

PLTE/Broadband Report

Utility Plans for Deployment

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Executive Summary

The results of the 2023 UTC PLTE/Broadband Survey provided a wealth of information about utilities' deployments or plans to deploy PLTE or broadband. What we found was that different types of utilities are either pursuing PLTE or broadband, and some are pursuing both. Whether a utility is pursuing PLTE or broadband, internal communications are a key driver, and the need for additional bandwidth is at the heart of it all.

On the PLTE front, there is widespread recognition among utilities that PLTE will serve as the foundation of their modernization strategy, and while utilities are at different stages in their deployment plans, nearly all the utilities that are considering PLTE intend to move forward and deploy. In fact, many of them are planning to deploy in the next three years. That said, none of the cooperatives reported that they were planning to deploy PLTE, while nearly all the IOUs and public power utilities reported that they were either deploying or planning to deploy PLTE.

On the broadband front, utilities are also moving forward generally, although there is a clear divide between utilities that are deploying last mile and those that are deploying only middle mile broadband infrastructure. Some are not interested in becoming ISPs and are only deploying middle mile, while others are deploying last mile to provide broadband ISP services to customers. Interestingly, utilities generally reported that they would be deploying broadband regardless of whether they were able to access federal funding, and most described the availability of broadband funding as complementary to their broadband plans, not essential. This reflects the reality that utilities are committed to deploying broadband, and funding will help to accelerate their deployment plans. Finally, all types of utilities reported that they planned to deploy broadband. While most of the responses were from cooperatives deploying last mile broadband infrastructure, there were nearly as many IOUs who reported that they are deploying broadband for middle mile, and a slightly smaller percentage of public power utilities said they were deploying a mix of middle mile and last mile broadband infrastructure.

Drilling down further into the data, utilities provided a variety of responses about the obstacles they are facing. On the PLTE front, funding was generally cited as an obstacle, and that was coupled with difficulties in developing a business strategy and/or a rate case strategy to support deploying PLTE. Access to suitable spectrum and other technical issues were also cited as obstacles, as was the lack of qualified workforce to deploy/operate a PLTE system. On the broadband front, there were divergent responses from IOUs, co-ops, and public power utilities. For example, IOUs cited supply chain and permitting as their main obstacles. They also cited a lack of funding and lobbying by incumbent commercial broadband service providers as obstacles. Cooperatives were mainly concerned with permitting and supply chain. Public power utilities were primarily concerned about lack of funding, coupled with lobbying by incumbents and permitting.

Interestingly, IOUs reported mixed support for PLTE from senior management, while public power utilities uniformly reported that senior management was supportive of PLTE. The groups supporting PLTE within the utilities included various departments, but gravitated towards IT/Telecom operations or similar groups, as well as business technology and power delivery groups. Also interestingly, many of the utilities reported that the alternative of not deploying PLTE was factored into their decision to move forward, and several of the utilities explained that they would have incurred significant operational expenses if they had continued with narrowband systems. Reduced security and reliability in the narrowband systems were also reasons cited for transitioning away from these legacy systems. For those utilities that reported that they did not have a PLTE project yet, most either explained that their existing systems were sufficient for their current needs, or they simply couldn't justify the expense of deploying PLTE yet. For those utilities that were moving forward or were close to deploying PLTE, they explained that they were doing so mainly to be able to use a unified, standardized platform to improve the economics of their communications. Others explained they mainly needed PLTE for additional bandwidth and improved cyber security. Interestingly, one utility reported that none of these reasons factored into its decision to deploy PLTE. This utility was unique in reporting that it was planning to offer PLTE to unaffiliated organizations and for broadband internet access services, which could explain why they also reported that they are applying for federal funding for their PLTE deployment.

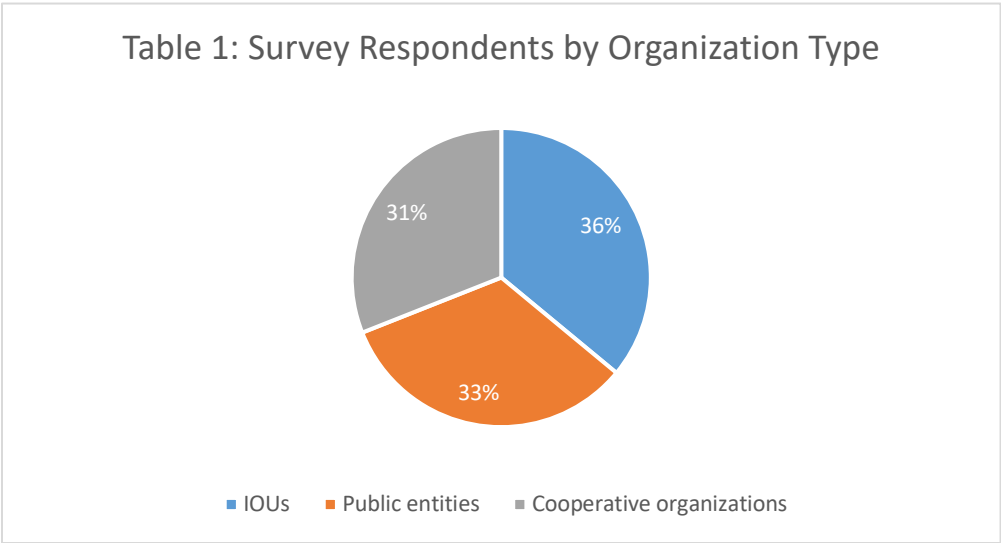
Most utilities reported that they are still in the early stages of their broadband deployment plans, and the last mile deployments are - either currently serving or may potentially serve tens of thousands of customers. The middle-mile deployments are growing in size, and several IOUs reported that they are now either currently deploying or planning to deploy middle-mile in multiple states in their service territories. The total miles of fiber deployed by a utility ranged from 5 to 820 miles among those utilities deploying last mile broadband, and ranged from a few hundred miles to a few thousand miles among those utilities deploying only middle mile broadband.

