UBBA *Insights*

The Network Behind the Grid

Critical Communications: Utility Operations and the Future of the Connected Grid



UBBA
Utility Broadband Alliance

© 2026 Utility Broadband Alliance, Inc.

Contents

Executive Summary 3

Business Drivers 3

Technology & Data 3

Organizational Dynamics 4

Business Operations 4

What the Research Suggests 5

Introduction 6

..... 7

Business Drivers 7

Technology & Data 10

The Evolving Utility Communications Environment 10

Spectrum 11

Data, Analytics & AI 12

Cybersecurity 14

..... 16

Organizational Dynamics 16

Executive Sponsorship 16

Workforce and Skill Requirements 17

Business Operations 19

Regulatory Dynamics 20

CapEx and OpEx 20

Budgets & ROI 22

Conclusion 23

Sources 25

Thank You, Sponsors & Participants 25

©2026 Utility Broadband Alliance, Inc.

Executive Summary

In Fall 2025, the Utility Broadband Alliance (UBBA) launched *The Utility Broadband Revolution: Insights*, a research program designed to capture how utilities are approaching the evolving role of communications infrastructure in grid operations.

The program draws on more than two dozen interviews with utility telecommunications, grid operations and IT leaders, as well as solution providers; an industry survey; and supporting third-party research. Together, these inputs provide a view into the business, technology, organizational and operational considerations shaping utility broadband strategies today.

Four themes emerged consistently from the research: **Business Drivers, Technology & Data, Organizational Dynamics, and Business Operations**.

Business Drivers

Utilities are operating in an environment of significant change. Distributed energy resources, electrification, large new loads, grid modernization initiatives and increasing expectations for reliability and resilience are placing new demands on utility operations.

As the grid becomes more distributed and data-intensive, communications infrastructure is playing a more critical role in enabling visibility, automation and control across utility service territories. Interviews conducted through the UBBA *Insights* program consistently pointed to the growing importance of reliable, secure and increasing need for real-time connectivity at the grid edge.

For many utilities, Private LTE (pLTE) is emerging as one option for addressing these requirements. The value proposition is not simply the deployment of a new telecommunications technology. It is the ability to support multiple operational use cases on communications infrastructure that the utility can design, prioritize and manage around its own requirements.

Technology & Data

Utility communications environments have traditionally included a combination of technologies, including Land Mobile Radio (LMR), power-line communications, mesh networks, fiber and commercial cellular services. Each continues to serve important purposes, but the growth of data-intensive and latency-sensitive operational applications is creating new network requirements.

Private LTE can provide utilities with additional control over network performance, coverage, traffic prioritization, security and lifecycle planning. It can also enable a broader range of connected devices and applications across transmission, distribution, field operations and advanced metering.

That capability brings a second challenge: managing and deriving value from substantially more operational data.

As utilities deploy more intelligent devices at the grid edge, the focus is increasingly shifting from simply collecting data to determining what information is needed, how quickly it must be delivered, where it should be processed, and what operational decisions it can support.

©2026 Utility Broadband Alliance, Inc.

Artificial intelligence and advanced analytics are beginning to play a role in both communications network management and grid operations. Potential applications include network optimization, predictive maintenance, fault detection, asset management, DER orchestration and other use cases that depend on timely access to operational data.

Cybersecurity is also central to this transition. Survey respondents consistently identified increased network control as an important consideration in their private LTE strategies. At the same time, operating private communications infrastructure introduces responsibilities related to core network security, physical infrastructure, identity management, supply-chain risk and ongoing compliance.

Organizational Dynamics

The research also reinforced that a successful private broadband strategy is not solely a technology initiative.

Utilities moving toward private LTE are often navigating changes in organizational responsibility, workforce capabilities, governance and the relationship between telecommunications, IT and operational technology teams.

Executive sponsorship emerged as a key factor in successful programs. Private network investments frequently cut across multiple business units and require coordination around capital planning, operational priorities, cybersecurity, regulatory strategy and long-term network ownership.

Utilities are also confronting a skills challenge. Operating private cellular infrastructure can require capabilities that have historically resided outside the utility, including RF engineering, spectrum management, cellular core operations, SIM and eSIM management, advanced IT/OT cybersecurity and specialized field maintenance.

The utilities interviewed for this research described a range of approaches to filling those gaps, including retraining existing staff, hiring telecommunications expertise, using contractors and consultants, and creating more integrated teams that combine communications and utility operations knowledge.

Business Operations

Ultimately, utility broadband investments will be measured by the operational and business outcomes they enable.

Those outcomes can include improvements in reliability, safety, workforce productivity, system visibility, cybersecurity and operating efficiency. Building the business case, however, is often more complex than calculating telecommunications cost savings alone.

Private LTE typically changes the financial model from one based largely on recurring commercial carrier expenses to one involving greater upfront investment in utility-owned infrastructure. As a result, utilities are increasingly evaluating broadband investments across a longer lifecycle and across multiple use cases.

©2026 Utility Broadband Alliance, Inc.

The research suggests that the strongest business cases are built through value stacking: identifying how one communications platform can support multiple operational priorities rather than relying on a single application to justify the investment.

Regulatory education is an important part of that process. Because private broadband infrastructure may support applications across multiple utility functions, regulators, boards and other stakeholders need a clear understanding of how the investment contributes to reliability, safety, operational efficiency and customer value.

What the Research Suggests

Across the interviews, survey responses and supporting research, one conclusion emerged clearly: communications infrastructure is becoming more tightly integrated with the operation of the electric grid.

Private LTE will not be the only communications technology utilities use, nor will every utility follow the same deployment strategy. But for utilities requiring greater control, coverage, capacity, security and operational prioritization, private cellular networks are becoming an increasingly important part of the communications architecture supporting the modern grid.

The remainder of this report examines these findings in greater detail and incorporates perspectives from utility leaders, industry research and real-world deployments to illustrate how utilities are approaching the opportunities and challenges ahead.

©2026 Utility Broadband Alliance, Inc.

Introduction

In Fall 2025, the Utility Broadband Alliance (UBBA) launched *The Utility Broadband Revolution: Insights*, a year-long research initiative examining how communications infrastructure is evolving to support the changing needs of electric utilities.

The *Insights* program draws on more than two dozen interviews with utility telecommunications, grid operations and IT leaders and practitioners, as well as solution providers; an industry survey; and supporting third-party research. The objective is to bring together perspectives from across the utility ecosystem and identify the business, technology, organizational and operational considerations shaping utility broadband strategies.

The research looks beyond individual technologies to examine the broader role communications infrastructure plays in an increasingly connected and data-driven grid. It explores both near-term implementation challenges and longer-term strategic considerations, including network architecture, operational use cases, cybersecurity, organizational readiness, workforce requirements, regulatory considerations and investment priorities.

In addition to this white paper, the *Insights* program includes two webinars delivered in May and July 2026, a special session at UBBA's Summit & Plugfest 2026, and a thought leadership series sharing research findings and industry perspectives with the broader utility community.

