Retail Regulatory Affairs. I am writing you to reaffirm TVA's position in this matter and reiterate TVA's view that its position as the exclusive retail rate regulator for distributors of TVA power, including services relating to such rates, is consistent with both federal laws and the decisions of the courts of Kentucky.

TVA, as a federal corporation, has under federal law the exclusive authority to regulate retail rates and service practices of distributors of TVA power. Among TVA's duties is a duty to supply electrical power at the lowest feasible cost. *See* 16 U.S.C. § 831n-4(f) ("power shall be sold at rates as low as are feasible"). TVA's jurisdiction to "regulate local intrastate rates and service … supplant[s] state regulation …." *TVA v. Tenn. Elec. Power Co.*, 90 F.2d 885, 890 (6th Cir. 1937). And, TVA is expressly authorized to do so in the manner that "as in its judgment may be necessary or desirable" for carrying out the purposes of the TVA Act. 16 U.S.C. § 831i. As Ms. Herron indicated, this oversight extends to the regulation of "the use of electric system assets [(such as poles)] of the distributors of TVA power." Letter from Cynthia Herron to Jeff Derouen (May 16, 2013) (Docket Entry; June 18, 2013). TVA requires each distributor to charge a pole attachment fee that ensures full cost recovery so that no unfair burdens are placed on the electric ratepayers.

Any Commission activity with respect to the fees charged by a TVA distributor for the use of electric system assets (such as poles) will directly affect the distributor's cost of service. Kentucky long ago established that "the rates charged for pole attachments are 'rates' within the meaning of KRS 278.040, and … the pole attachment itself is a 'service' within the meaning of the statute." *Kentucky CATV Ass'n v. Volz et al.*, 675 S.W.2d 393, 396 (Ky. Ct. App. 1983). Further, in 1983, the Commission determined that "federal rather than state law governs the service as well as the rates of all TVA-supplied utilities." Letter from William Sawyer, General Counsel, Ky. Pub. Serv. Comm'n, to Sen. William Quinlan, Ky. Leg. (Mar. 2, 1983) (relying upon

*TVA v. Energy Regulatory Comm'n of Ky.*, No. 79-009-P, slip op. (W.D. Ky. Sept. 27, 1979)). The Commission's June 28, 2013, Order is consistent with the above-described determination that Commission regulation of rates and services of TVA distributors is precluded.

The Commission reached the correct result in its order of June 28, 2013. TVA respectfully submits that the Commission's continued forbearance from regulation of the rates and services of TVA distributors is both justified and appropriate.

Please file this letter in the record of Case No. 2012-00544.

Sincerely,

William D. Johnson
President and Chief Executive Officer

cc:
Eston Glover, President & CEO
Pennyrile RECC
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Warren RECC
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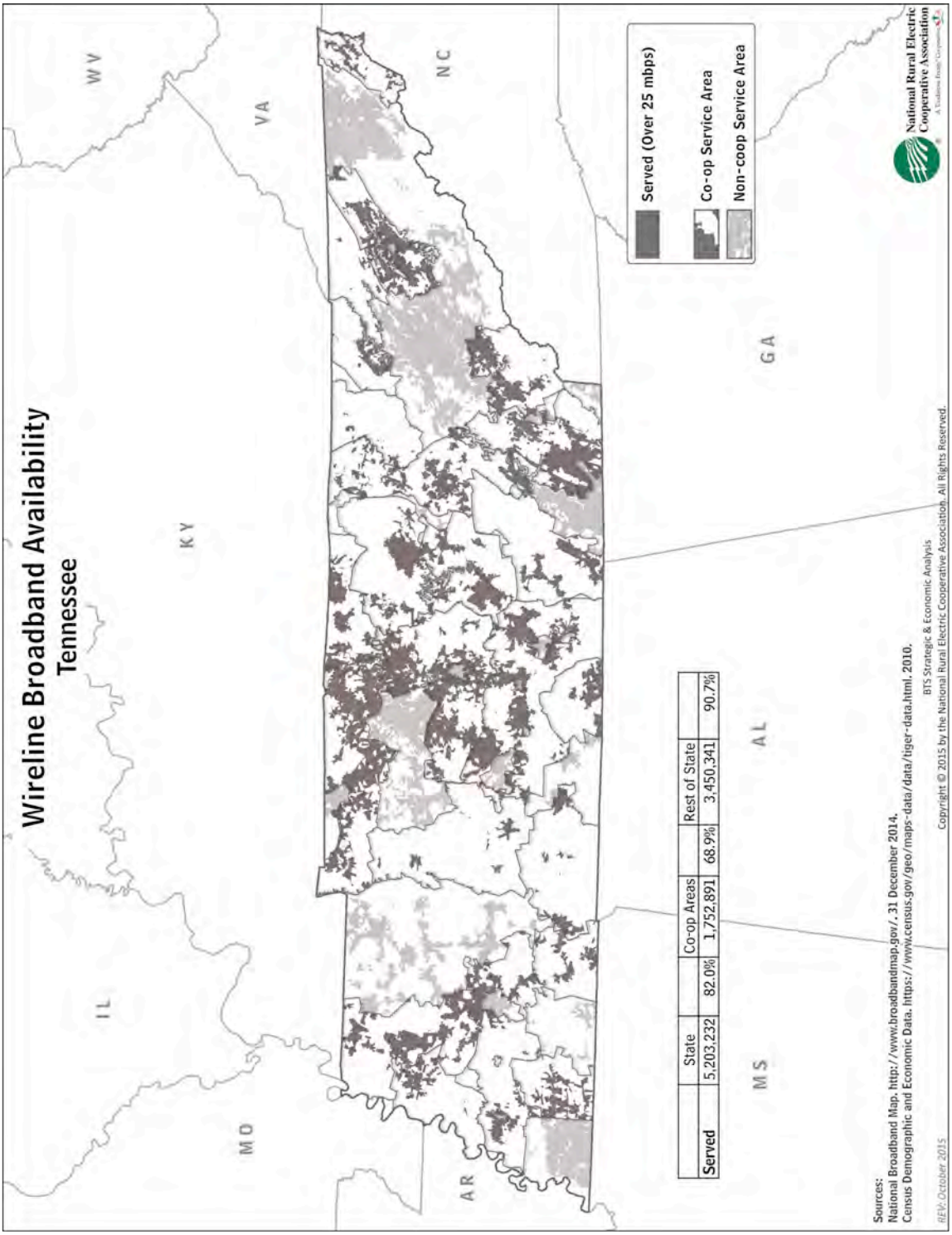
Mayfield, Kentucky 42066

