

Ameren Missouri
Case Name: ER-2022-0337
Docket No(s): 2022 Electric Rate Review

Response to Discovery Request: OPC 2-OPC 2011
Date of Response: 12/8/2022
Witness: N/A

Question: What, explained in detail, particularly as to its cost/benefit analysis, is Ameren Missouri's rationale for deploying its own Private LTE network, particularly as opposed to utilizing an existing third party service?

Response:

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Date: 12/2/22

Summary: As utilities in the US work to modernize the electric grid and provide customers with more options, the need to integrate electric grid and telecommunications technologies has become much greater. For Ameren Missouri to provide a reliable energy supply while supporting the deployment of Smart Grid, future storage technologies, bidirectional electricity flow, and managing evolving customer expectations, a robust private communication network will be critical and integral to maximizing the operational impacts of these technological advances. The current rate of Smart Grid technology deployment within the Ameren Missouri territory establishes a need for a coordinated capital investment of communication assets. The Missouri Private Long Term Evolution (PLTE) project meets the need of updating and enhancing the existing wireless communication system in order to support these efforts.

Building a private, wireless network delivers superior value to our customers, versus relying on the public networks, and meets the growing needs of the company with a globally recognized standard that enables further smart grid deployment, including in parts of Ameren Missouri's territory that the public carriers may not serve. PLTE will also allow Ameren to reduce the number of network technologies currently deployed required by the public networks from over 20, down to four standard solutions with PLTE. This will reduce complexity, provide greater scalability, and standardization and thereby simplifying support and maintenance. Inherently, the Private LTE solution also greatly reduces the dependency on public carriers, thereby increasing communication reliability, resiliency, and cyber-security, creating a platform which supports the growth of connected devices well into the future. In other words, Ameren will define the communications priorities to match electric needs versus relying on the public carriers to define priorities for our network including:

- Enabling future innovative, grid technologies (Grid of the Future)

- Providing a stronger cyber-security posture by providing an additional air gap for protection

To the contrary, the continued use of the public network would not guarantee an improvement in the reliability of the network and would not enable efficient deployment of SmartGrid and other innovative technologies in the future. It requires modem replacements every 3-5 years as Public Carriers step up their technology, which does not give Ameren control over the lifecycle of the devices and with future SmartGrid plans and would result in an increase of \$70M in O&M over the next 10 years.

Qualitatively, a private network has distinct advantages over a public network including higher reliability, enhanced controls, and stronger security.

As a system of owned assets, the private network would be directly managed end-to-end by Ameren and would not be dependent on third-parties for operations, decision-making, and cyber security. For example, the AMI network uses public cellular modems on the collectors that communicate back to Ameren's network. Over the past couple of years, the metering network in Ameren Illinois has experienced numerous communication issues and outages that after root cause analysis were determined to be the result of communication carrier (AT&T) network changes and outages. Another national example of an instance where public cellular service experienced issues occurred during the Texas extreme cold event in February 2021. AT&T's Firstnet became very spotty due to a combination of inadequate backup power for the system and the system being overwhelmed by the level of demand.

Business Case Specifics

Capex

Under the public cellular solution, modems in the field historically are replaced within 3-5 years, as mandated to Ameren by the public carriers. For example, AT&T & Verizon required Ameren to replace all 3G modems with 4G technology in 2019 & 2020, as their networks prepare to sunset that support on data services. Under the private LTE solution, the decision to upgrade to new technology would be under the control of Ameren, which is anticipated to be closer to a 7-10 year period. From a 2019 report issued by Groupe Special Mobile Association (GSMA), "...new generations will evolve every decade, but prior technologies remain in use...", meaning that opportunities to extend the life of older technologies remains viable, especially for the use cases identified for the private LTE network – as represented in Figure 1 – which show 4G technology in existence for greater than 10 years. In extending the lifecycles of modems on the private network, fewer capex will be spent to maintain asset usability.