In summary, many utilities are deploying PLTE and broadband infrastructure, although some types of utilities are only deploying broadband (e.g., electric cooperatives). To be sure, some utilities reported neither any broadband nor PLTE deployments or plans, but there clearly is an overwhelming majority of utilities that is at least deploying either broadband or PLTE. Most utilities are still considering whether to deploy PLTE. That said, a good number of utilities are actually deploying or planning to deploy PLTE within three years, especially among IOUs and to a lesser extent, public power utilities. Meanwhile, most of the utilities deploying last mile broadband infrastructure are either cooperatives or public power, but a number of IOUs, cooperatives, and public power utilities are deploying middle mile broadband infrastructure. Overall, the results of the survey confirm that utilities are deploying wireless and wireline broadband infrastructure to support private internal and external applications.

PRIVATE LTE AND BROADBAND DEPLOYMENT SURVEY 2023

In Q1 2023 UTC’s Public Policy Division, in collaboration with the Utilities Broadband Committee, conducted a survey regarding members’ plans for private LTE (PLTE) as well as broadband middle mile and last mile infrastructure deployment. The responses to the survey provide the basis for the following report that will provide utilities and other stakeholders with an overview of utility wireless and wireline broadband plans. Overall, the responses from UTC’s members form a representative cross-section of the prevalent utility organization forms, i.e., investor-owned utilities (IOUs), public power utilities (Public), and cooperatively organized utilities. While the survey shows that only IOUs and Public deploy are planning to deploy PLTE, all types of utilities reported that they are deploying either last mile or middle mile broadband infrastructure, as described below:

The responding entities are a good cross-section of UTC members:



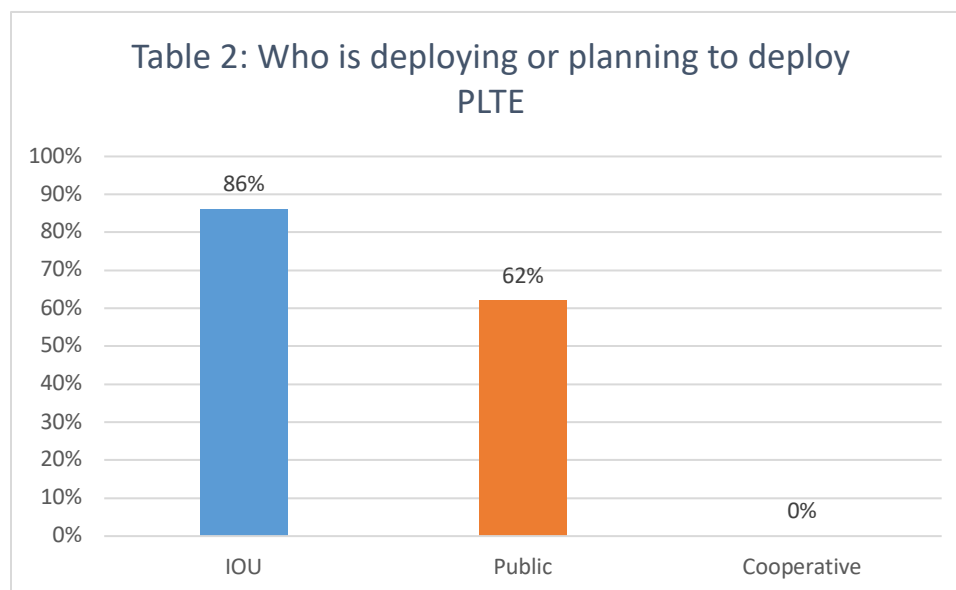
PRIVATE LTE

Private Long-Term Evolution (Private LTE) wireless services continue to become a more prevalent service option for electric utilities. Driving the intelligent network further into the utility system is a necessity to prepare companies for grid modernization and greater data and throughput requirements associated with it. That includes streaming video from substations and monitoring sensors across transmission and distribution infrastructure, as well as monitoring and controlling power quality across thousands of connected buildings throughout utilities’ service areas. Private LTE, and further down the road 5G, will be needed to meet the capacity and coverage requirements for grid modernization. It is a standardized technology that is commercially available and provides sufficient bandwidth for many of the applications that utilities are increasingly needing

to enable, as well as offering reliability, security, and product support. Private LTE will also enable utilities to apply analytics to vast amounts of data generated by their existing applications, such as Supervisory Control and Data Acquisition (SCADA) systems, and could also allow them to support new applications, such as Unmanned Aerial Systems (UAS or drones).

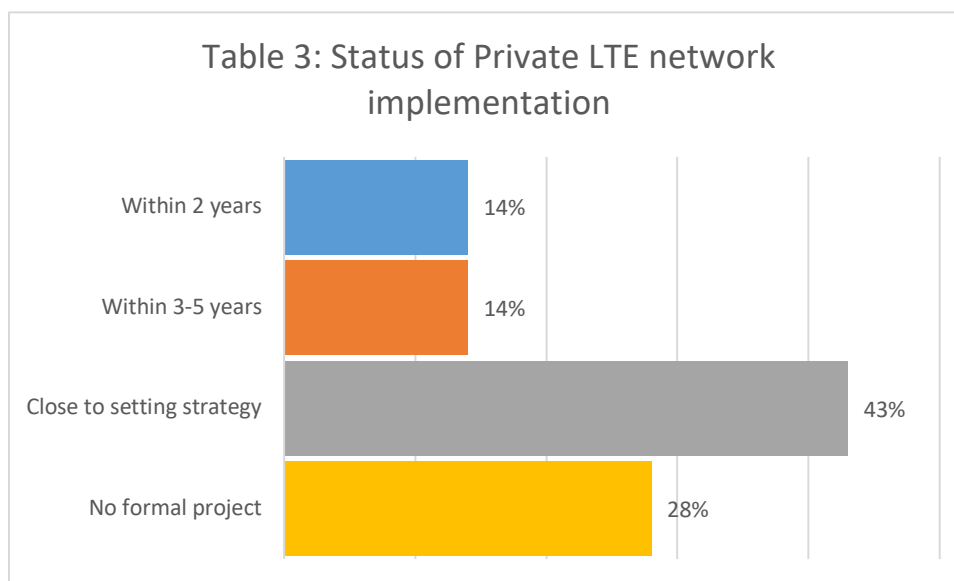
Who is deploying Private LTE?