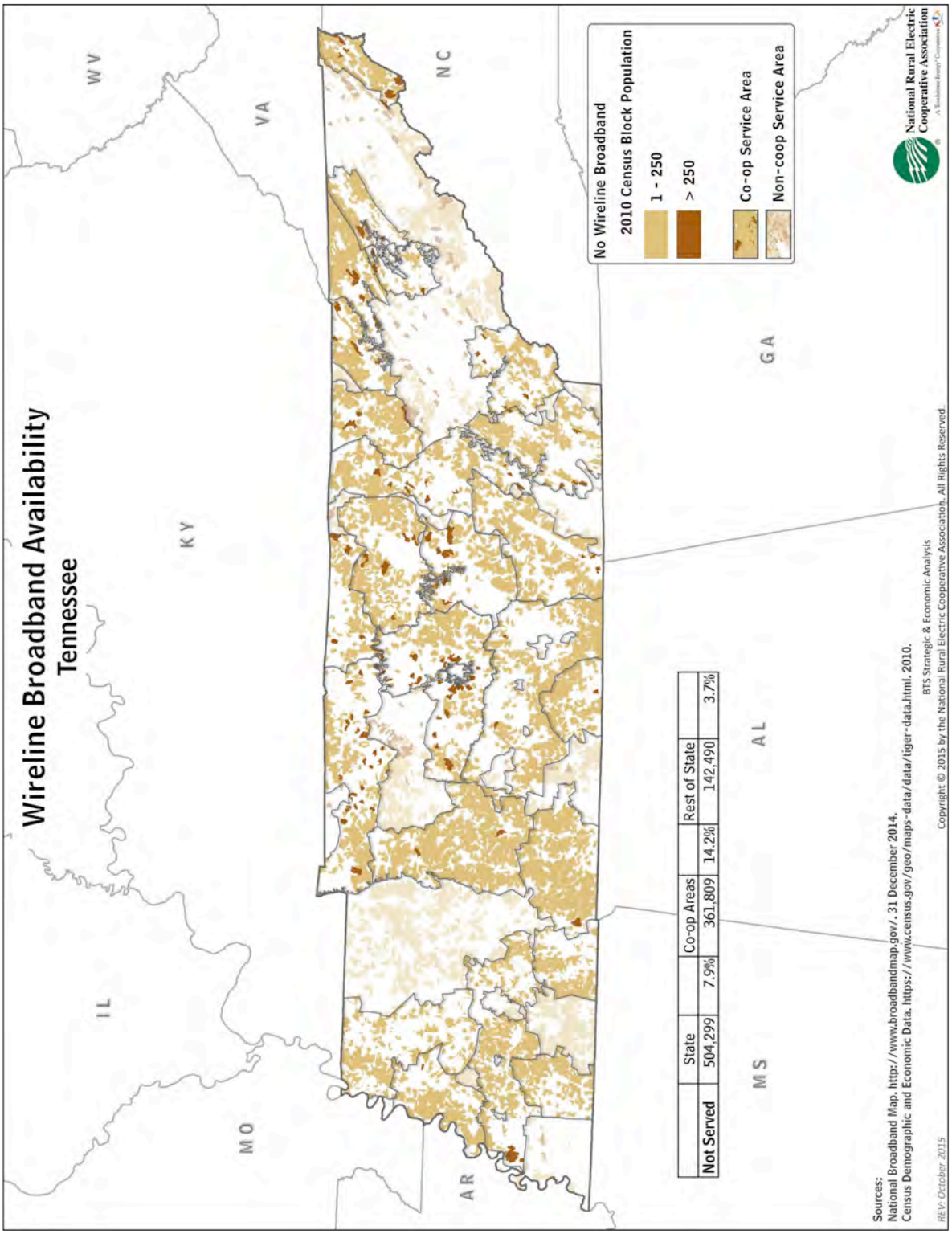
*Item Number Seven*

*Adequate Wireline Broadband Service, Population Density Map – 25 mbps minimum download speed*



