PUBLIC INFRASTRUCTURE/ PRIVATE SERVICE: A SHARED-RISK PARTNERSHIP MODEL FOR 21ST CENTURY BROADBAND INFRASTRUCTURE

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Coalition for Local Internet Choice

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Broadband Delivers Opportunities
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Dedication

To the memory of our dear friend **Charles Benton,** who inspired us with his enthusiasm for a big broadband future led by America's communities and left a legacy to which we aspire every day.

Author Biographies

Joanne Hovis is president of CTC Technology & Energy, where she heads the firm's work in public broadband strategy, network business planning, market analysis, and policy. Joanne advises cities and states regarding how to build strategy and opportunity for public–private partnerships in broadband. She led the CTC teams that developed first-of-their-kind public-private broadband collaborations for the cities of Tacoma, WA, Westminster, MD, and Lexington, KY; the states of Alabama, Delaware, and Kentucky; and the Urbana-Champaign Big Broadband consortium. Joanne also serves as CEO of the Coalition for Local Internet Choice and on the boards of Consumer Reports, the Fiber Broadband Association, and the Benton Institute for Broadband & Society.

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Cat Blake, Civic Technology Analyst at CTC Technology & Energy, works with clients to develop infrastructure and funding strategies to meet community needs and performs a range of research and writing tasks related to civic technology and digital equity. Cat is currently working with nonprofit Generation West Virginia to support communities in the state as they seek to expand access to broadband. Recently, she helped develop a new broadband funding plan for the Alabama Department of Economic and Community Affairs. A University of Virginia graduate, Cat came to CTC from Next Century Cities, where she was a Senior Program Manager.

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1. Introduction: The Rise of *Public Infrastructure/ Private Service* Broadband Models

Broadband networks rank among the most important infrastructure assets of our time—for purposes of economic development and competitiveness, innovation, workforce preparedness, health care, education, and environmental sustainability. In the brief 25 years since the advent of the commercial internet, broadband access has become foundational to the American economy and participation of Americans in our democracy.

The criticality of broadband was illustrated when the COVID-19 pandemic shut down the U.S. economy. Households with fast connections were able to continue working and attending classes online. Unconnected households found themselves more cut off than ever. If there were ever any doubt about the centrality of broadband to the national interest, the devastating pandemic erased this doubt. Yet the United States faces persistent gaps in broadband availability and affordability—as well as a troublingly noncompetitive broadband ecosystem in which most communities are served by only one or, at best, two high-speed broadband providers.[1]

The persistence of these gaps demonstrates that private-sector investment alone is not closing our digital gaps. In rural areas of the country, in particular, there exists insufficient return on investment for private capital; as a result, broadband deployment does not emerge absent some form of public support. In less rural areas, competition is rare because return-on-investment challenges deter new investors from competing against existing monopolies and duopolies.

Given these difficult economics, even the most optimistic estimates are that only a third of American homes have access to all-fiber-optic networks.[2] Fiber represents the holy grail of communications infrastructure, recognized as a future-proof technology for facilitating the bandwidth needs of homes, businesses, schools, libraries, institutions, and government agencies—and a necessary platform for advanced wireless services that require fiber to deliver high speeds.

How, then, can America's communities secure the benefits of fiber-optic infrastructure?

Our answer is that local governments need not accept a binary option of waiting for the private sector to solve the problem—which the private sector already would have done if it made business sense—or taking on the challenge entirely as a public enterprise. Rather, public-private collaboration can disrupt this binary and give communities options. Indeed, in recent months and years, a range of collaborative public-private models—involving various levels of risk-sharing—have emerged and proved worthy of emulation.

A range of collaborative public-private models have emerged and proved worthy of emulation.

In some of the most promising of these partnerships, the public entity funds, builds, and owns the underlying communications infrastructure and the private entity does the rest: It provides the electronics and service over that infrastructure and deals with the complexities of running a broadband business. This *Public Infrastructure/Private Service* model puts the locality in the business of building infrastructure, a business cities and counties know well after a century of building roads, bridges, and utilities. The model leaves to the private sector most aspects of network operations, equipment provisioning, and service delivery.

