

# Electric Companies Are Critical To Closing the Digital Divide

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# Agenda



Electric companies need robust broadband networks.



Communities served by electric companies need access to broadband.



Electric companies are well-positioned to help close the digital divide.



Partnerships between ISPs, telecoms and electric companies can be a win-win for customers.



What industry needs to be successful in middle mile broadband deployments.

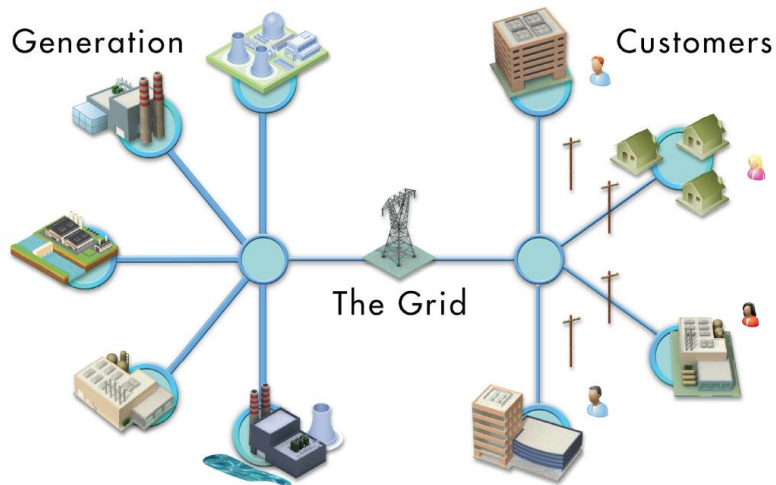


# Why Do Electric Companies Care About Telecommunications?

- Mission-critical communications systems are used to monitor and support the reliable delivery of electricity and other critical utility services, including:
  - Automatic Generation Control
  - SCADA
  - Voice over IP
  - Two Way Radios
  - Smart Grid Applications
- These systems serve as the backbone to the grid.