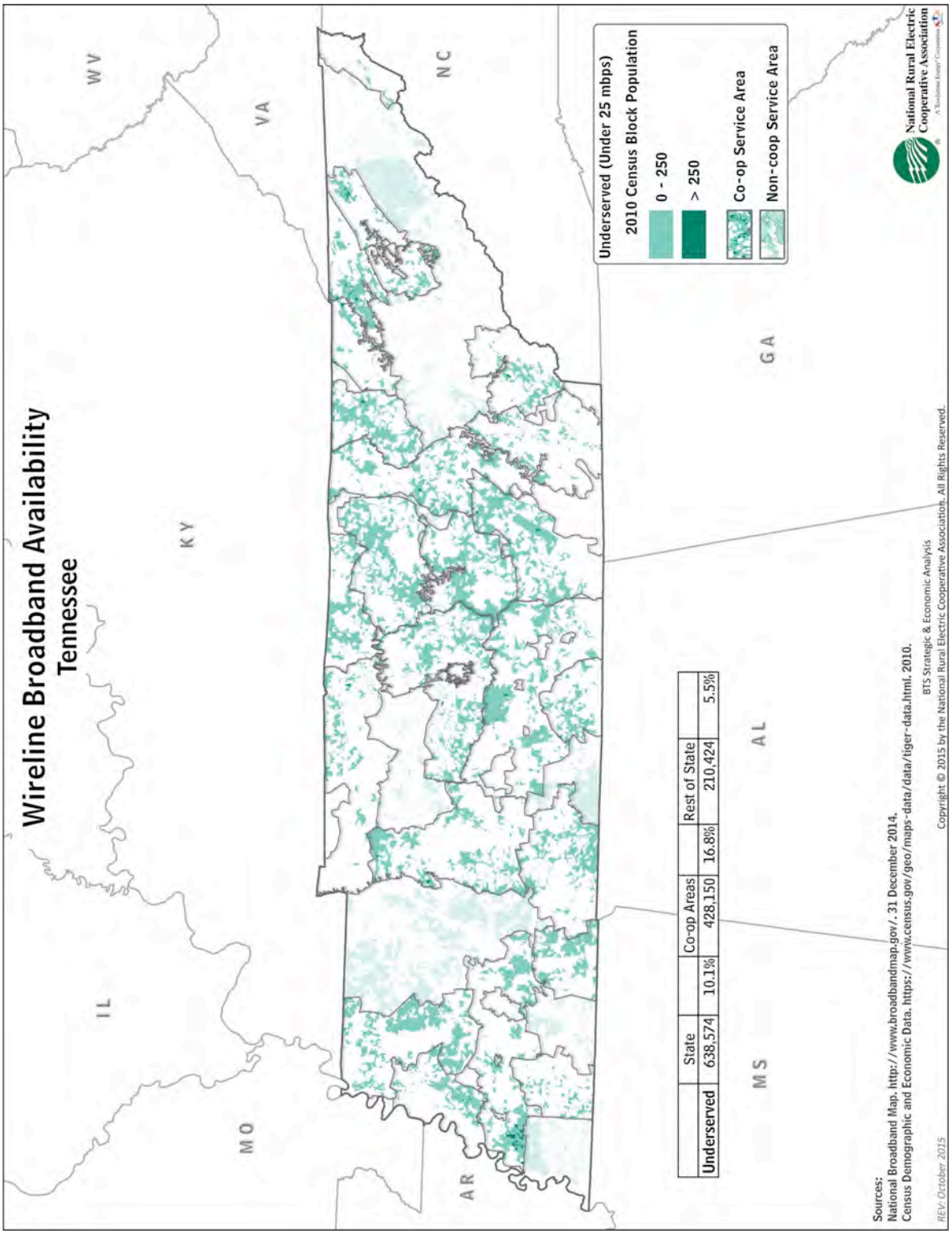
*Item Number Eight*

Unserved Wireline Broadband, Population Density Map



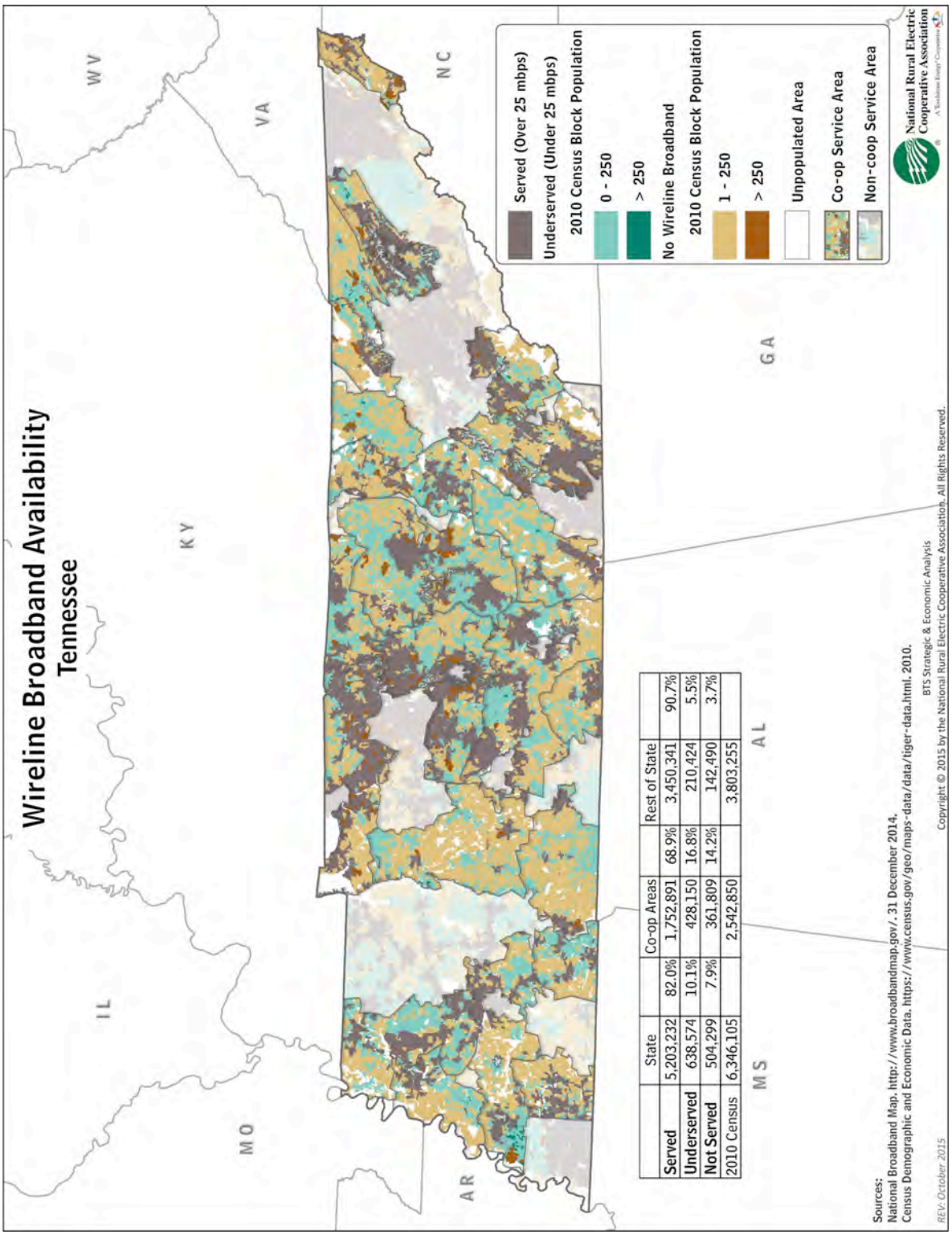
*Item Number Nine*

Underserved Wireline Broadband Service, Population Density Map



*Item Number Ten*

Combination Wireline Broadband Service, Population Density Map



*Item Number Eleven*

White Paper, "Federal Grants for Broadband Expansion in Rural America" by National Rural Electric Cooperative Association, Strategic and Economic Analysis, March 2015

**Federal Grants for Broadband Expansion in Rural America**

There are several sources of federal grants available for expanding broadband in unserved and underserved areas. Although the majority of funding is received by large price-cap carriers, such as AT&T or Frontier, there is additional support available to both telecommunications and electric cooperatives. The following programs provide assistance for expanding broadband in Rural America.

Connect America Fund

The Connect America Fund (CAF) was created in 2011 when the Federal Communications Commission (FCC) made reforms to the Universal Services Fund (USF) to accelerate the expansion of voice and broadband connectivity to unserved rural areas. The FCC established the CAF to replace components of the USF that support telecommunications service in high-cost areas, and set up two phases for transitioning to the new fund.[30] In Phase I, price-cap carriers[31] receive grants annually based on the amount of their existing high-cost support from the USF, "frozen" at December 2011 levels. In addition, the CAF offered two rounds of one-time assistance, in 2012 and 2013, designed as incremental support for broadband. Phase II, which was scheduled to begin in early 2015, will provide a total of $1.8 billion annually, distributed among the price-cap carriers based on calculations from a forward-looking Connect America Cost Model (CAM). Carriers whose Phase II support will be less than the frozen portion of their Phase I support will also receive 75% of this difference in the first year of Phase II, 50% in the second year, and 25% in the third year. To date, Phase II has not yet been implemented, and therefore the exact distribution has not been finalized.