The level of risk (and potential reward) can be calibrated under the partnership terms to suit local conditions and community goals.[3]

This paper uses the shorthand "*Public Infrastructure/Private Service*" to describe this model, and in most cases the public infrastructure is dark fiber. But in some cases, the infrastructure might be conduit for housing the fiber; in others, fixed-wireless technologies might supplement the fiber if local conditions warrant. In rare cases, the public fiber infrastructure might include the electronics, forming a public "lit" network over which partners can provide services over virtual circuits.

And alternative emerging approaches among other kinds of entities confirm the model, demonstrating the wisdom of the separation of function according to the partners' capabilities and the most efficient allocation of responsibilities. For example, the collaborators could be private-private, public-public, and even cooperative-cooperative—but playing the same basic roles, with one providing infrastructure and the other providing service.

The *Public Infrastructure/Private Service* model leverages the best capabilities of the public and private sectors. In this model, cities and counties do what they've always done: finance and build basic infrastructure, manage rights-of-way, and maintain that infrastructure over long periods of time—ensuring that the entire community benefits from the infrastructure and that government functions can happen over fiber that connects municipal offices, libraries, public safety agencies, and schools.

At the same time, private entities do what they traditionally do well: run a business, engage in sales and marketing, handle customer service, and adapt to changing technologies and customer preferences. In some cases, public or cooperative entities ably perform these service roles in a partnership with their infrastructure collaborators.

The *Public Infrastructure/ Private Service* model is an option to add to the menu of choices: a pragmatic, community-driven, pro-market, pro-business approach to advancing broadband in communities where solutions have not already emerged.

This emerging model presents a scalable option for communities that lack the expertise or interest to operate communications networks or act as internet service providers (ISPs) themselves but want to own and control the core communications assets in their community as a means of securing the benefits of the broadband internet.

It should always be the prerogative of local community leaders to make their own decisions about whether and how to address the need for broadband in their communities. The *Public Infrastructure/Private Service* model is an option to add to their menu of choices: a pragmatic, community-driven, pro-market, pro-business approach to advancing broadband in communities where solutions have not already emerged.

This paper defines and describes the model (and related variations, such as private-private and public-public) from both a business and a technical standpoint, and it summarizes case studies across the country of partnerships solving problems today. The paper is organized into two sections. In the first, we provide a strategic overview of the basic *Public Infrastructure/Private Service* model and its variants, together with a framework for public-sector entities to consider as they evaluate potential technical approaches and levels of risk-sharing. In the second, we address the key legal issues that arise in public-private partnership deals.

2. The Infrastructure: Why This Paper Focuses on Fiber Optics and Conduit

Fiber optics represent the most scalable long-term broadband infrastructure option. For purposes of capacity, reliability, and scalability, fiber-to-the-premises is superior to all other broadband technologies. Despite some industry marketing claims, fiber-to-the-premises is superior to even the best of all theoretical wireless technologies (which, we note, would require a large amount of fiber infrastructure for backhaul).

Cable networks, the most prevalent broadband infrastructure in the United States, are physically capable of providing service that can compete with fiber-to-the-premises in terms of capacity and cost—but cable technology cannot surpass fiber's capacity. Similarly, wireless technologies cannot approach fiber's capabilities, despite the current hype over 5G wireless. These new wireless technologies—which may promise far higher bandwidth, ultra-low latency, and the capacity to handle far greater numbers of devices—will require a hybrid of widely deployed fiber to provide backhaul to numerous small cells as well as many more point-to-point and point-to-multipoint wireless components.

But the next-generation wireless services will not be able to compete for speed with fiber all the way to the user—and the wireless technologies will not deliver the promised speeds unless they are supported by extensive fiber optics themselves. Indeed, fiber is one of the few technologies that can legitimately be referred to as "future-proof," meaning that it will be able to provide customers with better and faster service offerings to accommodate growing demand.

The biggest advantage that fiber offers is bandwidth. A strand of standard single-mode fiber-optic cable has a theoretical physical capacity in excess of 10,000 GHz,[4] far in excess of the entire wireless spectrum combined, and thousands of times the capacity of any other type of wired medium, which can be symmetrically allocated between upstream and downstream data flows using off-the-shelf technology.

Further, modern fiber can provide extremely low losses within a wide range of frequencies, or wavelengths, of transmitted optical signals, enabling long-range transmissions. Compared with a signal loss on the order of tens of decibels (dB) over hundreds of feet of coaxial cable, a fiber-optic cable can carry a signal of equivalent capacity over several miles, without amplification, with minimal signal loss.