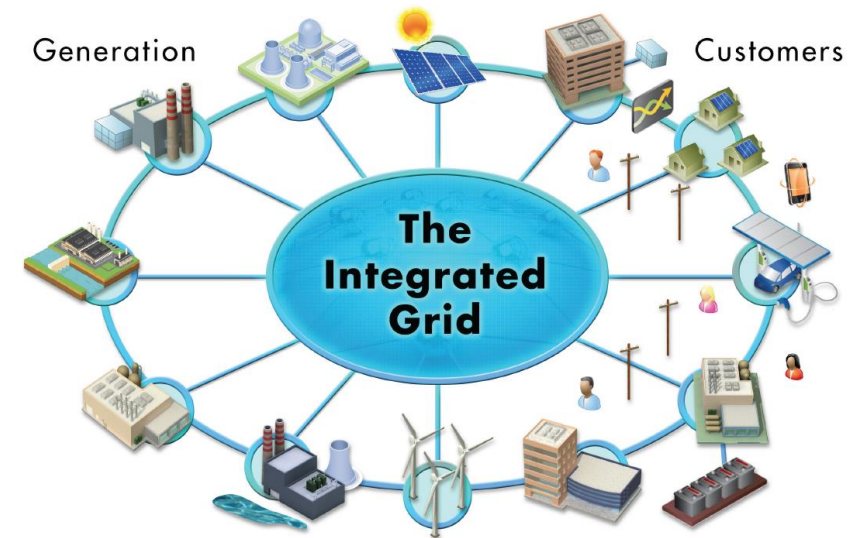
# Energy Grid in Transition

## Traditional Energy Grid



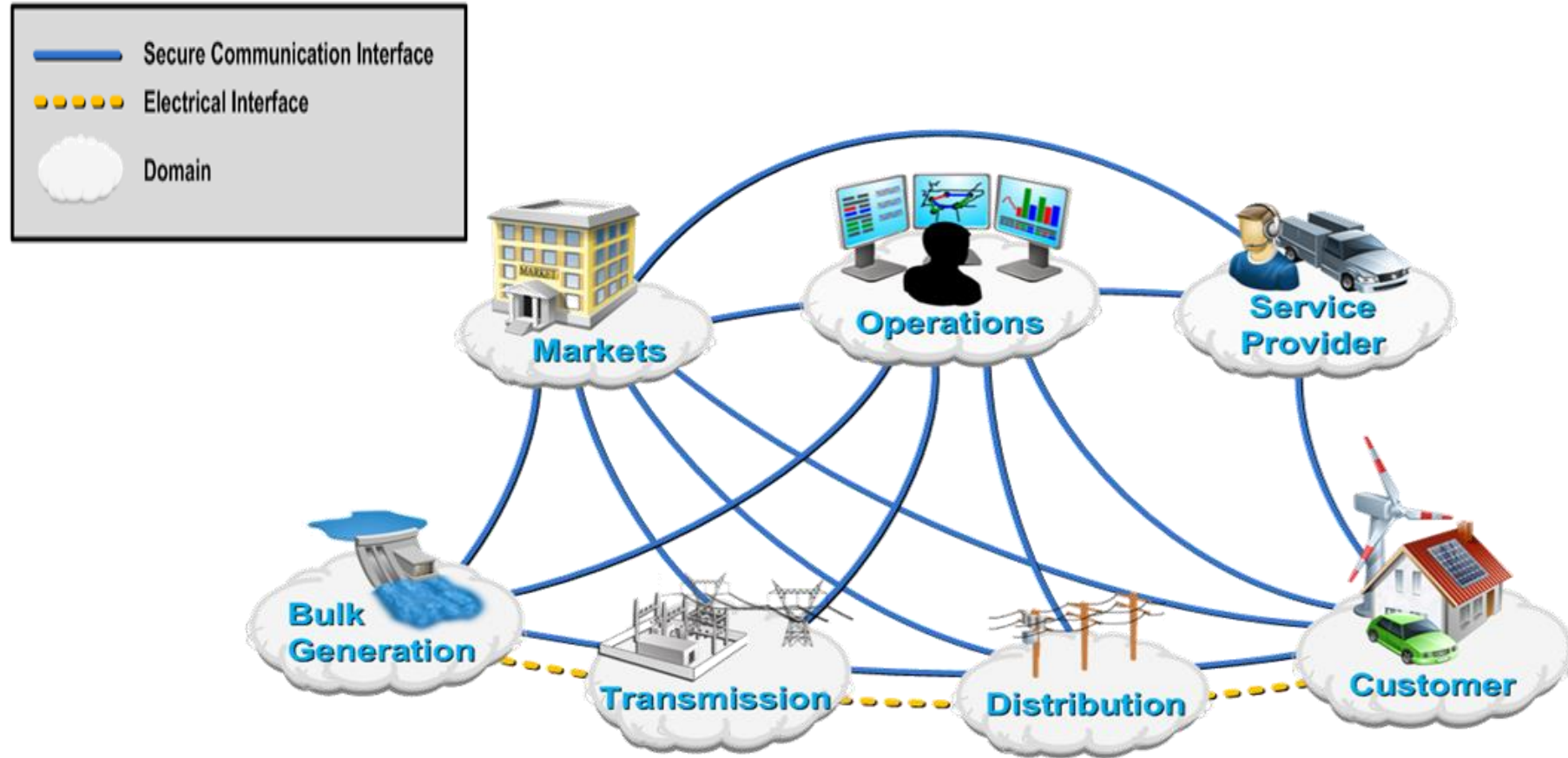
- One-way power flow from power company to customer
- Central station electricity generation

## Evolving Energy Grid



- Two-way power flow between power company and customer
- Central station and distributed electricity generation