In the first three years of the CAF, price-cap carriers have received a total of approximately $3.5 billion in grants for broadband, with Cincinnati Bell receiving $1.04 billion, followed by AT&T at $621 million, Frontier at $597 million, and Windstream at $365 million.[32] With annual funding of $1.8 billion per year, price-cap carriers are expected to be offered more than $10 billion in grants over the six years of Phase II.

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[30] The CAF includes a broadband portion and a wireless telephone portion, called the Mobility Fund. Although both aspects of the plan feature two phases, Phase I and Phase II amounts discussed here refer only to the broadband program.
[31] Price-cap carriers are large local exchange carriers (LECs) that are not subject to rate base/rate-of-return regulation. The price-cap carriers eligible for CAF grants are Alaska Communications Systems; AT&T Inc.; CenturyLink, Inc.; Cincinnati Bell; Consolidated Communications, Inc.; FairPoint Communications, Inc.; Frontier Communications Corporation; Hawaiian Telecom Communications, Inc.; Micronesian Telecommunications Corp.; Puerto Rico Telephone Company; Verizon Communications; Virgin Islands Telephone Company; and Windstream Communications.
[32] FCC Universal Service Monitoring Report 2014, supplementary table "HC Claims - by Study Area.xlsx"; Connected Nation, "Connect America Fund Underway: Some Telephone Providers Commit to Broadband Deployments", July 26, 2012, available at: http://www.connectednation.org/sites/default/files/bb_pp/phase_i_connect_america_fund_commitments_7.26.2012.pdf; FCC Public Notice DA 13-2103, October 31, 2013, available at: https://apps.fcc.gov/edocs_public/attachmatch/DA-13-2103A1.pdf; and FCC Public Notice DA 13-2329, December 5, 2013, available at: https://apps.fcc.gov/edocs_public/attachmatch/DA-13-2329A1.pdfe-time assistance grants in 2012 and 2013.

Although Phases I and II of the CAF are currently only available to price-cap carriers, other incumbent local exchange carriers (ILECs) and competitive eligible telecommunications carriers (CETCs) can potentially receive Phase II funding that is not initially claimed. In states where price-cap carriers decline some or all of their offered Phase II model-based support, grants will be awarded via a competitive bidding process where other entities, including cooperatives, can bid to receive funding to provide broadband to these unserved areas. It should be noted that price-cap carriers that initially turn down their Phase II awards are also eligible to bid for this funding in the competitive bidding process.

In addition, non-price-cap carriers have continued to receive high-cost support from the USF, reduced from their 2011 levels of funding by 20% each year. Since 2012, a total of $2.05 billion of high-cost support has been awarded to these entities. However, $810 million of this funding has gone to affiliates of price-cap carriers such as AT&T and Verizon, and telecommunications cooperatives have received just $10.4 million.[33]

RUS Community Connect

The Rural Utilities service (RUS), a rural development agency of the United States Department of Agriculture (USDA), established the Community Connect Grant Program in 2002[34], to help rural communities extend access where broadband service is least likely to be commercially available. The program provides financial assistance to rural utilities, municipalities, commercial corporations, limited liability companies, public utility districts, Native American Indian Tribes, cooperatives, and other nonprofit or mutual associations. Since its inception, the Community Connect program has provided more than $148 million in grants. Of this total, telecommunications cooperatives have received nearly $29 million and electric cooperatives have received almost $2 million.[35]

American Recovery and Reinvestment Act of 2009

In February 2009, in response to the continuing economic crisis, Congress passed the American Recovery and Reinvestment Act (ARRA) of 2009. As part of the ARRA, the RUS and the Department of Commerce's National Telecommunications and Information Administration (NTIA) were directed to expand broadband access to communities across the U.S., with emphasis on those that are unserved or underserved, in an effort to create jobs, spur investments in technology and infrastructure, and provide long-term economic benefits to rural areas.

As a result, the RUS Broadband Initiatives Program (BIP) and the NTIA Broadband Technology Opportunities Program (BTOP) were established, to provide funding for broadband infrastructure via grants and loans. The BIP awarded more than $2.2 billion in grants, with telecommunications cooperatives receiving $764 million and electric cooperatives receiving nearly $128 million.[36] Price-cap carriers also received $164 million. Under the BTOP, out of a total of $3.5 billion in grants,

[33] FCC Universal Service Monitoring Report 2014, supplementary table "HC Claims - by Study Area.xlsx."
[34] The program was first administered as a pilot program for two years, and was formally implemented in 2004.
[35] Community Connect Broadband Grant Program Award Summaries, awards by year for 2002-2014, available at: http://www.rd.usda.gov/programs-services/community-connect-grants.
[36] USDA Broadband Initiatives Program Awards Report, January 2011, available at: http://www.rd.usda.gov/files/reports/RBBreportV5ForWeb.pdf.