Moreover, weather and environmental conditions do not cause fiber cables to corrode over time in the way that metallic components can, which means that fiber has lower maintenance costs—and a lifetime of decades if properly maintained.

Figure 1 shows the current and emerging capacity of fiber-to-the-premises as compared with other broadband technologies. (Because of fiber's significantly greater capacity, the chart is not to scale.)

In short, fiber infrastructure represents a long-term, prudent investment for a public entity with significant potential use and impact. In the next chapter, we describe the challenge localities face in securing the benefits of this infrastructure for their communities.

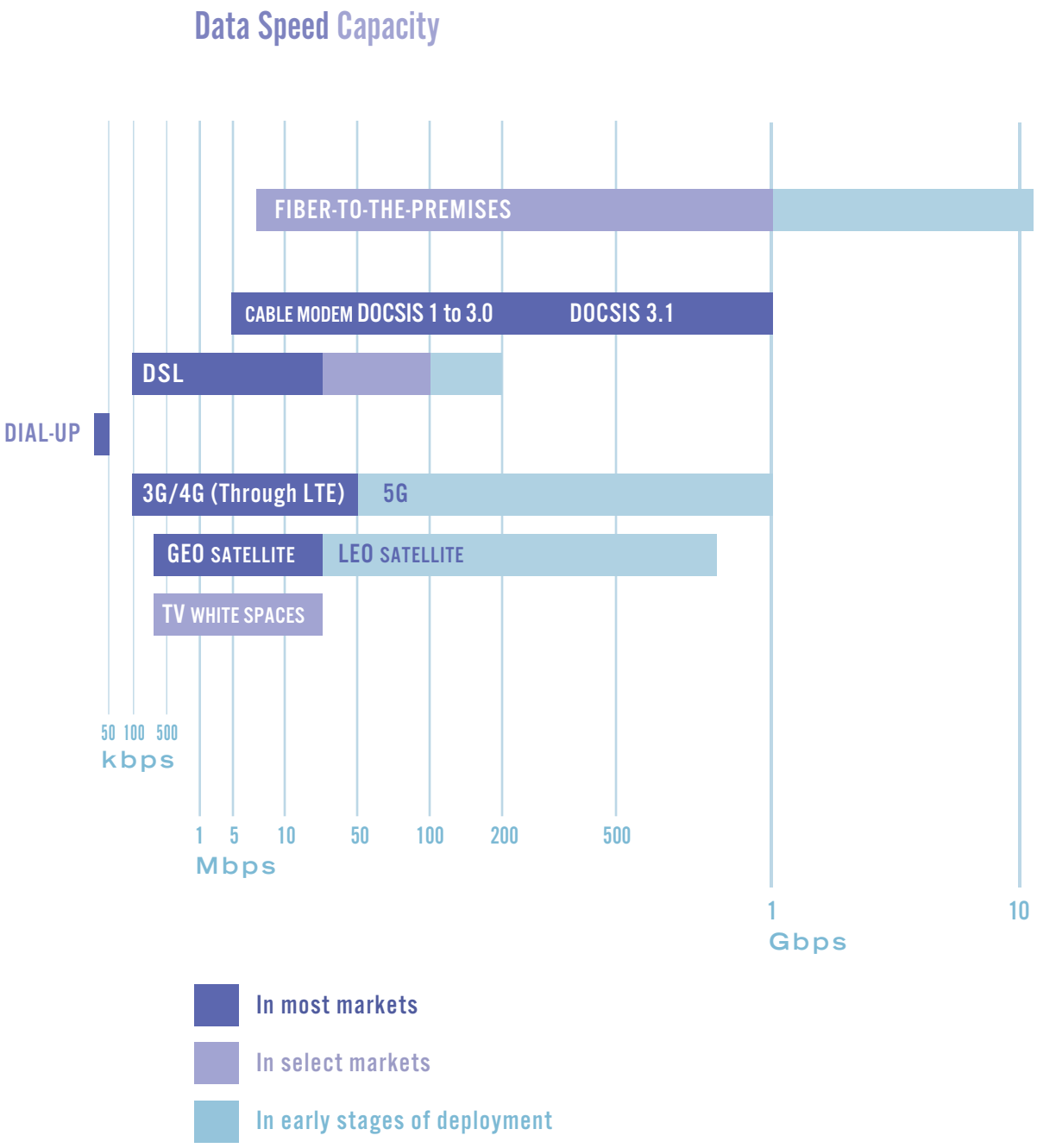


Figure 1: Capacity of Fiber-to-the-Premises and Other Broadband Technologies

3. The Challenge: Neither All-Private nor All-Public Models Will Fully Bridge Our National Broadband Gaps

Rural regions, other low-density populated areas, and low-income areas of cities have seen far less investment in 21st century broadband networks than have more densely populated, higher-income areas of the United States. This is part of the reason the economies of these areas can stagnate, young people depart for more promising locations, and communities decline.

Fortunately, the *Public Infrastructure/Private Service* model offers a promising solution that is precisely targeted to the areas with greatest broadband gaps, frequently those with lower income levels and lower population densities. And this model is needed because neither all-private nor all-public solutions are likely to solve this problem everywhere.

3.1. Business Imperatives Mean Private-Only Models Have Been Inadequate

Americans access the internet over networks owned by incumbent phone companies, cable companies, and, in a few locations, new competitors. Broadband, like any other type of infrastructure, requires significant up-front capital for deployment of networks and services, and private capital will flow to areas where potential return is highest.

In a number of densely populated, higher-income areas, incumbent phone and cable companies have upgraded their networks to enable new services and high-speed internet access. A handful of these areas have also seen investments by new entrants seeking to outflank the incumbents by building 21st century broadband infrastructure: fiber.

We need fiber everywhere in the United States—but this is not a job that private capital alone can finish. While the private sector is responsible for building much of the fiber available to Americans today (helped by a healthy set of federal subsidies for rural deployment), there is not sufficient return on fiber investment to incentivize private capital to deploy fiber to most of the country.

Stalled markets have proved that private investment alone is not profitable enough to drive the deployment of fiber to as many Americans as possible. Even where the private sector is deploying fiber, it is doing so primarily in areas where it is cheapest to deploy relative to the number of potential customers and the opportunities for profit are greatest. That results in fiber deployments to affluent urban and suburban neighborhoods. Left behind are rural and low-density suburban communities, lower-income urban areas, and small- and medium-size towns.