# Interfaces and domains



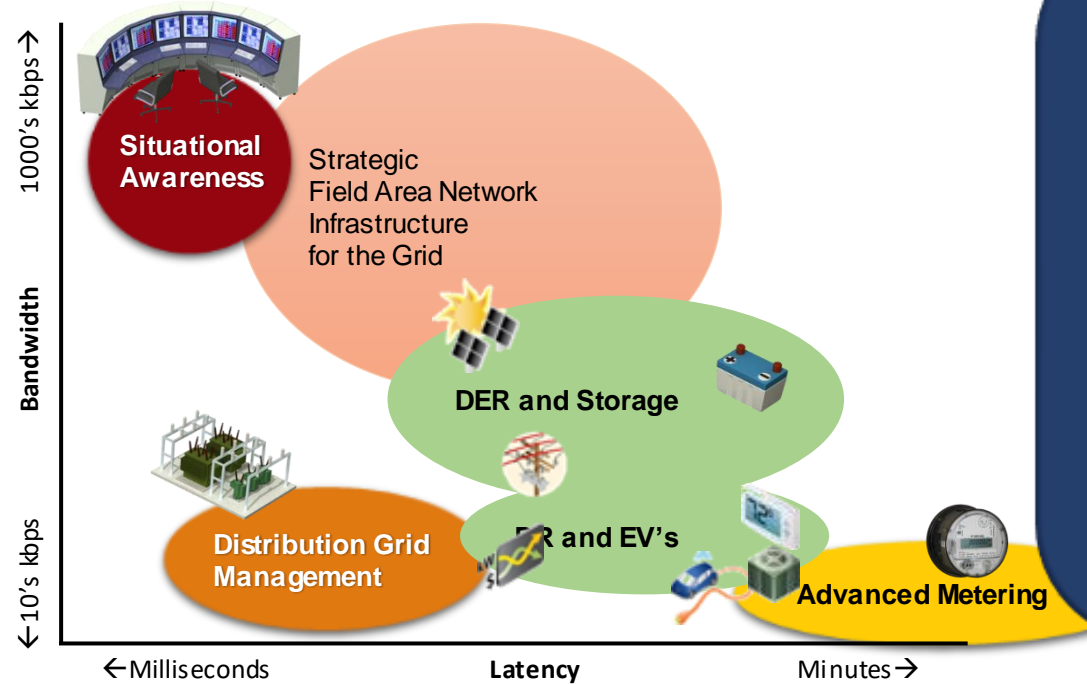


# Electric Company Telecommunications Networks are Strategic Assets

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- Substantial investments in telecommunications technology are needed to make the energy grid smarter, stronger, cleaner, more reliable, and more secure.
- Building out electric companies' telecommunications network supports secure communications for mission-critical applications, facilitates additional smart grid tools and distributed energy resources, and makes the grid more resilient and more efficient.

# Communication Requirements & Options



## Options:

- **Wired:**
  - **Copper, Power Line Carrier, Fiber**
- **Wireless:**
  - **Unlicensed Private**  
802.11 (2.4GHz, 5GHz), 802.15.4g Mesh (900MHz)
  - **Licensed Private**  
WiMAX 1.4, 1.8, 3.65GHz, LTE 700MHz, 1.8 GHz
  - **Licensed Public**  
3G, LTE
  - **Licensed Public Safety Sharing**

## Communication Requirements:

- **Available**
- **Affordable**
- **Reliable**
- **Resilient**



# FCC Definition of Broadband

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The FCC defines broadband as data transmission technologies that are always on and capable of simultaneously transporting multiple signals and traffic types between the Internet and end users.

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In January 2015, the FCC upgraded the definition of broadband speeds for downloading content from 4 Mbps to 25 Mbps and for uploading content from the previous rate of 1 Mbps to a new standard of 3 Mbps.



# What is a Broadband Network?

Broadband communication networks can take multiple forms: wired or wireless, fixed or mobile, terrestrial or satellite.

Broadband networks are defined by level:

1. Backbone (or central hub)
2. Middle Mile (which enables connectivity to Internet service providers)
3. Last Mile (over which providers deliver services to end users such as households, businesses, and community anchor institutions).