$163 million went to telecommunications cooperatives and $13.7 million was received by electric cooperatives.[37]

Rural Broadband Experiments

In July 2014, the FCC launched the Rural Broadband Experiments (RBE) program to explore how broadband can be expanded at lower cost in rural America. Viewed also as an effort to inform future decisions regarding the CAF Phase II competitive bidding process, the RBE offered a total of $100 million over ten years, to be awarded based on applicant bids, with the most cost-effective projects receiving funding. In November 2014, the FCC closed the application window and provisionally selected the winning bids. Electric cooperatives were awarded $3.05 million in grants and telecommunications cooperatives were awarded $0.17 million.[38]

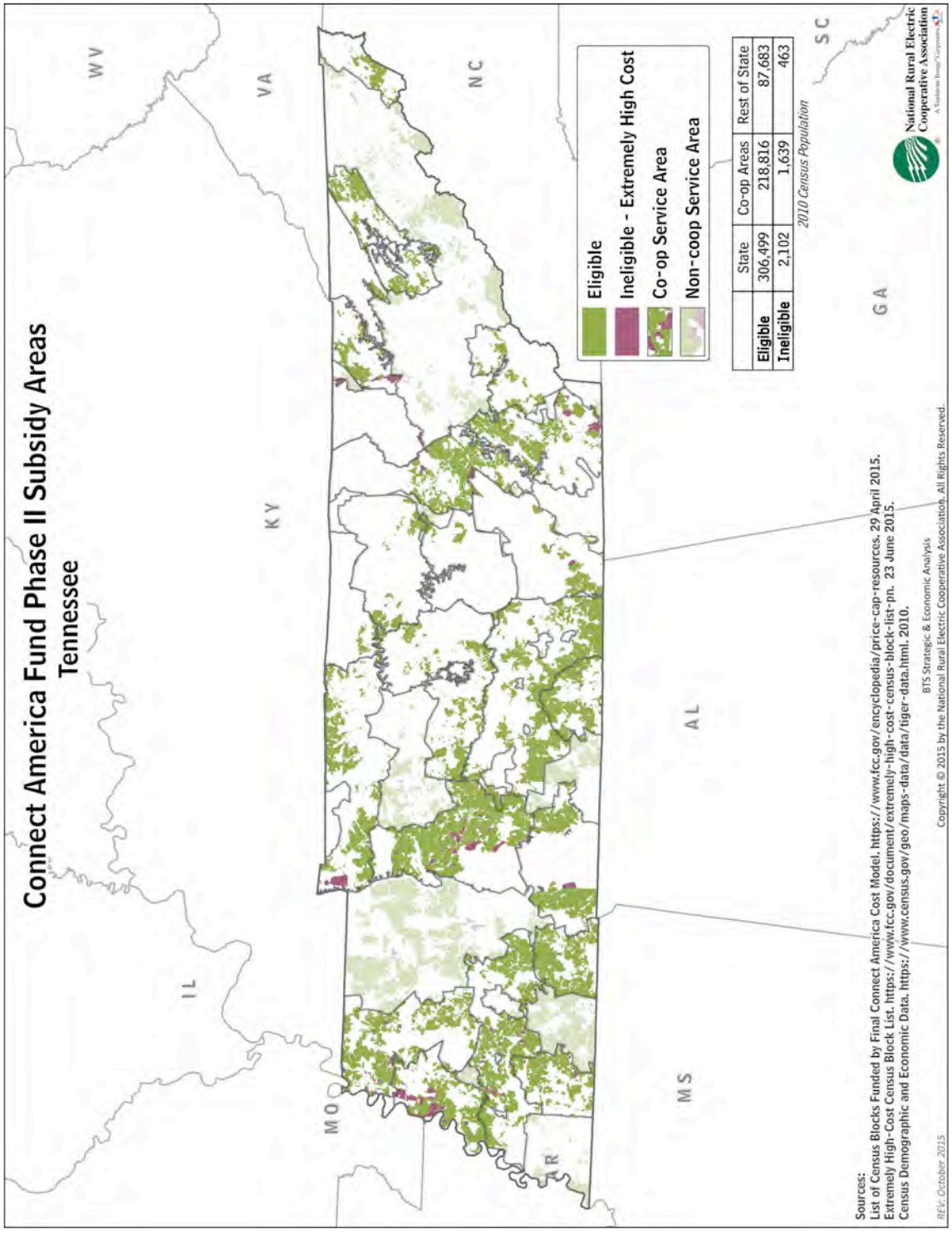
Summary Totals

| | Price-Cap Carriers | Telecom Cooperatives | Electric Cooperatives | Tribes and Public Entities[39] | Other[40] |
|---|---|---|---|---|---|
| | | | | | |
| Connect America Fund Phase I | $3.51 billion | -- | -- | -- | -- |
| "Frozen" High Cost Support | $810 million | $10.4 million | -- | -- | $1.23 billion |
| RUS Community Connect | -- | $28.9 million | $1.99 million | $29.4 million | $88.1 million |
| RUS BIP | $164 million | $764 million | $128 million | $135 million | $1.04 billion |
| NTIA BTOP | -- | $163 million | $13.8 million | $2.04 billion | $1.27 billion |
| Rural Broadband Experiments | -- | $17,420 | $3.05 million | -- | $96.4 million |
| **TOTAL** | **$4.48 billion** | **$967 million** | **$147 million** | **$2.2 billion** | **$3.73 billion** |
| **SHARE OF TOTAL** | **38.9%** | **8.39%** | **1.27%** | **19.1%** | **32.4%** |