Scale is of course an important factor in deploying a Private LTE network. Utilities can either purchase their own spectrum and build their own wireless private network; they can purchase spectrum from licensees; or they can purchase a “Private LTE network in a box” from wireless providers. The responses from our survey show that 51% of responding utilities are pursuing PLTE. Specifically, 86% of responding Investor-owned utilities (IOUs) and 62% of public power companies are deploying or have plans to deploy Private LTE networks. None of the electric cooperatives responding to the survey reported that they have deployed or have plans to deploy Private LTE.



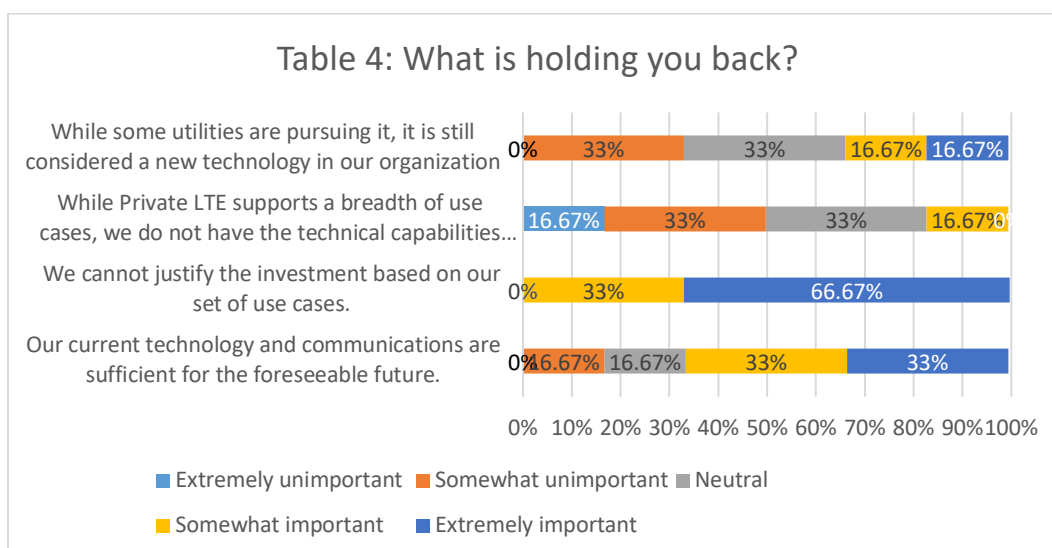
Status of Deployment

Of all utilities that indicated that they had deployed or planned to deploy Private LTE, 29% reported that they plan to initiate their deployments within 5 years. Specifically, 14% are ready to start deployment within the next two years, another 14% within the next 3-5 years, and 43% are close to setting their communications strategy. Meanwhile, 28% are planning to evaluate Private LTE in the next few years, but do not have yet a formal project to do so.



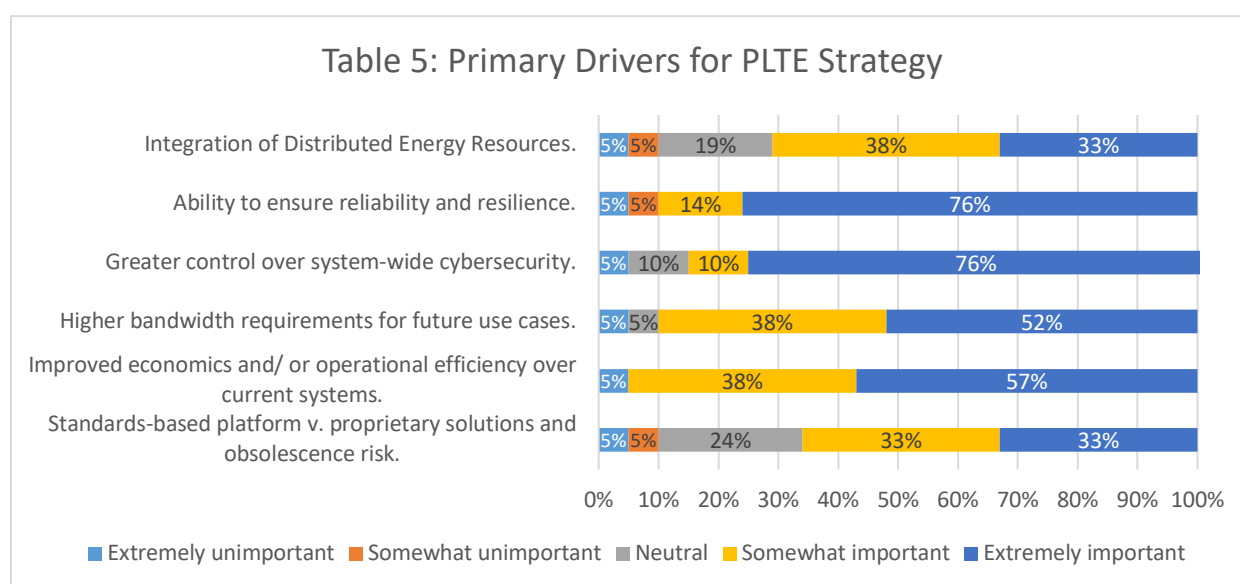
What is Holding Utilities Back?