Different types of networks have different capabilities, benefits, and costs

# Wireless Broadband Evolution

## G TECHNOLOGY EVOLUTION

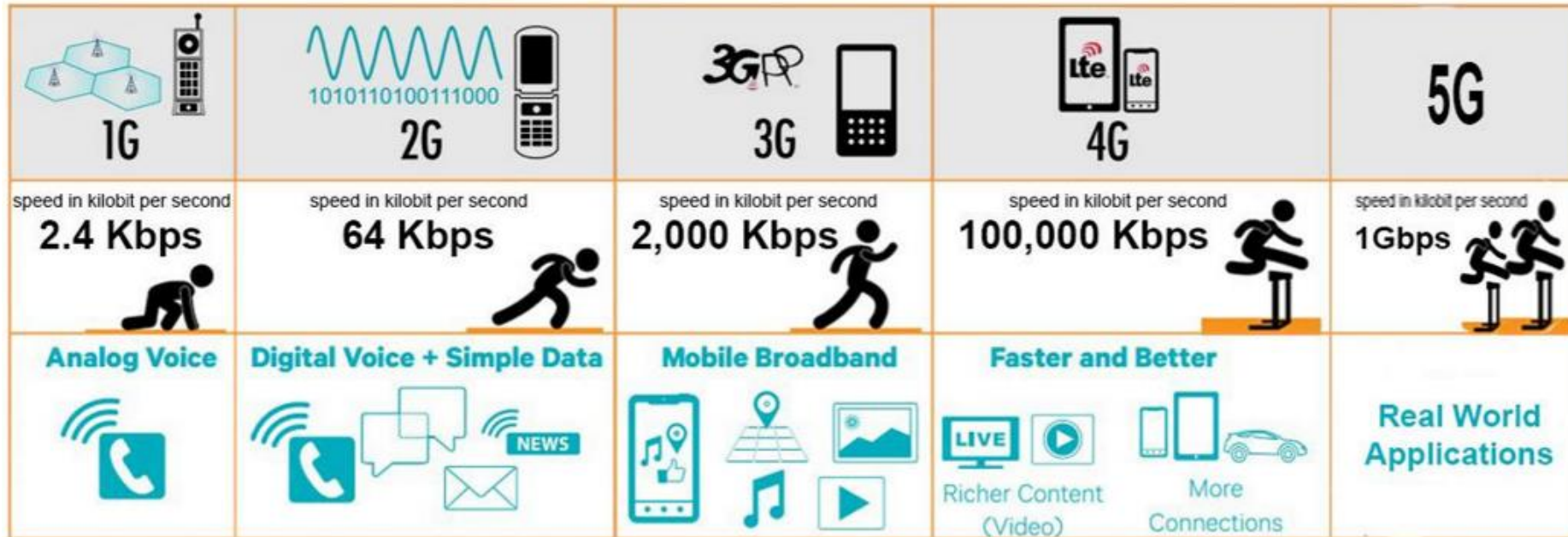
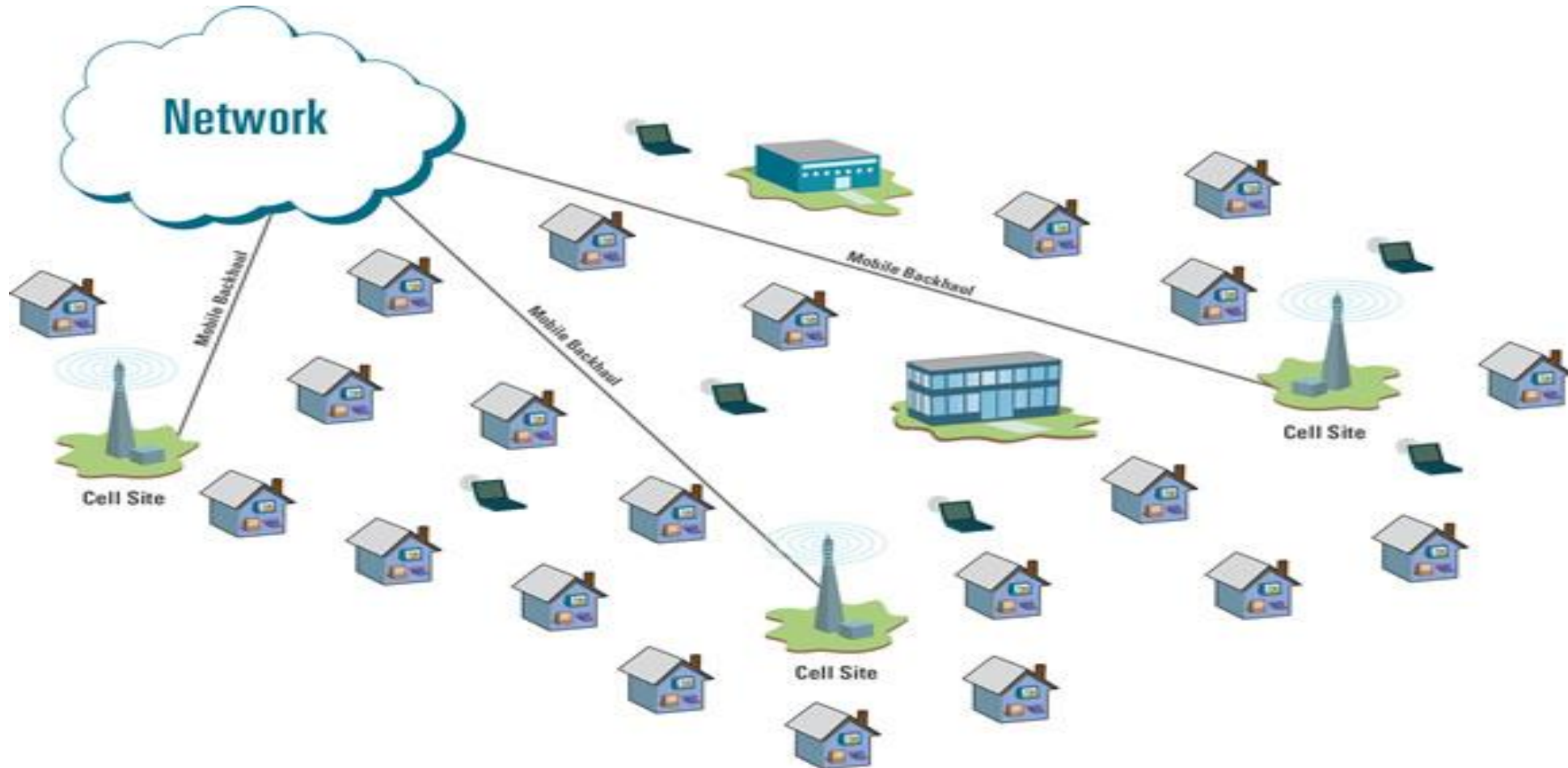