This report is organized around four areas that emerged consistently throughout the research: **Business Drivers, Technology & Data, Organizational Dynamics, and Business Operations**. Industry *Insights* and Success Stories are included throughout the report to provide additional perspectives and examples from organizations working directly in the utility broadband market.

©2026 Utility Broadband Alliance, Inc.



Business Drivers

Utility communications strategies are being shaped by changes occurring across the electric grid. Growth in distributed energy resources, electrification, grid automation, resilience investments and large new loads are increasing both the volume of information available to utilities and the speed at which some operational decisions must be made. At the same time, utilities continue to operate geographically dispersed infrastructure where reliable communications can be difficult to achieve.

These changes are causing utilities to examine whether existing communications architectures can support the operating requirements they expect over the next decade.

Private LTE is one of the technologies receiving increased attention as part of that evaluation. For utilities pursuing pLTE, the business case generally extends beyond telecommunications itself. The network is considered as infrastructure capable of supporting multiple operational applications across distribution, metering, field operations, security and other areas of the enterprise.

Interviews conducted through the UBBA *Insights* program reinforced the connection between communications capabilities and emerging grid requirements. Two operations leaders interviewed at large investor-owned utilities described the role they see private LTE playing:

> “The distribution team needed broadband wireless for grid edge use cases. This is our future and was our main reason for going to this (pLTE).”
>
> “Private LTE is not only conducive to enabling the grid of the future, it is imminent. The necessary technology requirements for some of the use cases, including the real-time nature of

©2026 Utility Broadband Alliance, Inc.

this and the load growth/ growing demand…these all necessitate us being able to manage the grid in real- to near real-time. It' can't be done with other comms media."

Their comments reflect a broader theme that surfaced throughout the research: as utilities deploy more connected devices and automate more operational functions, communications requirements increasingly need to be considered alongside the grid technologies and applications they support.

Several broader industry trends provide context for that shift:

- Five-year investment outlook: Investor-owned electric companies are projected to invest approximately $1.4 trillion through 2030 to strengthen energy infrastructure and support rising demand. [1]
- Record 2025 investment: EEI reports that annual investor-owned electric utility capital expenditures reached approximately $204.1 billion in 2025. [1]
- Affordability pressure: Utilities are seeking substantial rate increases in many areas as they fund infrastructure investment; requested increases do not necessarily equal approved increases. [2]
- Reliability and resilience: A significant share of utility investment is directed toward grid modernization, reliability, resilience and new infrastructure needed to serve rising demand. [1]
- Energy transition and resource mix: Utilities continue to balance growing demand with investments in renewable resources, storage, generation and grid modernization while navigating affordability and regulatory constraints. [3]

Taken together, these trends are creating pressure for utilities to obtain more timely information from a growing number of assets and to communicate reliably with devices distributed throughout the service territory.



That does not mean every operational application requires broadband, low latency or private cellular connectivity. Network requirements vary significantly by use case. The more important question for utilities is whether their overall communications architecture can support the combination of applications, performance requirements and growth they anticipate.

Advanced Metering Infrastructure provides one example of how communications requirements are evolving.

Traditional meter reading generated relatively small amounts of data at relatively long intervals. As metering evolved through AMI 1.0, utilities gained access to more frequent interval data and event information. AMI 2.0 is expanding that model further by positioning the meter as a grid-edge sensor capable of supporting operational applications in addition to traditional billing and customer functions.

Using the example in this research, twelve annual meter reads evolved into approximately 35,040 data events per year in an AMI 1.0 environment and could increase to approximately 105,120 events per year in an AMI 2.0 environment.

The significance is not simply the increase in data volume. Different operational applications can have quite different requirements for latency, throughput, reliability, prioritization and where data is processed. Some information can be collected and analyzed over time. Other events may require a response in seconds—or faster.

Figure 1 illustrates several AMI 2.0-era use cases and the range of grid applications that may be supported by next-generation metering.