Asked about the factors that have affected delays in the decision to accelerate the Private LTE deployment, utilities overwhelmingly identify cost as extremely or somewhat important. Meanwhile, the capabilities of their current technology and communications capabilities were ranked a little less favorably but still held utilities back. Utilities were roughly split when asked whether they considered PLTE a new and unproven technology for utilities with almost an equal number of utilities describing this concern as either unimportant, neutral, or important. The survey also shows that the lack of in-house technical capabilities is another significant factor in delaying utilities from pursuing Private LTE, although many utilities recognize that PLTE can provide a uniform platform capable of supporting a variety of use cases.



Primary Drivers for Your Organization's Interest in Developing a Private LTE Strategy.

When asked about the primary drivers for their organization's Private LTE strategy, utilities overwhelmingly assigned the highest priority to two factors: greater control over system-wide cybersecurity and the ability to ensure reliability and resilience – each of which was listed as extremely important factors by 76% or more of utilities. Besides these factors, the biggest drivers with 95% and 90% combined scores for extremely important and somewhat important, respectively, were improved economics and/or operational efficiency as well as higher bandwidth requirements for future use cases. Meanwhile, 29% of respondents rated the Integration of Distributed Energy Resources as somewhat unimportant or extremely unimportant.



Private LTE Strategy and the Value of Private vs. Commercial and Role of Champions.

Over half of the respondents (57%) indicate that Private LTE is a foundational element of their organization's modernization strategy. It is possible that this percentage will increase considering that, for 86% of respondents, updating critical communications for grid modernization is an issue that resonates with their senior leadership team. Further, 76% of respondents state that senior management understands the value proposition of Private LTE vs. Commercial LTE. Internal drivers and champions within utilities for Private LTE deployment were overwhelmingly reported as: 1) the IT/OT departments, 2) telecommunications groups, and 3) network infrastructure and also occasional C-level support.

Table 6: Private LTE as foundation of modernization strategy?

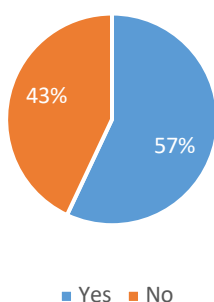


Table 7: Support for updating critical communications?

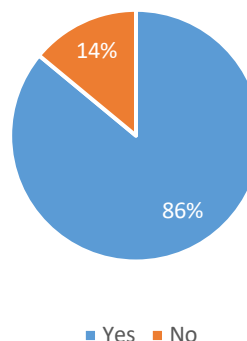
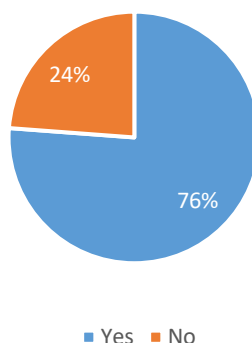
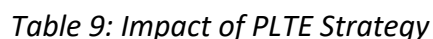


Table 8: Understanding of PLTE v. Commercial LTE?



Weighing the Options of Not Taking Action

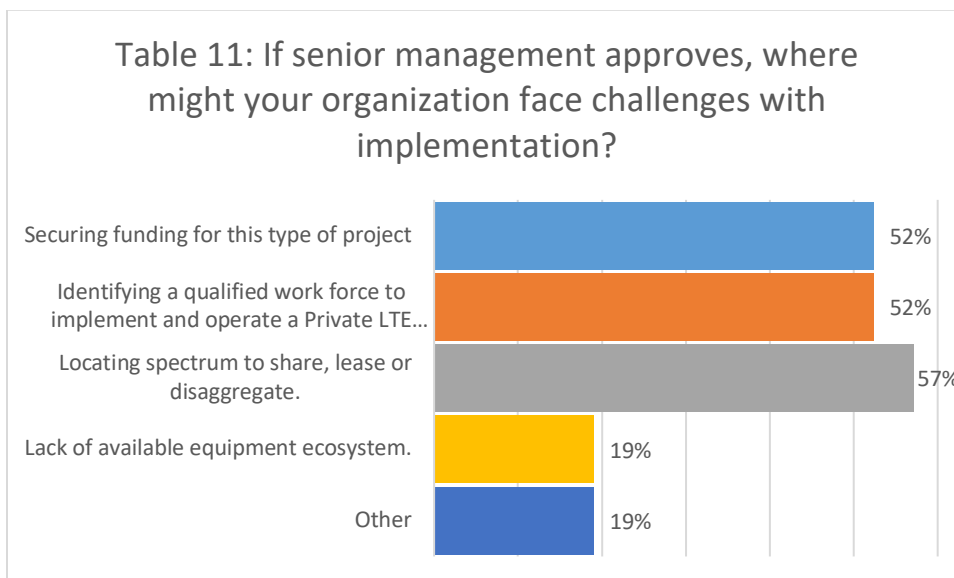
Surprisingly, 29% of respondents indicate that they have not done an impact assessment of not pursuing a Private LTE strategy in the broader context of grid modernization investments generally. Of the 71% who have done such an analysis, respondents indicate that they valued the system control Private LTE afforded them, the better cybersecurity posture, and the capabilities and capacity of the system for future requirements.