Figure 1. Evolution in Wireless Communication.

# Fiber Backhaul is Key for Wireless Networks



# Benefits of Broadband

• The benefits of faster broadband can be categorized as:

- Economic effects, including increased innovation and productivity in business
- Social effects, including better access to services and improved healthcare
- Environmental effects, including more efficient energy consumption.

A faster broadband speed boosts personal productivity, in part by supporting more flexible work arrangements.

A higher speed connection enables more advanced home-based businesses as a replacement, or complement to, an ordinary job.

Broadband speed enables people to be more informed, better educated and socially and culturally enriched – fueling a faster career path.

# Barriers to Broadband

Enormous deployment cost is one factor in whether broadband is affordable.

The last mile/to the premises buildout is expensive and time consuming.

Economics of low population density and high costs does not incentivize major carrier.

Lack of competition as almost half of rural America is served only by one providers, but 34 percent of urban areas also face a monopoly on broadband.

# Opportunity for Electric Companies

Electric companies long have incorporated telecommunications equipment and fiber technology into their operations—particularly in rural areas—to support their communications infrastructure and to provide real-time monitoring and controls for generation and transmission operations.

Electric companies have increasing needs for telecommunications, and they are increasingly deploying fiber for internal communications needs.

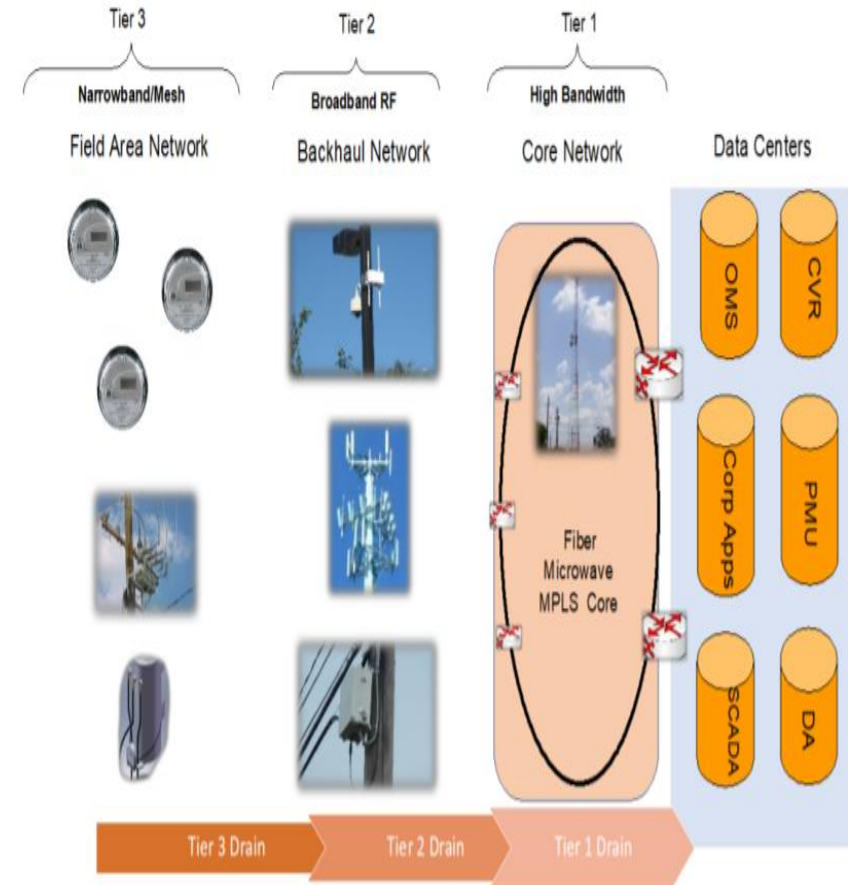
Video and connected devices are driving growth in data traffic but rural America is getting left behind.

A lack of connectivity affects local economies and affects job growth.

As regulated service providers, electric companies are well-positioned to help close the digital divide, as they have a physical connection near or to nearly every home and business within their service territory.

# Electric Company Telecom Network Core

- The core is a high-bandwidth network providing application aggregation. This consists primarily of fiber and point-to-point microwave transport, typically constructed in a ring topology for redundancy.
- Fiber is the preferred transport medium, but it is also the most expensive (~ \$50-150k per mile).



# Why Focus on Fiber?

Highly resistant and can last for over 30 years.

It scales well with little impact as users are added – no slowdown with shared usage or distance from the headend or data center.

It is easy to dispatch and configure remotely.