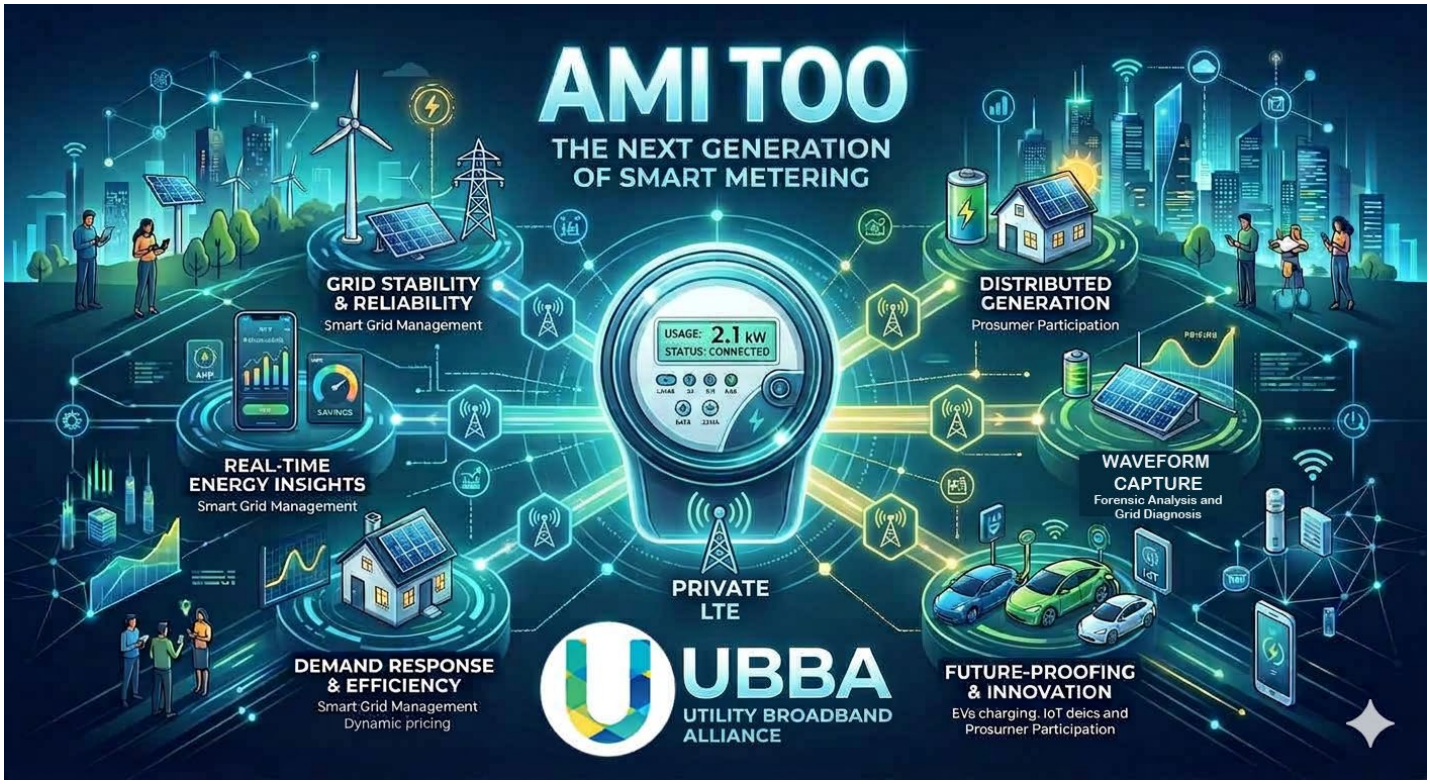
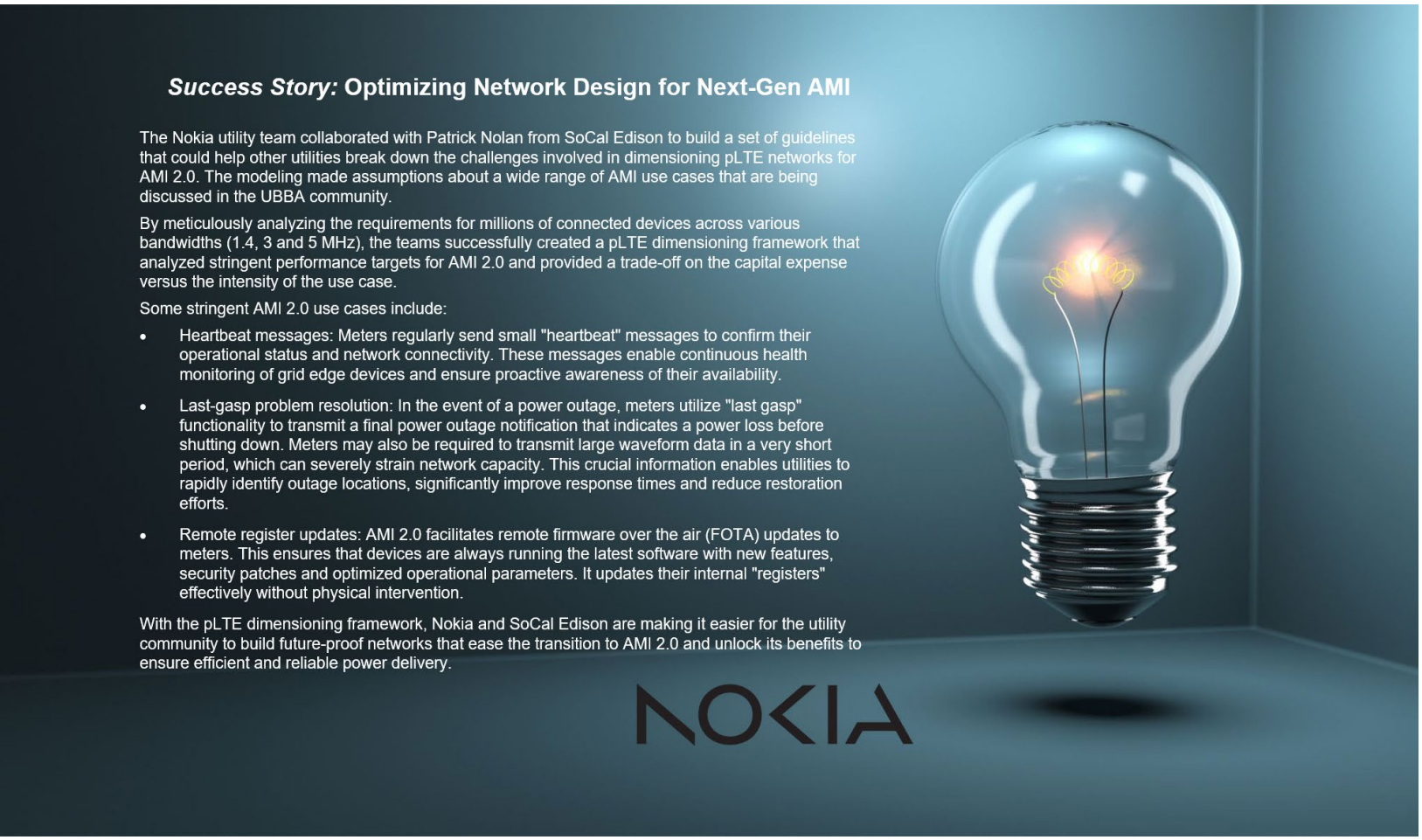


Figure 1. "AMI TOO." The Next Generation of Smart Metering. (Source: UBBA.)

©2026 Utility Broadband Alliance, Inc.

The use cases shown in Figure 1 demonstrate why utilities are increasingly evaluating communications and operational technology together. Although many of these applications are primarily grid-focused, their outcomes can also affect customers through improved reliability, outage response, efficiency and the ability to support innovative programs and services.

Private LTE can provide one communications option for supporting these applications, particularly where utilities require greater control over coverage, network performance, traffic prioritization or security. The appropriate architecture, however, will depend on the utility's service territory, existing infrastructure, spectrum availability, operational requirements and business objectives.



Technology & Data

The Evolving Utility Communications Environment

Utilities have historically relied on a mix of communications technologies, including Land Mobile Radio (LMR), power-line communications, mesh networks, fiber and commercial cellular services. These technologies continue to support important operational functions, including SCADA, telemetry, field communications and metering.

©2026 Utility Broadband Alliance, Inc.

As utility applications become more data-intensive and, in some cases, more time-sensitive, utilities are evaluating whether their existing communications environments can support emerging operational requirements. Those requirements may include higher throughput, lower latency, broader device scalability, traffic prioritization, improved visibility into network performance and greater control over how critical applications are supported.

Commercial cellular networks remain a component of many utility communications strategies. At the same time, utilities interviewed through the *Insights* program identified circumstances in which greater control over coverage, prioritization, availability and security are increasingly important for operational applications.

This is contributing to growing interest in private cellular networks as part of a broader utility communications architecture.

Spectrum

Spectrum is one of the foundational considerations in any private cellular strategy.

Using licensed or otherwise appropriately authorized spectrum, a utility can operate a private LTE network designed around its service territory and operational requirements. This can provide greater control over network design, coverage, capacity, traffic prioritization and lifecycle planning than is typically available when the utility is solely a customer of a commercial network.

For utilities, however, spectrum strategy is rarely simple. Service territories can cover large geographic areas and may cross multiple regulatory or jurisdictional boundaries. Different operational applications can also create different requirements for coverage, propagation, capacity and device support.

The research identified two broad categories of spectrum considerations.

The first is spectrum acquisition and selection, including:

- Determining which spectrum options best align with the utility's operational and geographic requirements.
- Understanding infrastructure implications associated with different frequency bands.
- Availability of spectrum within the utility's service territory
- Regulatory and jurisdictional considerations
- Availability of compatible devices and equipment

The second is ongoing spectrum and network management, including:

- Device and chipset ecosystem constraints
- Interference mitigation and coexistence
- Spectrum compliance and regulatory requirements
- Network performance management.
- The skills required to design, optimize and maintain a private cellular environment.

These factors reinforce an important finding from the research: a private LTE strategy is not simply a network procurement decision. It creates ongoing operational responsibilities that utilities need to account for in their technology, workforce and governance plans.