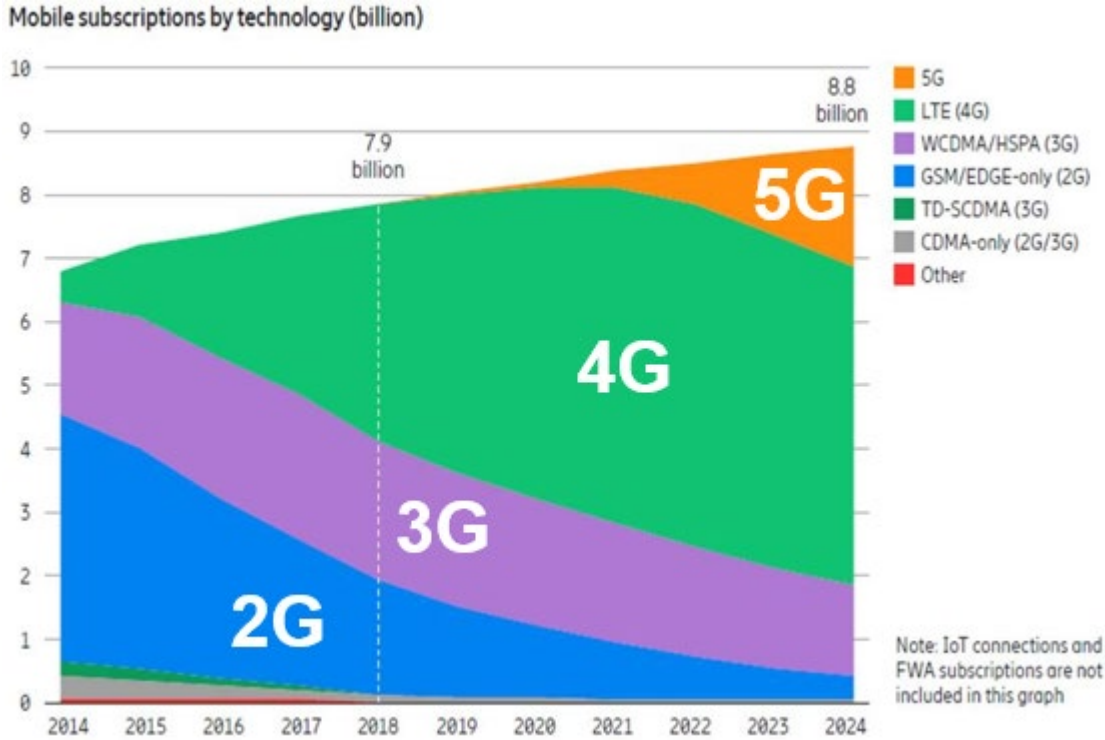
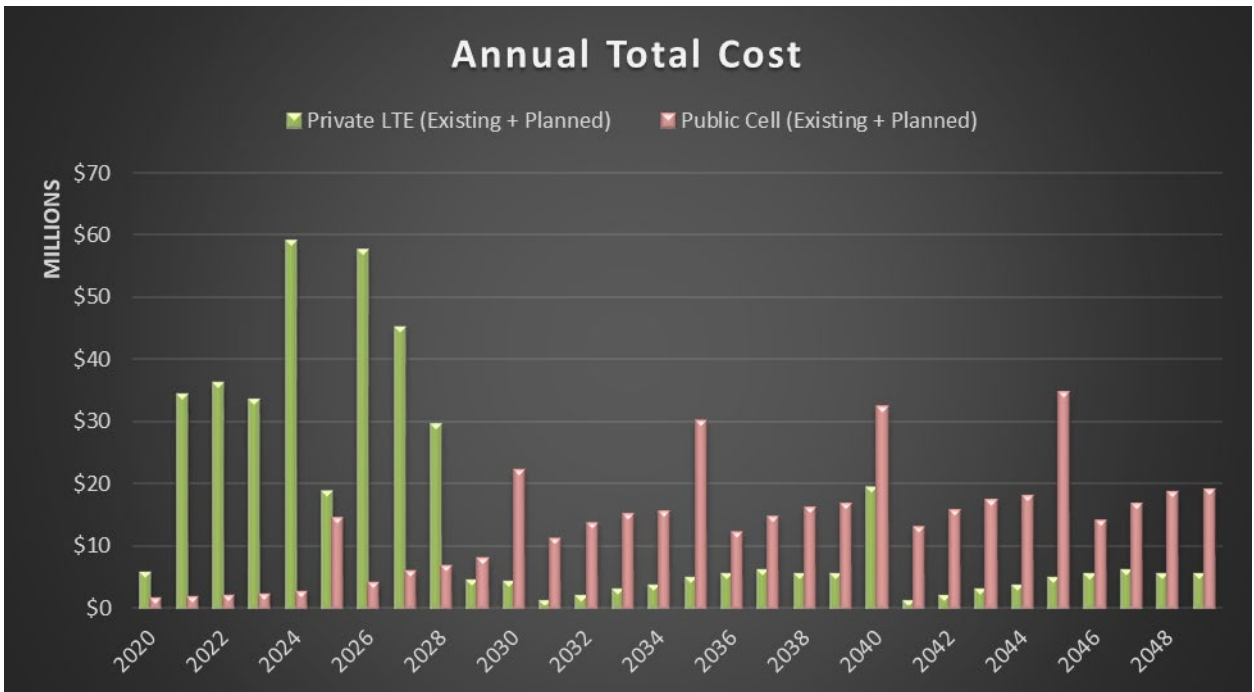