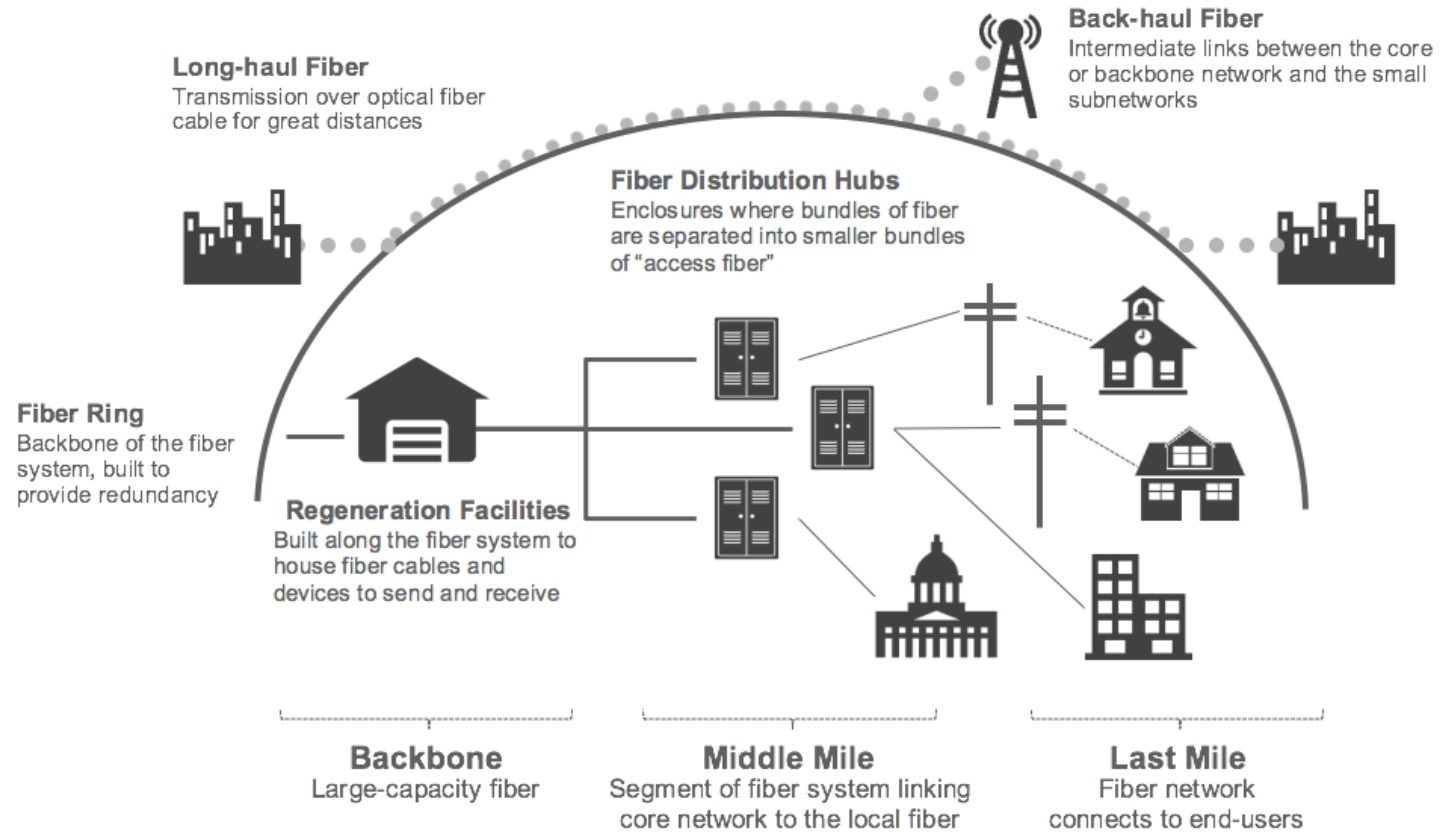
Fiber supports data demands and presents broadband opportunities.

Fiber optic broadband delivers much faster speeds because it uses fiber optic cables, instead of copper wire.

Fiber optic cables are made of thin strands of glass that allow laser light to travel down them which improves the speed that data can be sent and received.



# Fiber Network Opportunities



# Leveraging Electric Company Fiber Networks for The Middle Mile

Electric companies can install new fiber within their existing networks with enough capacity to support their needs and can lease additional capacity to others. This ability to install and to lease additional fiber has helped to lower broadband deployment costs in historically high cost underserved and unserved communities.

Under this arrangement, the electric company provides the “middle mile” infrastructure—the segment that connects a local access point to the major carriers and the broader internet—which the ISP will use to build out “last mile” broadband services to homes and businesses.

Installing middle mile infrastructure typically is cost-prohibitive for ISPs in these areas – therefore, partnering with electric companies allows both entities to build needed infrastructure cost-effectively and to reduce costs both for electric customers and new internet customers.

# Common Sense Partnership

High-speed internet is no longer a matter of convenience—it is a matter of necessity. Bringing high-speed broadband access to underserved and unserved communities through expanding energy infrastructure that either is already, or soon-to-be, installed is a common-sense approach that maximizes these assets and reduces costs for customers.

Allowing electric companies to provide the middle mile infrastructure provides a cost-effective solution to communities.

It also gives ISPs additional opportunities to broaden their service offerings to customers, while the revenue generated from leasing dark fiber helps to lower costs for electricity customers.

This is a win-win for all stakeholders, particularly, the residents of underserved and unserved areas who will be able to start and grow their businesses, educate their children, and access life-saving medical care in their communities and homes.

# Benefits of Electric Company Broadband: Powering the Quality of Life

Opportunities to benefit electric company customers by maximizing the value of the electric company's broadband infrastructure they support through rates are many:

- New revenues to offset customer revenue requirements
- Economic development enabled by utility broadband attracting and retaining businesses, enabling e-commerce, creating jobs.
- Growing electric demand through economic development, reducing KWh rates
- Expanding potential for competition and choices among retail broadband providers.
- Stretch limited broadband funding resources
- Reduced impact on the environment by utilizing existing infrastructure.