©2026 Utility Broadband Alliance, Inc.

Industry Insight: The Grid's Next Upgrade Is Network Resiliency

A recent GSMA survey of large IoT enterprises, published with Mobile World Live, found that 62 percent of businesses see cybersecurity and network resiliency as growth drivers. For utilities planning the next phase of grid modernization, the message is clear: communications infrastructure now deserves the same strategic attention as physical grid assets.

Public mobile networks were built for people, roads, and dense demand. Utilities operate across a different map: transmission corridors, reservoirs, generation plants, offshore wind farms, desert solar fields, and substations beyond the commercial logic of mass-market coverage. Today's cellular networks are highly capable, but a single network path remains a single point of failure. At roughly 99.9 percent availability, brief outages can interrupt command, delay meter reads, and leave operations teams blind at the edge.

Secure eSIM turns connectivity from a fixed subscription into a controllable resilience layer. A device can be provisioned remotely, strongly authenticated, and redirected across public, private, or fallback networks without a truck roll or physical SIM swap. Because network outage events are often independent, redundancy across one or more fallback networks can improve communications availability by an order of magnitude.

Kigen's GSMA-certified eSIM solutions bring high-assurance security to this model, supporting constrained networks, interrupted updates, rescue, and recovery. For C&I leaders serving data centers, industrial campuses, and logistics hubs, resilient connectivity underpins power quality, transparent data, and rapid restoration.

The strategic choice is no longer public versus private. The sharper question is: what gives utilities the true pulse of availability and control, down to the last sensor?



One related development is the GSMA SGP.32 standard for remote eSIM provisioning and management for IoT devices.

For utilities managing large numbers of geographically dispersed connected devices, remote SIM and eSIM management can provide greater flexibility in how device connectivity is provisioned and maintained over time. The significance is less about the SIM itself than about creating another management capability within an increasingly complex utility communications environment.

As utilities consider private, public and hybrid network architectures, device identity, provisioning and lifecycle management will become an increasingly important part of network operations.

Data, Analytics & AI

More capable communications networks can significantly increase the amount and frequency of operational data available to utilities.

That creates opportunity, but it also changes the question utilities need to answer.

What data is operationally valuable, how quickly is it needed, where should it be analyzed, and what decision or action does it enable?

Private LTE can provide the throughput, latency and connectivity needed to support a broader range of field devices and applications. But creating value from that connectivity depends on the utility's ability to manage, analyze and act on the information that becomes available.

©2026 Utility Broadband Alliance, Inc.

The UBBA *Insights* research identified two areas where artificial intelligence and advanced analytics are beginning to intersect with private cellular networks.

The first is communications network operations. Potential applications include analyzing network performance, identifying coverage or equipment issues, monitoring traffic patterns and using historical network data to improve maintenance and optimization.

A telecom engineering leader at a large Investor-Owned Utility (IOU) described how network data is being used to improve operations: “We are doing a lot with our network data. A lot of our KPIs use the network data. We are constantly optimizing our coverage. We’re always drive-testing and using this data to make changes for more optimized coverage, including being more predictive in our network operations.”

The second area is grid operations, where better access to timely field data can support a range of operational applications.

- Predictive Asset Maintenance: Using condition and performance data to supplement or replace time-based maintenance strategies.
- Fault Detection, Location and Wildfire Mitigation: Applications such as Falling Conductor Protection (FCP) and Fault Location, Isolation and Service Restoration (FLISR), where communications performance can contribute to faster detection and response.
- DER and Microgrid Orchestration: Managing increasing numbers of distributed resources and incorporating multiple data sources into operational decision-making.
- Computer Vision and Drone-Based Inspection: Using image and sensor data to support inspection, asset management and field operations.

A senior manager in grid operations at another large IOU also connected improved data availability with proactive maintenance and network performance: “From the grid side, pLTE supports a lot more analytics, especially for proactive maintenance strategies. You are converting emergent worked into planned work – this is a huge benefit to the utility. The utility needs the data to make these decisions, and you need the network to enable you to get this data. pLTE is uniquely positioned to being a cost-effective way of doing this. It’s not just that pLTE is ‘there’ but also that the technology is also low latency and high bandwidth.”

The broader implication is that communications infrastructure, data architecture and operational applications increasingly need to be planned together.

A higher-capacity network does not create operational value simply by moving more data. The value comes from delivering the right information, at the right time, to the right system or decision maker.

©2026 Utility Broadband Alliance, Inc.

Industry Insight: Beyond Data Collection: Meters as a Sensor Array

The utility industry has spent decades investing in systems that collect data. The next challenge is generating value from that information. As utilities deploy AMI 2.0 architectures and private LTE communications networks, analytics are emerging as one of the most important tools for turning measurements into operational outcomes.

Historically, much of the focus in AMI centered on meter reads, billing determinants, and basic event notifications. Today's environment is very different. Utilities are being asked to support electrification, renewable integration, changing demand patterns, and increasing customer expectations. Meeting these challenges requires more than data access. It requires insight.

Modern analytics platforms can identify patterns across large populations of devices and reveal relationships that are difficult to observe through traditional operational methods. By correlating measurements across thousands of endpoints, utilities can improve outage awareness, identify asset-loading concerns, detect anomalies, and gain a deeper understanding of distribution system performance.

Importantly, analytics are most effective when paired with a balanced architecture that combines local processing with centralized intelligence. Local decision-making enables fast response where necessary, while fleet-wide analytics provide context and visibility across the broader system. This approach allows utilities to maximize the value of their AMI investments while maintaining the flexibility to add new applications over time.

As utilities look toward the future, analytics will increasingly define the value of AMI 2.0. The network that delivers the greatest benefit will not necessarily be the one that collects the most data, but the one that transforms information into better decisions.

HUBBELL

Cybersecurity

Cybersecurity was one of the most consistent themes in the *Insights* research.

All respondents to the *Insights* survey indicated that moving to private LTE could improve their cybersecurity posture, with several specifically identifying greater control of the network as an important consideration.

Private cellular architecture can provide utilities with additional control over elements such as subscriber identity, authentication, network access, traffic separation and data flows. These capabilities can support broader utility cybersecurity strategies, including Zero Trust approaches and the segmentation of operational technology environments.

At the same time, private network ownership does not eliminate cybersecurity risk.