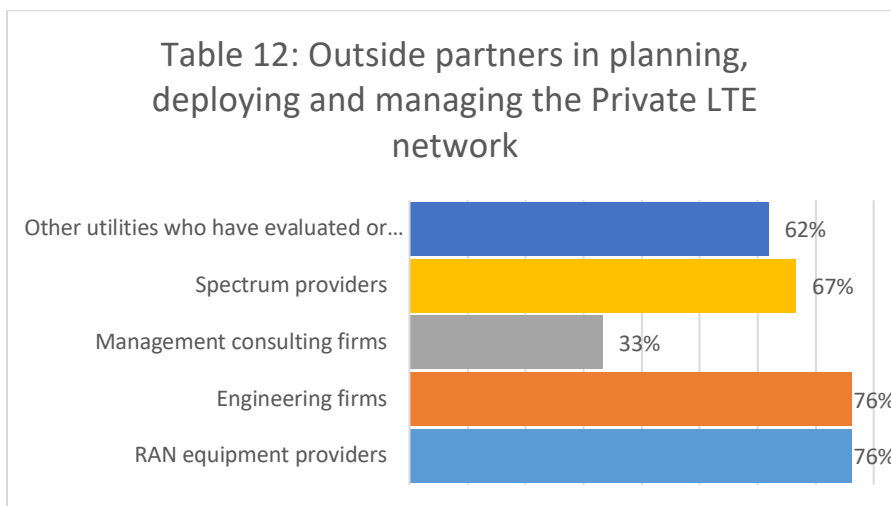
Respondents reported serious concerns about various evaluation and implementation challenges. Specifically, 71% identified “creating an effective rate case strategy” and “developing a detailed business model” as potential challenges for PLTE, while 66% foresaw problems reaching “internal alignment on the value of Private LTE.” Almost half of utilities reported challenges associated with “engineering analysis and RF studies.”



The most pressing challenges in the implementation process facing respondents included “locating spectrum to share, lease or disaggregate” and “securing funding for this type of project” – each of which was reported by 52% of utilities responding, while “identifying a qualified workforce to implement and operate a Private LTE network” was rated as a challenge by 57% of the utilities reporting.



Utilities traditionally rely on trusted providers who have a successful track record in the utility industry. From that perspective, it is not surprising that 62% of utilities would ask for advice from utilities that have undertaken a similar project. Similarly, 76% of utilities said that they would also likely partner with RAN equipment providers and engineering firms to deploy PLTE, and 66% of utilities said they would also likely partner with spectrum providers. Finally, 33% of utilities reported that they would likely partner with management consultants.



Monetizing the Investment

While we know that utilities value the security, capabilities, and availability of their network, that does not mean that they will not consider opportunities to monetize their investment in PLTE systems. One obvious choice is for utilities to leverage the Private LTE system to support policymakers' broadband deployment objectives. 71% of utilities reported that they would consider this option. Similarly, over 50% of utilities reported they would be willing to add an additional revenue stream by extending their Private LTE service to unaffiliated cooperatives, municipalities, or other utilities, whether gas, water, or electric.

Table 13: Private LTE as a Means to Meet Other Objectives

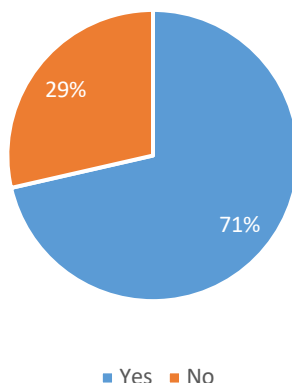
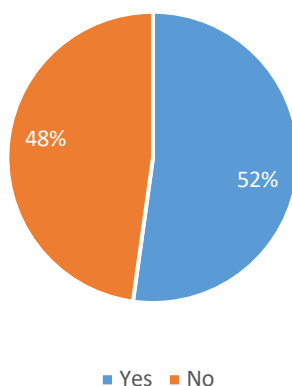


Table 14: Extending Private LTE service to unaffiliated Organizations?

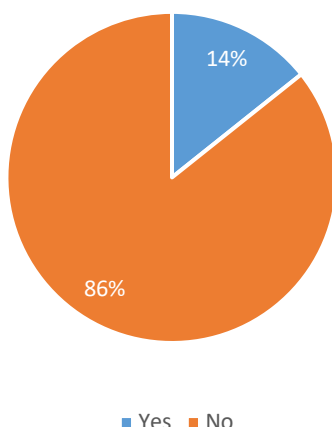


Have Utilities Considered Taking Advantage of ECIP Funding?

A potential area of untapped opportunity lies in taking advantage of the FCC's Enhanced Competition Incentive Program (ECIP) designed to promote secondary market spectrum transactions. Another is applying for federal funding programs or alternatively for federal funds that are then administered through state broadband offices.

Only 14% of respondents have indicated that they would consider taking advantage of the FCC's ECIP, which provides incentives to encourage incumbent licensees to negotiate to partition, disaggregate, or lease their spectrum licenses with other entities order. This is a relatively new program, but one that the FCC believes could promote access to spectrum that would otherwise go unused and which could make that spectrum available to entities who would otherwise not be able to afford it, if not for the incentives that it provides to incumbents in the form of extended license terms and build-out requirements, just to name a few incentives under ECIP.

Table 15: Have you made any plans to take advantage of the FCC's ECIP order?



MIDDLE MILE AND LAST MILE DEPLOYMENT

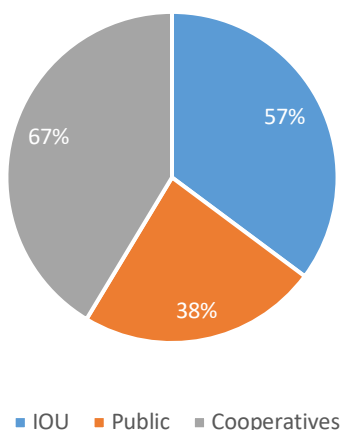
Broadband: How many of each type of utilities deploy or plan to deploy middle mile and/or last mile broadband?

The survey also asked questions about members' deployments or plans to deploy broadband as middle mile or last mile. Middle mile broadband describes the physical fiber infrastructure needed to enable connectivity, e.g., to last mile networks, and is capable of transporting large amounts of data very fast over long distances. Of all respondents, 54% responded that they had such plans.