[37] NTIA Grants Awarded: Broadband Infrastructure Projects, available at: http://www2.ntia.doc.gov/infrastructure?order=title&sort=asc.
[38] FCC Public Notice DA 14-1772, Attachment A: Provisionally Selected Bidders, December 5, 2014, available at: http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db1205/DA-14-1772A2.pdf.
[39] Includes municipalities, public utility districts, universities, and other government organizations.
[40] Defined as all other entities not already accounted for in the table, including commercial corporations, limited liability companies, and other private associations.

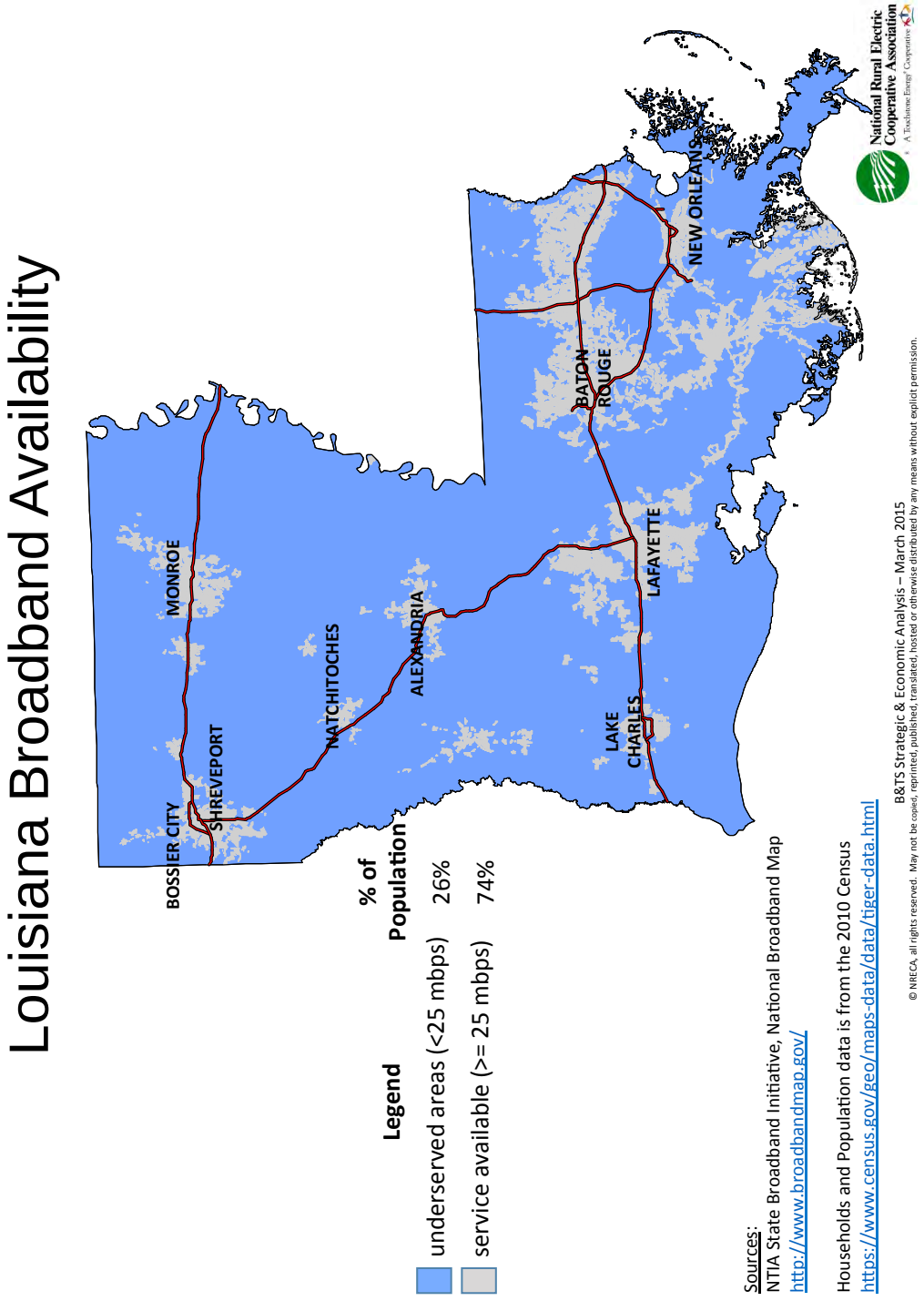
*Item Number Twelve*

Connect America Fund Phase II Subsidy Areas, Co-op Service Territories Map

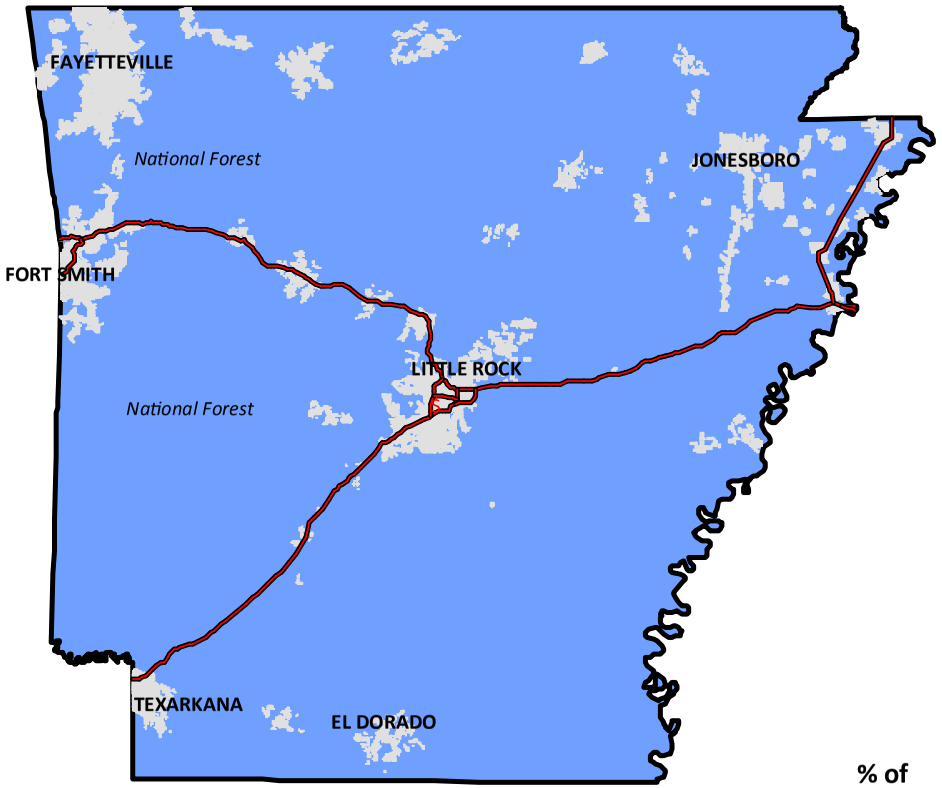


*Item Number Thirteen*

*Louisiana, Arkansas, Tennessee Broadband Availability Maps*