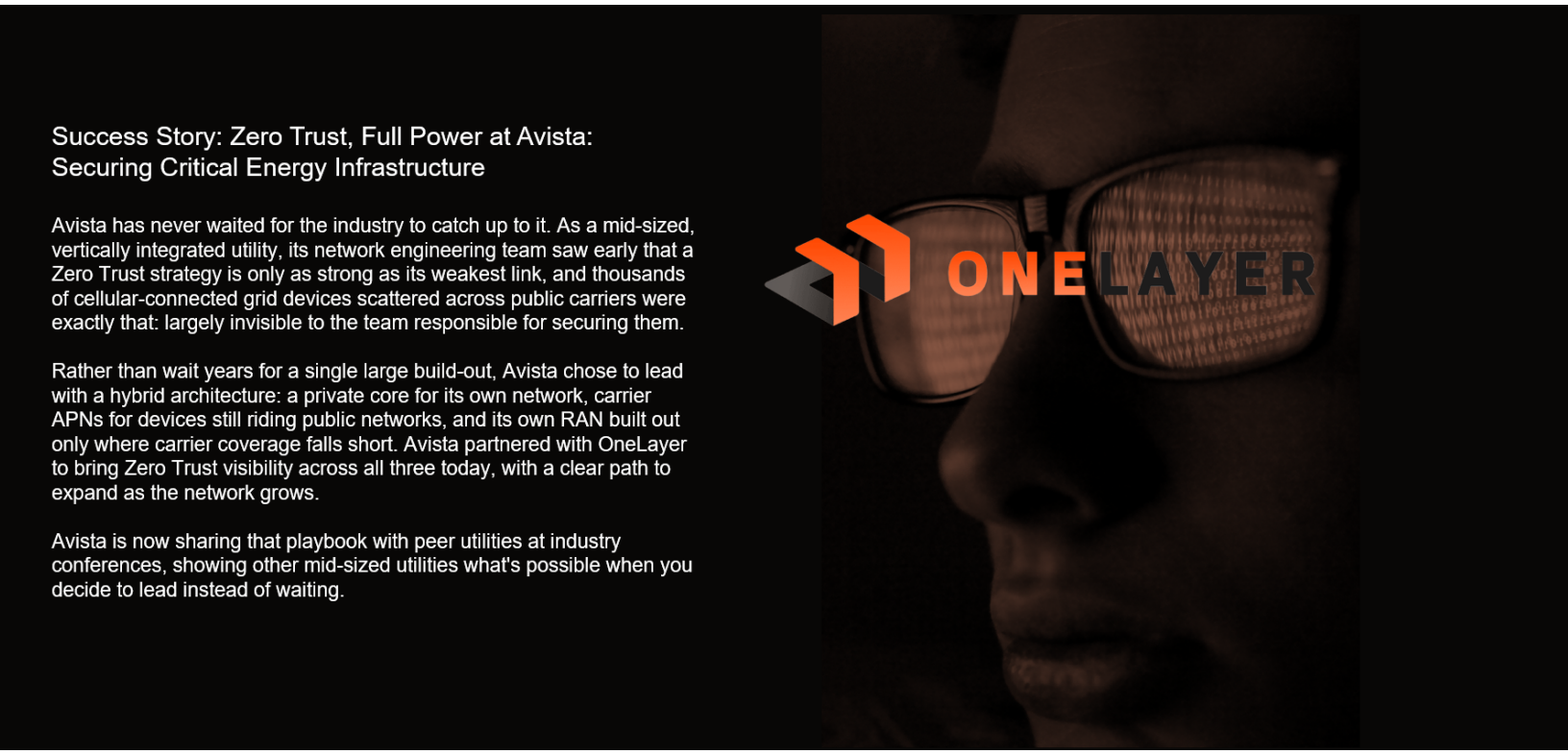
It changes where responsibility resides.

When a utility becomes the owner or operator of private cellular infrastructure, it also assumes responsibility for areas that may previously have been managed by a commercial carrier. These can include the security of the packet core, identity and credential management, software and firmware maintenance, physical security of communications sites, supply-chain considerations, monitoring and incident response.

©2026 Utility Broadband Alliance, Inc.

For that reason, the cybersecurity value of private LTE should be considered alongside the utility's ability to operate and secure the network throughout its lifecycle.

The UBBA *Insights* research suggests that the strongest cybersecurity case for private LTE is not that the technology is inherently risk-free, but that it can give utilities greater visibility and control over communications supporting critical operational applications.



Private LTE should therefore be viewed as part of a broader utility technology and operational journey rather than as an isolated telecommunications project.

As utilities move from initial strategy and spectrum planning through network deployment, device integration and long-term operations, the decisions made at each stage influence the capabilities and responsibilities that follow.

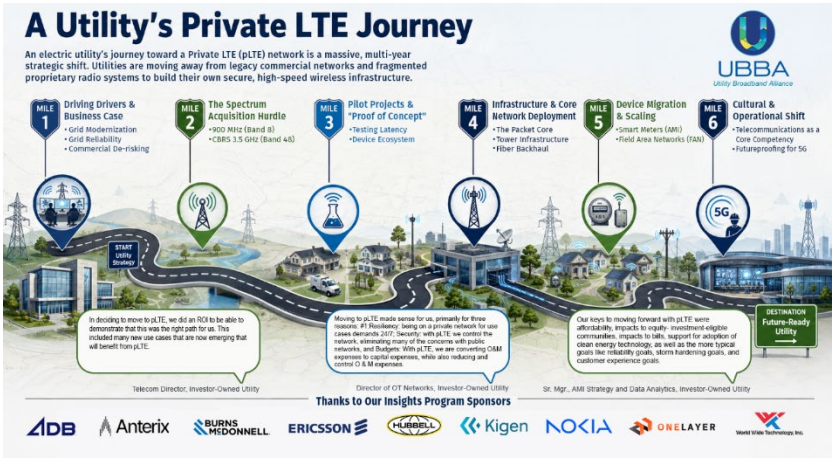


Figure 2. A Utility's Private LTE Journey. (Source: UBBA.)

©2026 Utility Broadband Alliance, Inc.

Industry Insight: **How Secure AI-Enabled Private Mobile Networks Transform Utility Operations: Avoiding Common Risks to Achieve Resilience**

A whitepaper from UBBA members Anterix, Palo Alto Networks, and GE Vernova details how energy grids are transitioning from centralized architectures to distributed, AI-enabled networks. At the heart of this evolution are intelligent electronic devices, AI models, and autonomous systems deployed at the network edge to enable predictive maintenance, real-time grid orchestration, and localized failure containment.

However, the expansion of AI and edge devices can increase the grid's cybersecurity exposure, making systems vulnerable to data spoofing, model poisoning, and cyberattacks. High-profile campaigns by state-sponsored actors, including Salt Typhoon and Volt Typhoon, highlight the risks of relying on public telecommunications infrastructure for critical operations.

To mitigate these threats, utilities require private wireless networks paired with AI-aware security and Zero Trust frameworks. Private networks provide distinct advantages:

- Customized Traffic Optimization: Prioritizes high-capacity uplinks required for AI-enabled sensor data and edge applications.
- Dedicated, Licensed Spectrum: Provides a purpose-built communications layer using 3GPP standards, with subscriber identity protection, SIM-based authentication, and separation from public infrastructure.
- Multilayered Defense: Integrates secure core transport, edge enforcement, AI ecosystem protection, and continuous network traffic monitoring.

By combining private networks with Zero Trust principles—continuously verifying endpoints, enforcing micro-segmentation, and monitoring traffic—utilities can better isolate operational technology from IT networks, protect data integrity and limit lateral threats.

The result is a more secure and resilient foundation for deploying AI across the modern grid.