# Entergy

- “It’s penny wise and pound foolish” said MS PUC Commissioner Brandon Presley, to spend so much \$ on grid modernization and not require it to support broadband deployment.
- Entergy + C Spire to built 270 miles of fiber in Mississippi in hard-to-reach parts of the state– providing access potentially for 30,000 customers.
- Each company will improve its infrastructure. Entergy will serve as anchor tenant, and C Spire obtained access to conduits.
- C Spire to provide additional service to schools, businesses, residential customers and anchor institutions.
- All customers benefit from enhancements to electric grid.

# Dominion Power

- Dominion Energy is partnering with Prince George Electric Cooperative (PGEC) to bring broadband to underserved and unserved customers in rural Surry County, Virginia.
- The partnership marks the first time an investor-owned electric company has joined with an electric cooperative to expand broadband access in the Commonwealth of Virginia.
- By using fiber capacity for both operational needs and broadband access, Dominion Energy is reducing broadband deployment costs for ISPs, such as PGEC and its wholly owned subsidiary, RURALBAND.
- Dominion Energy will provide middle mile infrastructure, and RURALBAND will lease fiber and provide last mile fiber-to-the-home services.
- The project will require between \$16 million and \$18 million in investment, including federal and state grants.

# Appalachian Power

- West Virginia:
  - Appalachian Power (APCo) will lay more than 400 new miles of fiber to support the deployment of broadband in Logan and Mingo Counties.
  - This new fiber will help APCo integrate communications capabilities into its energy grid, and it then will lease portions of its fiber to an ISP, GigaBeam Networks.
- Virginia:
  - In Grayson County, APCo is installing more than 200 miles of middle mile fiber to upgrade its energy grid delivering new benefits that include smart meters for customers, as well as equipment and technology that will pinpoint and correct faults on circuits, shortening outages.
  - Through a partnership with the county, the ISP, GigaBeam Networks, will lease fiber capacity to provide last-mile connectivity to the county's schools, libraries, public safety agencies, and residents.
  - The project will enable Gigabit speeds, with approximately 60% of customers connecting via Fiber To The Premise and the remainder via Fixed Wireless.

# Alabama Power

Alabama Power has been partnering to make its infrastructure available to other broadband providers to facilitate the expansion of broadband access throughout its service territory.

- Point Broadband partnership in Lake Martin: will offer fiber-to-the-premises high-speed internet for areas on Lake Martin in Alabama. Point Broadband is partnering with Alabama Power on the new initiative. The company will contract for a portion of Alabama Power's fiber infrastructure to help support Point Broadband's offering of high-speed internet on Lake Martin.
- Fayette County: Alabama Power and Tombigbee Communications' freedom FIBER, a subsidiary of Tombigbee Electric Cooperative are working together to provide access to rural broadband and high-speed fiber internet service.



# Elements of Success

- Plan for sustainable success:
  - Line up adequate financial resources
  - Identify available existing infrastructure to lower costs.
  - Collect and analyze demand data and community input to determine when and where to expand/upgrade network.
  - Engage in cooperative planning with local, regional and state leaders.
- Mitigate foreseeable risks
  - Identify environmental and easement issues. Disputes are costly and delay deployments.
- Operate network on an open access basis and seek out wide array of ISPs by offering commercially reasonable terms and conditions.
- Build community support

# To Help Close The Digital Divide, Electric Companies Need:

To be eligible to lease utility fiber to 3<sup>rd</sup> parties.

To be able to use ROW for non-electric purposes like broadband middle mile projects.

To have robust funding sources:

- Ensure electric companies are eligible and incentivized to participate in federal broadband grant programs.
- Create grant program to allow electric companies to offset the costs of building out middle mile infrastructure to rural underserved or unserved communities.
- Develop a grant program to allow electric companies to invest in a fixed wireless broadband approach in places where fiber buildout remains a challenge, thus leveraging electric infrastructure to extend wireless service into the homes of underserved and unserved Americans.