Middle mile infrastructure in our context is mostly deployed by larger utilities with extensive transportation networks where the fiber is used to upgrade the intelligence of the network and at the same time can serve as a resource to connect data traffic from ISP end-user networks to Internet Connection Points. These middle connections play an important role in making last mile connections faster, more reliable, and more affordable. In the absence of such middle mile networks, ISPs are dependent on older, more expensive, and less capable networks which negatively affects user experience and can degrade some provided services.

In contrast to the Private LTE portion of the survey, the broadband survey results show that broadband deployment is an important issue for all utilities irrespective of their organization form. Overall, 54% of respondents report that they are deploying or have plans to deploy broadband. Electric cooperatives are the type of utility with the highest broadband activity with 67%. Meanwhile, 57% of investor-owned utilities reported broadband activities, and 38% of public power companies are involved in broadband.

Table 16: Who Deploys Broadband?

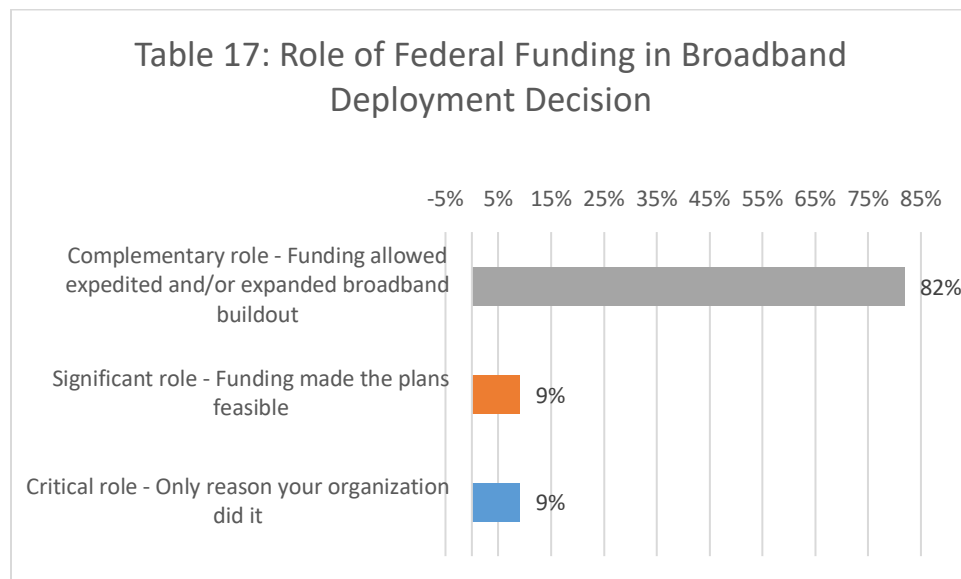


Is Funding the Critical Incentive for Utilities?

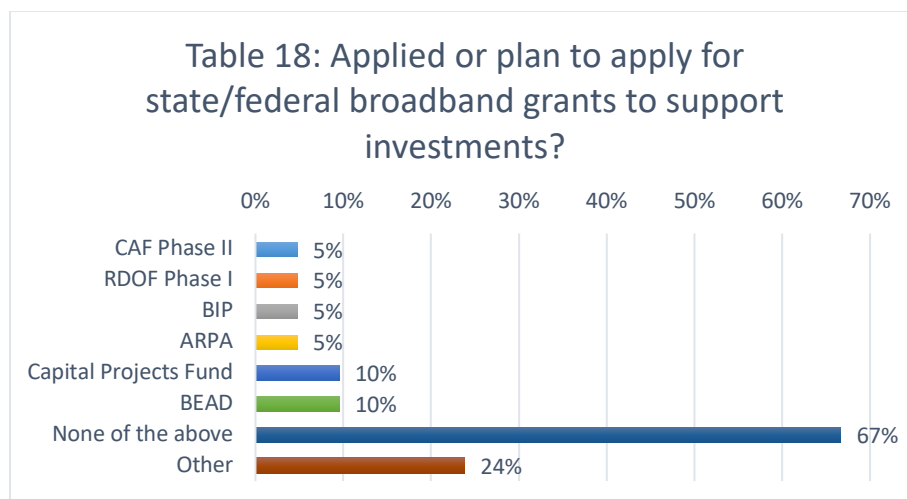
There is a plethora of federal funding opportunities available, many of which are administered on the state level. Many of these programs (e.g., the Department of the Treasury's Capital Project Fund and the State and Local Fiscal Recovery Fund) have only been partially distributed; and others have been distributed (e.g., the FCC RDOF Phase I Auction funds or the USDA ReConnect program) but deployment might not have started yet. Then, there is the \$42.45 billion Broadband Equity, Access and Deployment (BEAD) program which has announced the state allocations on June 26, 2023. Utilities reported that the delayed availability and sometimes challenging application procedures for funds are discouraging factors, which may explain the relatively low percentage of utilities responding to the survey question about their plans to apply for federal funding programs. Specifically,

50% of all utilities did not respond, the vast majority of them electric cooperatives, and only a few investor-owned utilities and public power companies reported that they were applying for such funding.

This unsettled picture is also mirrored in the responses when utilities were asked about the role funding availability played in their ability to deploy broadband. Only 55% registered a response, and 82% of them indicated that access to funding played a complementary role, while 9% reported that federal funding played either a significant or critical role. Of the 45% of non-responding entities, 22% were electric cooperatives, 33% were investor-owned utilities, and 45% were public power utilities.