The whitepaper is available here: https://anterix.com/how-secure-ai-enabled-private-mobile-networks-transform-utility-operations/.



Organizational Dynamics

A utility's transition to private LTE is not solely a technology initiative. The research consistently pointed to organizational structure, executive sponsorship, workforce capabilities and cross-functional coordination as key factors in determining how effectively a private network can be deployed and operated over time.

Because private cellular networks can support applications across telecommunications, IT, cybersecurity, grid operations, metering and field services, responsibility for the network often spans multiple parts of the organization. Utilities therefore need to address not only who designs and operates the network, but also how priorities are established, investment decisions are made and operational requirements are translated into communications capabilities.

Executive Sponsorship

Executive sponsorship emerged as an important theme throughout the *Insights* research.

Private LTE investments can involve significant capital, long planning horizons and multiple internal stakeholders. They may also require changes in how communications infrastructure is governed and how telecommunications, IT and operational technology teams work together.

For these reasons, executive sponsors can play several important roles, including:

- Connecting the communications strategy to broader utility business and operational priorities
- Building support for capital investment
- Helping coordinate decisions across IT, OT and operational business units
- Supporting the regulatory and financial rationale for the investment

©2026 Utility Broadband Alliance, Inc.

- Establishing accountability for long-term network ownership and operations
- Helping address organizational and workforce changes that emerge as the network evolves.

The appropriate sponsorship model will vary by utility. In some organizations, responsibility may reside with a single executive. In others, a group of leaders across grid operations, telecommunications and IT may collectively provide sponsorship.

One area where executive leadership can be particularly important is IT/OT alignment.

Private cellular networks often sit at the intersection of traditional telecommunications infrastructure, enterprise IT systems and operational grid applications. As a result, decisions about coverage, cybersecurity, device integration, traffic prioritization and resilience can require input from teams that historically operated independently.

Creating more structured collaboration among those groups can help ensure that network design decisions reflect operational requirements rather than being made solely from a telecommunications or IT perspective.

A VP at a large public utility described the executive sponsor's role this way: "The executive sponsor collaborates with team on roadmap plans, challenges, and solutions, and eventually provides sponsorship of budget and project execution."

A director at a large municipal utility described a more distributed model: "In our organization it may be led by a committee of C-level executives. Operationally, it may be a matrix of utility business unit, OT group, and IT group leaders."

A telecom leader at an IOU provided another example of shared executive sponsorship: "For us it is a true partnership with three executive sponsors. Two were senior directors from the energy delivery side of our business, and third is our VP of network engineering and operations. This group went before the executive leadership and then our Board and made the case for moving forward."

These examples reinforce a broader finding from the research: successful sponsorship is less about where the role sits on an organizational chart and more about whether the utility has visible leadership capable of connecting the network investment to operational priorities, financial decisions and enterprise-wide execution.

Workforce and Skill Requirements

Operating a private LTE network can also introduce capabilities that many utilities have historically relied on commercial carriers, vendors or outside specialists to provide.

Utilities considering private cellular therefore need to determine which skills should be built internally, which can be developed through training, and which should continue to be supported through vendors, contractors or consultants.

The research identified several capability areas that utilities may need to address:

- RF Engineering and Spectrum Management, including RF design, optimization, interference management and spectrum compliance.
- Cellular Core and Network Operations, including packet core management, SIM and eSIM lifecycle management and network configuration.

- IT/OT Cybersecurity, including identity management, access controls, network segmentation, monitoring and compliance.
- Field Telecommunications Maintenance, including towers, radio equipment, fiber backhaul and other communications infrastructure.
- Operational Integration, including the ability to translate grid application requirements into network performance and design requirements.

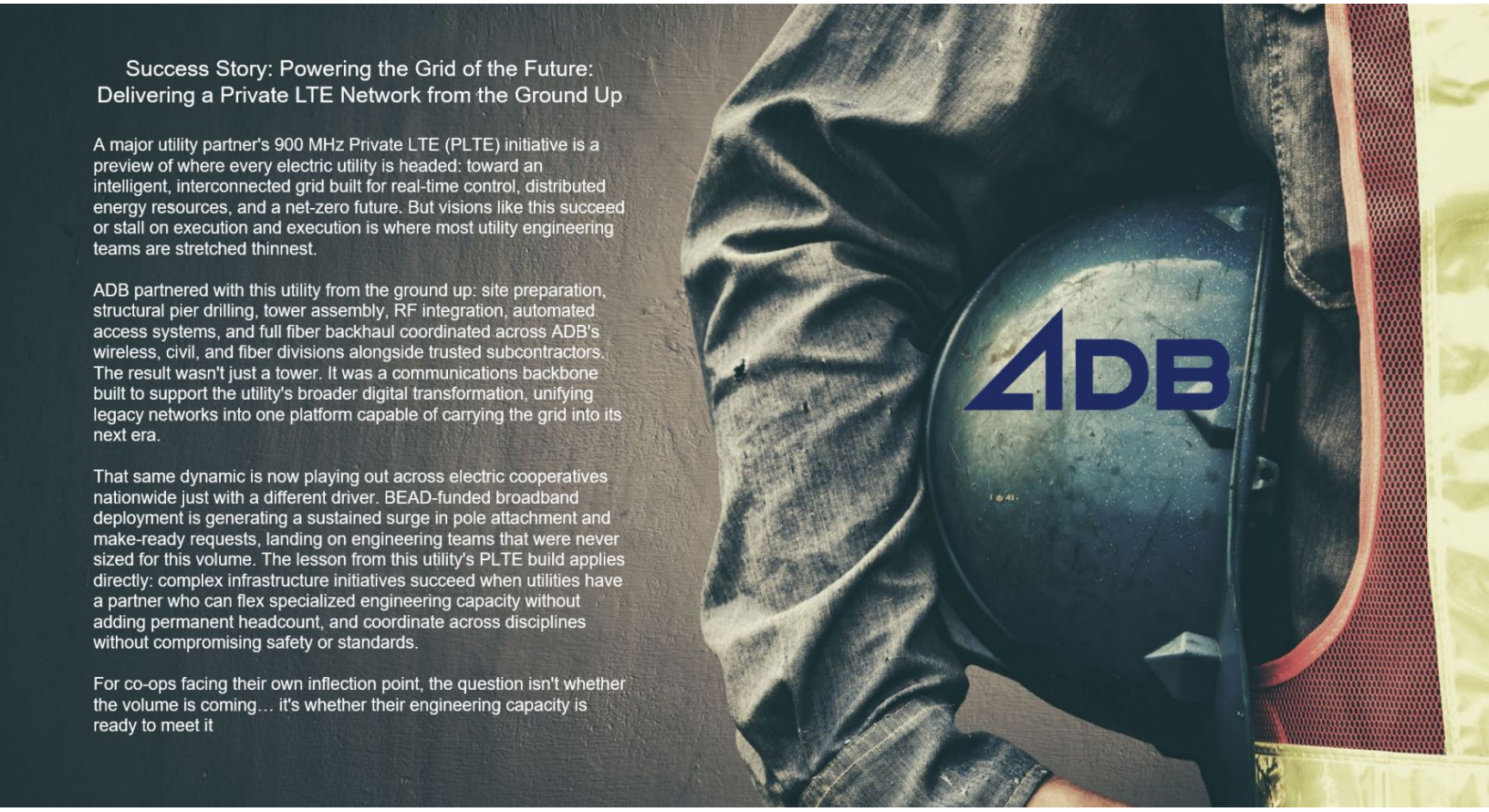
Not every utility will need to develop all these capabilities to the same degree. The appropriate operating model depends on factors such as network scale, geography, existing telecommunications expertise, internal workforce strategy and the extent to which the utility chooses to own and operate network functions directly.