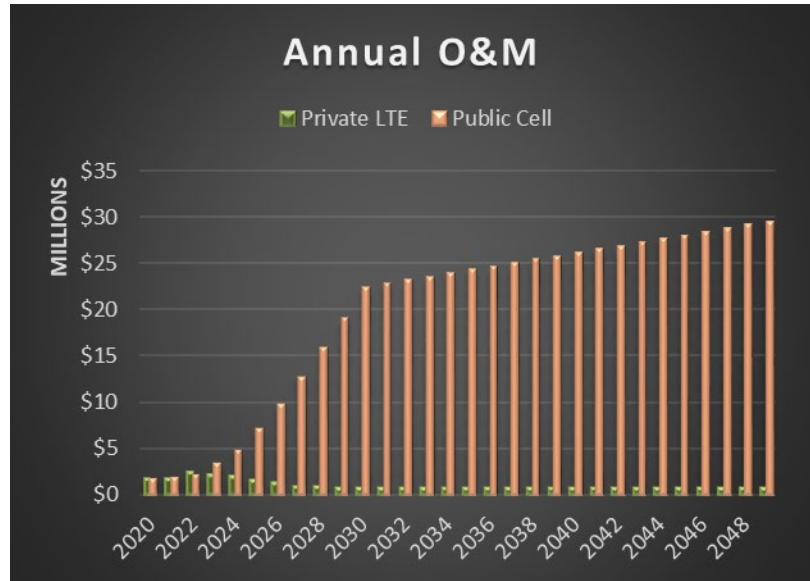
Figure 1

The result of this expansion is seen in the capital required for the two alternatives below.



O&M

Under the public cellular solution, each modem incurs a monthly service charge from a public carrier (\$30 average per device per month). This data charge inherently grows with each new modem added. When accounting for recent network requests and planned deployments in the next 5 years (e.g. – Smart Energy Plan in Ameren Missouri) those device counts are expected to grow by 7,300 total – this equates to an additional \$20M of O&M by 2030. In comparison, a private cellular network will be supported by Ameren (leveraging automation to gain operational efficiencies). Ameren resource projections are estimated around \$700k per year by program completion, starting in 2022. Therefore, at projected device growth, O&M on the public cellular network would exceed the private cellular O&M projections within this first three years.



As of 2020, there are an estimated 4,500 modems in use at Ameren Missouri on public cellular networks. When accounting for the planned growth in the next 5 years as mentioned above, that totals 7,300. We are not alone in the industry seeing this trend, Southern Linc (an unregulated subsidiary of Southern Company) endeavored on a journey in 2015 to build an LTE network to support fixed device deployments by their sister utility companies. Within 5 years, they will have 2x the number of devices originally planned and justified for starting the program.

Aside from device use cases currently identified, other technologies and industry trends are projecting even higher modem counts. With DER inverters, sensor technologies, drones, and cameras growing in relevancy across the industry, Ameren's realization of the Grid of the Future over the next 10 years may bring even more devices that will be supported by wireless communication. Furthermore, part of the strategic roadmap for the private LTE network is to incorporate mobility and Digitized Field workforce. In a conservatively low estimate, these additional use cases could push device counts greater than 50,000.

In taking these device projections, program costs, and lifecycle estimates over a 30-year period – taking into account depreciation, tax, debt, & equity, this equates to a net present value customer savings of ~20% on a private network when compared to a public network.

Customer Perspective	
Alternative	NPV (30 Years)
Private LTE	\$318,726,282
Public Cell	\$380,327,214