# Arkansas Broadband Availability



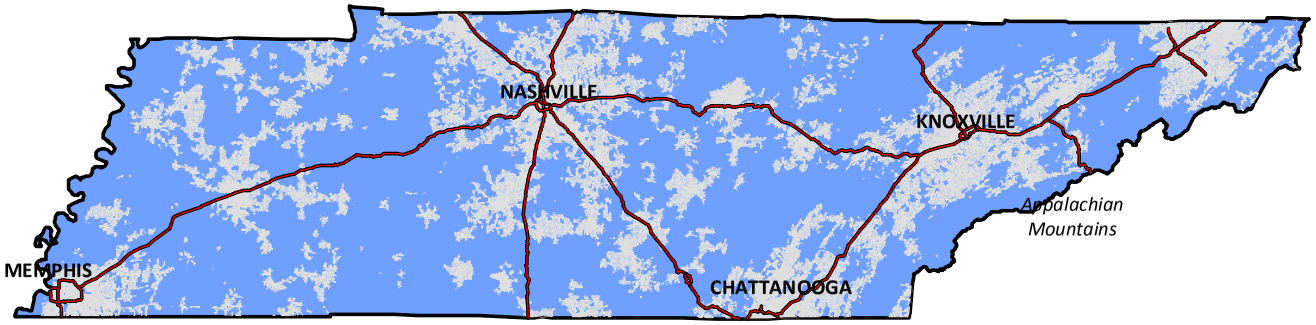

Sources:
NTIA State Broadband Initiative, National Broadband Map
http://www.broadbandmap.gov/

Households and Population data is from the 2010 Census
https://www.census.gov/geo/maps-data/data/tiger-data.html

| Legend | % of Population |
|---|---|
| underserved areas (<25 mbps) | 50% |
| service available (>= 25 mbps) | 50% |

B&TS Strategic & Economic Analysis – March 2015

# Tennessee Broadband Availability




| Legend | % of Population |
|---|---|
| underserved areas (<25 mbps) | 18% |
| service available (>= 25 mbps) | 82% |

Sources:
NTIA State Broadband Initiative, National Broadband Map
http://www.broadbandmap.gov/

Households and Population data is from the 2010 Census
https://www.census.gov/geo/maps-data/data/tiger-data.html