For many utilities, the resulting model is likely to be a combination of internal expertise and external support. How those responsibilities are divided is a strategic decision. Utilities need enough internal knowledge to govern the network, establish operational requirements and make informed decisions even when significant portions of network implementation or operations are supported by external partners.

The workforce challenge identified in the research is not simply a shortage of cellular expertise, but it is the need to combine telecommunications knowledge with an understanding of utility operations.

Insights survey respondents described several areas where this transition is already creating challenges:

- “Most (staff) are not used to cellular connectivity and the troubleshooting involved there. Also, telecom/cell tower needs versus transmission tower needs have been a hurdle for us as well.”
- “Core management, RF management, RAN management.”
- “Network management. Core management. Cell site management.”



An interview with an operations leader at a large IOU points to a workable model for meeting the skills gap when transitioning to pLTE; “We did ‘all of the above’ for getting the skills sets that we needed: up- and re-training, hiring away from big telecoms, contractors, consultants. No single one of these is enough to get it down. Telecom people need to understand how a utility operates - latency over bandwidth, for example – so you need to connect people with telecom knowledge to people with utility and grid knowledge.”

That observation captures one of the most important organizational findings from the *Insights* research.

Private cellular networks introduce specialized telecommunications capabilities, but technical expertise alone is not sufficient. The greatest value comes when communications professionals understand the operational requirements of the grid and utility operations professionals understand enough about network capabilities and constraints to make informed decisions together.

For utilities, that convergence may ultimately be as important as the technology itself.

Business Operations

Private LTE investments ultimately need to be evaluated in the context of the operational and business outcomes they support.

For utilities, those outcomes can include improvements in reliability, safety, workforce productivity, cybersecurity, operational visibility and cost management. The challenge is that the value of communications infrastructure is often distributed across multiple business units and use cases rather than captured in a single financial metric.

The UBBA *Insights* research identified three recurring business considerations: regulatory treatment, the balance between capital and operating expense, and the ability to build a business case across multiple use cases and benefits.

Success Story: **Evergy Accelerates Grid Modernization with Private LTE**

Evergy, a major electric utility serving 1.7 million customers across Kansas and Missouri, sought to reduce the cost and complexity of managing multiple carrier and purpose-built networks while enabling large-scale grid automation. To support this transformation, Evergy partnered with Ericsson to deploy a mission-critical private LTE network.

Rather than starting with a limited pilot, Evergy adopted an infrastructure-first strategy, building broad network coverage upfront to support rapid deployment of connected devices. The network spans 94 sites using 900 MHz and 2.5 GHz spectrum and provides coverage across 81 percent of Evergy’s service territory. The first site went live just two months after contract signing, and the large core deployment was completed in approximately 12 months.

Today, more than 3,000 devices are connected to the private LTE platform, supporting applications such as predictive maintenance, distribution automation, and security systems. By eliminating recurring per-device carrier fees, Evergy reduced connectivity costs while enabling broader deployment of automated grid applications. The private LTE network provides utility-controlled data flows, complete data ownership, network isolation, and a stronger security posture.

The network has also enabled new capabilities, including connected security cameras that can monitor construction sites, virtually eliminating equipment theft. With a software-upgradable architecture that supports a future evolution to 5G, the network provides a foundation for applications under evaluation, including advanced metering infrastructure and mission-critical push-to-talk services. Through its private LTE deployment, Evergy has established a scalable communications platform to support ongoing grid modernization.



Regulatory Dynamics

Utility regulators can have a considerable influence on how private LTE investments are evaluated, funded and ultimately approved.

Depending on the utility's regulatory structure and jurisdiction, communications investments may be assessed through considerations such as prudency, rate treatment, asset ownership, reliability benefits, cybersecurity, operational necessity and customer impact.

The *Insights* research identified several regulatory considerations that utilities may need to address:

- Treatment of capital investment versus recurring operating expense
- Demonstrating the prudency and operational need for the investment
- Explaining how spectrum and communications infrastructure fit within broader grid modernization strategies.
- Demonstrating benefits across multiple operational use cases
- Identifying opportunities to consolidate or retire legacy communications systems over time.
- Connecting communications investments to reliability, resilience, safety and customer outcomes

For regulators, boards and other stakeholders, private LTE may differ from more traditional technology investments because the same communications platform can support multiple applications across the utility.

This can strengthen the long-term business case, but it can also make the investment more complex to evaluate.

Rather than tying the entire value proposition to an individual use case, utilities may need to explain how communications infrastructure supports a portfolio of operational capabilities and how those capabilities contribute to measurable utility and customer outcomes.

This places additional importance on regulatory education and on clearly connecting technology investments to business and operational requirements.

An OT network manager at a large IOU described this dynamic: "Regulators are looking for more data that they want utilities to collect. Smart metering is just one example. With these requirements, you must address bandwidth issues. Private LTE future proofs this process and gives you control of the network."

The comment reflects a broader issue identified through the research: as utilities are asked to collect, analyze and act on more information from the grid, communications infrastructure increasingly becomes part of the conversation around grid investment and regulatory strategy.

CapEx and OpEx

Private LTE can also change the financial structure of utility communications.

Commercial carrier services are typically associated with recurring operating expenses, while utility-owned private infrastructure generally requires greater upfront capital investment in areas such as spectrum, radio access infrastructure, core network systems, sites, backhaul and related integration.

©2026 Utility Broadband Alliance, Inc.

Neither model is inherently preferable in every circumstance. The appropriate balance depends on the utility's operating requirements, scale, geography, existing assets, internal capabilities and long-term communications strategy.

A private network can provide the utility with greater ownership and control over infrastructure, but it also introduces ongoing responsibilities for operations, maintenance, upgrades, cybersecurity and workforce capabilities.

Commercial services can reduce the amount of infrastructure the utility must directly own and operate, but they may provide less control over certain aspects of coverage, traffic prioritization, network design and lifecycle planning.

For many utilities, the relevant comparison is therefore not simply CapEx versus OpEx, but the total lifecycle cost and operational value of different communications approaches.

Table 1 provides a decision-factor comparison. The financial assumptions should be evaluated based on the specific circumstances of each utility.