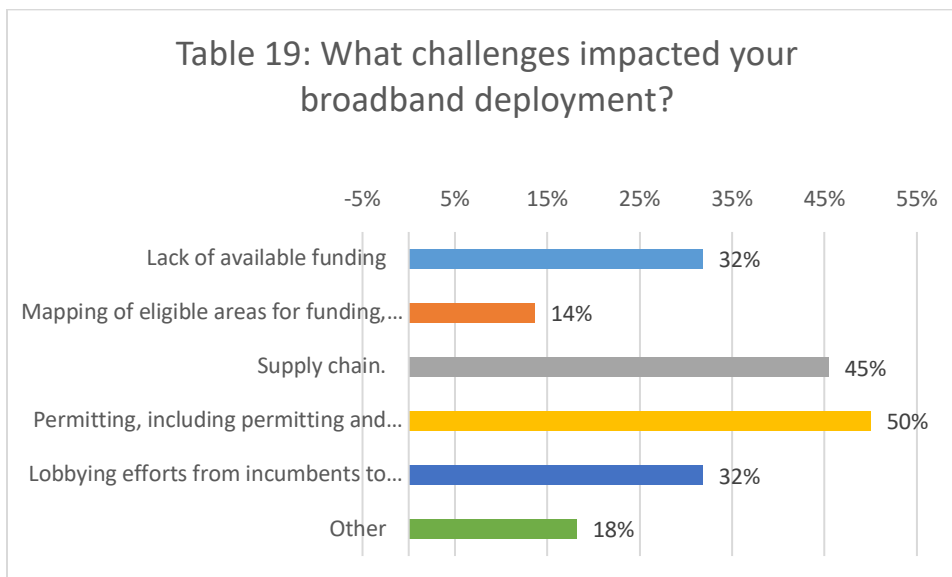


It appears that federal funding programs have not been top of mind in informing utilities' broadband plans. Specifically, 66% of utilities reported that they do not intend to take advantage of any of the available federal or state funding programs like BEAD, CPF, or RDOF.

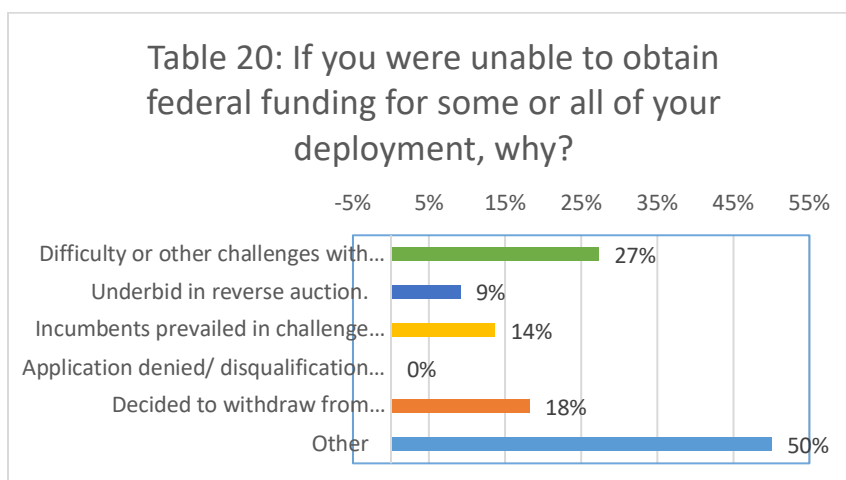


What's Keeping Utilities from Providing Broadband?

Upon review of the challenges reported by utilities when deploying broadband, most respondents pointed to difficulties and delays with the permitting and rights-of-way process. Lack of available funding; and lobbying efforts by incumbents to avoid, delay, or reduce the scope of deployment also played an important role, while mapping of eligible areas was a concern of very few respondents.



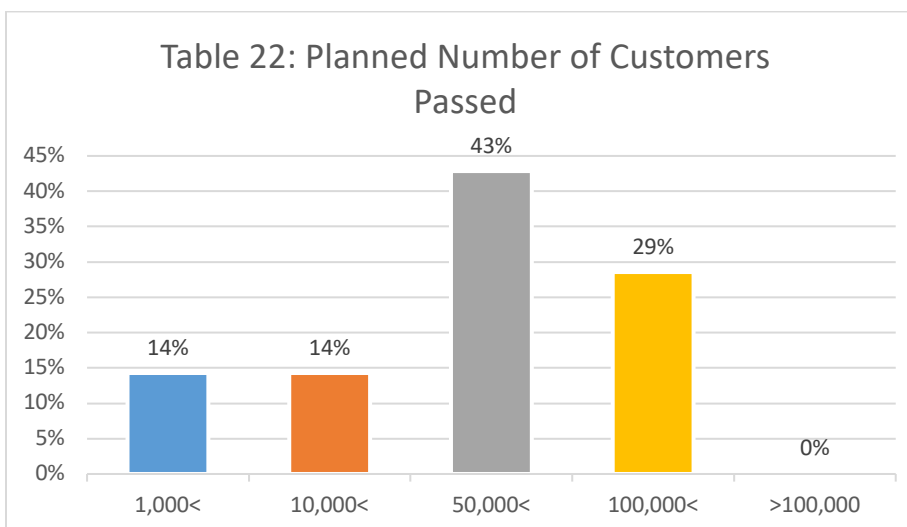
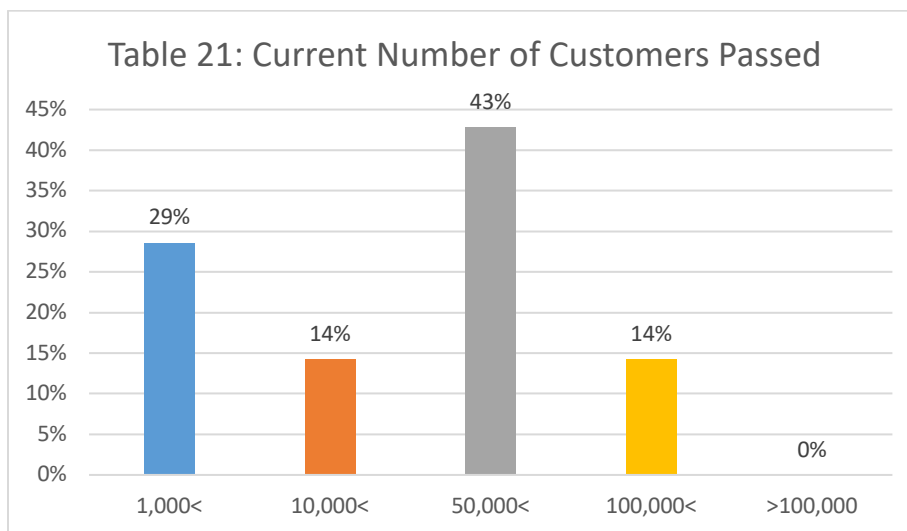
Only a few entities were unable to secure federal funding and the reasons varied widely. However, highlighting the careful and concise approach of utilities, none of them reported that their applications were denied or disqualified. Notably, some of the utilities that were unable to obtain funding reported that they were underbid at auction or that they decided to withdraw from consideration, and/or the difficulty of the application process was a barrier.