Decision Factor	**Commercial Carrier Model**	**Private LTE Model**
Upfront Investment	Generally lower; infrastructure is primarily provided by the carrier	Generally higher; may include spectrum, RAN, core network, sites, backhaul and integration
Recurring Expense	Service and connectivity fees typically continue over the life of the deployment	Ongoing costs include network operations, maintenance, software, staffing and upgrades
Infrastructure Ownership	Carrier owns and operates most network infrastructure	Utility owns or controls significant portions of the communications infrastructure
Coverage & Network Design	Based primarily on the carrier's network footprint and commercial priorities	Can be designed around utility service territory and operational requirements
Traffic Prioritization & Control	Available capabilities depend on carrier services and agreements	Utility can establish network policies and prioritization based on operational requirements
Operational Responsibility	Significant network operations responsibility remains with the carrier	Utility assumes greater responsibility for network performance, maintenance,

		cybersecurity and lifecycle management
Scalability	Additional devices may result in additional recurring service costs	Marginal connectivity costs may decline as device counts increase, subject to available network capacity
Technology Lifecycle	Network evolution is largely determined by the carrier	Utility has greater influence over network investment and technology migration decisions
Regulatory & Financial Treatment	Primarily operating expense, subject to utility-specific regulatory treatment	Capital investment may be eligible for rate-base treatment, depending on jurisdiction and regulatory approval
Best-Fit Considerations	May be appropriate where carrier coverage, service levels and economics meet utility requirements	May be appropriate where greater control, coverage, prioritization, security or operational independence is required

Table 1. Communications model considerations over a 10–15-year lifecycle. Source: UBBA Insights research and industry analysis. Actual costs, regulatory treatment and operating models vary by utility, area, network architecture and use case.

Budgets & ROI

The research suggests that private LTE business cases are strongest when utilities evaluate the network as shared infrastructure supporting multiple operational applications.

This approach is often described as value stacking.

Rather than relying on one use case to justify the entire network investment, utilities can evaluate how the same communications infrastructure may support metering, distribution automation, field operations, security, asset monitoring, voice communications and other applications over time.

The resulting business case may include both direct and indirect benefits.

Direct financial considerations can include reduced recurring service costs, consolidation of legacy networks, reduced field activity and greater operational efficiency.

Other benefits may be more difficult to quantify but still important to the investment decision, including improved reliability, faster outage response, wildfire mitigation, cybersecurity, safety and the ability to support future grid applications.

©2026 Utility Broadband Alliance, Inc.

The *Insights* survey identified a range of use cases that utilities associate with the potential return from private LTE investments:

- “SCADA, Wildfire Mitigation technologies, Smart meter connectivity.”
- “Distribution-level SCADA: substations, capacitor banks, volt-var optimization, regulators, vipers, intellirupters.”
- “Metering: New grid monitoring devices. SCADA systems. Pole-top switching devices. LMR replacement.”

An interview with the VP, Telecom for a large public utility further demonstrated that utilities may enter the private LTE business case from different starting points: “We took a different approach than most utilities. Mobility was a huge use case for us, so mission critical voice was our main driver for our pLTE system. Long story short, traditional LMR (land mobile radio) would not be sufficient for our growth. Automation and ease of deployment also played into us looking at pLTE extremely hard.”

Another research interview highlighted the potential strategic value of spectrum ownership: “With pLTE you have an asset that appreciates over time. So, with pLTE you have an investment you have an asset (spectrum) that has increased in value, something that is relatively unheard of in utilities.”

These perspectives reinforce an important finding from the research: **there is no single private LTE business case that applies to every utility.**

The strongest rationale depends on the operating challenges the utility is trying to solve, the communications assets it already owns, the applications it expects to support and the financial and regulatory environment in which it operates.

For some utilities, the initial business case may be driven by network cost consolidation. For others, the primary driver may be distribution automation, advanced metering, mission-critical voice, cybersecurity, resilience or another operational requirement.

What is consistent across the research is the importance of evaluating the network over time and across multiple applications rather than as a telecommunications investment in isolation.

Conclusion

The utility industry is entering a period in which communications infrastructure is becoming increasingly intertwined with grid operations.

Growth in distributed resources, advanced metering, automation, large new loads and increasingly data-driven operating practices is expanding both the number of connected assets on the grid and the range of decisions that depend on timely, reliable information.

The research conducted through the UBBA *Insights* program indicates that utilities are responding by taking a more strategic view of communications.

Rather than evaluating networks solely as telecommunications systems, utility leaders are increasingly considering how communications infrastructure supports reliability, resilience, safety, cybersecurity, field operations, grid visibility and the ability to deploy new operational applications over time.

©2026 Utility Broadband Alliance, Inc.

Private LTE is emerging as an important part of that discussion.

The research does not suggest that private LTE will replace every existing utility communications technology or that a single network architecture will be appropriate for every utility. Fiber, commercial cellular, LMR, mesh, satellite and other technologies will continue to play important roles depending on the application and operating environment.

What is changing is the level of control and performance some emerging operational use cases require.

For utilities evaluating private cellular, the decision extends well beyond technology selection. Spectrum, cybersecurity, workforce capabilities, organizational governance, regulatory strategy, operational responsibility and long-term economics all influence whether a private network can deliver sustainable value.

The *Insights* research also reinforces the importance of beginning with the operational requirement rather than the technology.

Utilities need to understand what information an application requires, how quickly it must be delivered, how critical the communication network is to grid operations and what level of network control is necessary. Those requirements can then inform the appropriate communications architecture.

Across the interviews and survey responses, one theme was particularly consistent: **the communications network is becoming operational infrastructure.**

As more intelligence and decision-making move toward the grid edge, the network connecting those assets becomes increasingly important to how effectively utilities can see, understand and operate their systems.

For some utilities, private LTE is already providing that foundation. For others, the evaluation is still underway.

UBBA's role is to continue bringing those experiences together, providing a forum where utilities can compare approaches, understand lessons learned, evaluate emerging technologies and develop a clearer picture of how communications infrastructure can support the evolving grid.

The transition will not look the same for every utility. But the research points to a common direction: **as the grid becomes more connected, distributed and intelligent, communications strategy will increasingly become part of grid strategy.**

UBBA
Utility Broadband Alliance

©2026 Utility Broadband Alliance, Inc.

Sources

[1] Edison Electric Institute (EEI), "EEI Data: Electric Companies to Invest $1.4T to Support Customers, Power Growth," Electric Perspectives, May 27, 2026. https://www.electricperspectives.com/capital-expenditures-grid-investment/

[2] PowerLines, "Utilities Requested Record $31 Billion in Rate Increases in 2025, Double That of 2024," January 29, 2026. https://powerlines.org/utilities-requested-record-31-billion-in-rate-increases-in-2025-double-that-of-2024/

[3] EY, "Outlook 2025: four themes empowering utilities," January 8, 2025. https://www.ey.com/en_us/insights/power-utilities/utilities-sector-outlook

Thank You, Sponsors & Participants

UBBA thanks the *Insights* Program sponsors, survey respondents, and interview participants whose contributions helped inform this research. Their perspectives, experience, and participation provided valuable input into the findings and analysis presented in this report.

For more information on the Utility Broadband Alliance, visit UBBA.com or email info@ubba.com

©2026 Utility Broadband Alliance, Inc.