Utilities Will Bring Broadband to Communities in Rural America, Deploy Smart Grids and Provide Connectivity to Third Parties.

Electric utilities have been recognized by the FCC, NTIA, and the RUS as engines for rural broadband deployment. Electric cooperatives bring reliable, robust, and affordable gigabit connections to communities where others wouldn't go. Generation and Transmission cooperatives and IOUs are deploying middle mile broadband to connect these new last mile deployments with the same reliable, robust, and affordable service, enabling them to reach internet exchange points that were not reachable before or only with lower speeds, uncertain reliability, and higher cost.

The survey makes clear that electric coops and municipalities are serving a cross-section of America with a focus on areas neglected by the incumbent telecommunications and cable companies.



Utilities Lead the Way in Bringing Broadband, Smart Grid, and Innovation to Unserved and Underserved Communities.

Electric utilities do not exist solely to generate, transmit, and distribute power. They are also integral parts of their communities, and they take this function seriously. While we may look at the total number of miles deployed in the last mile broadband network and think of the opportunities for economic, social and health advances, there is much more. These broadband networks will also bring substantial benefits to their communities with respect to safety, reliability, and affordability. A smart grid network can detect potential problems before they turn into outages and a smart network can enable two-way communications, providing availability of intelligent demand response, the addition of distributed energy resources, and integration of electric vehicle charging and battery availability.

Table 23: Number of miles in last mile broadband network at completion

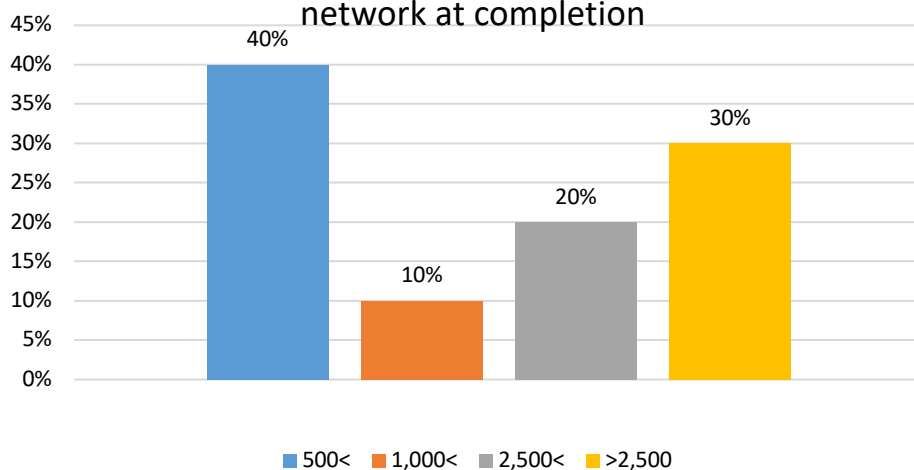
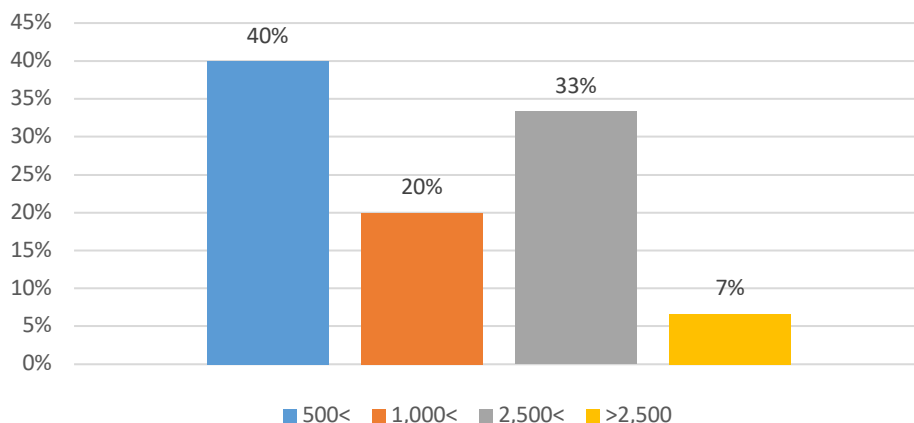


Table 24: Number of miles in middle mile broadband network at completion



Electric utilities are facing exciting times, and challenges await them at every turn. In order to successfully manage the transition to an intelligent grid with a multitude of responsibilities, utilities will need access to reliable, robust and resilient private communications network. Private LTE and the deployment of last mile and middle mile networks are an integral part of that process. Utilities are prepared to embark on this journey and will continue to provide reliable electric, gas and water services along the way.

End Notes