In rural areas, capital costs per potential customer are very high, resulting in low or nonexistent returns on investment—and thus requiring federal or state subsidy to incentivize deployment. In more densely populated areas, fiber is frequently not an attractive investment for ISPs. Providers have to invest large sums before they can start generating cash flow, and those revenues may be limited by the presence of other providers offering internet service, however inadequate relative to fiber-based service. This means slower and lower returns than result from other potential investments, at the same time that the capital markets require private ISPs to realize fast and high returns.

In sum, private fiber investment provides only moderate returns, requires long time frames, and entails potentially significant risks. The end result is lower levels of private investment than is needed to meet the nation's broadband interests.

3.2. Public-Only Models Cannot Be Expected to Fill the Gap Alone

Around the country, dozens of municipalities and municipal electric utilities—as well as member-owned community nonprofits such as rural electric cooperatives—have started up broadband businesses in which the public or nonprofit entity builds, operates, and provides services over its own network. But public and member-owned entities cannot be expected to shoulder the load and scale the public-only paradigm nationally.

For starters, some 20 states have passed laws that prohibit or significantly impair public entities from providing or partnering for the provision of advanced communications services. Even in states with no such laws, incumbent providers may bring to bear their lobbying muscle or launch public campaigns to fight a community initiative that creates new broadband competition. At the local level, these anti-competition threats have the effect of chilling new public initiatives by greatly increasing the cost to the community of the undertaking.

And for some communities, the idea of operating a broadband utility is not attractive. While they recognize that private markets are not functioning to deliver the necessary levels of investment for world-class broadband infrastructure, those communities would prefer not to enter the broadband market themselves. Rather, they reasonably seek ways to incentivize or encourage private service provision.

So, although a public or cooperative-only network can meet community goals—on matters such as service speed and quality, ubiquity, equity, and openness—the challenges include developing internal capacity to build and operate a new utility; obtaining public financing in light of the many important projects vying for funds; managing the risks having to do with construction, operations, markets, and technology; and of course dealing with the costs and challenges of anti-competition opposition.

All of this is not to say that a public or cooperative-only approach cannot work; to the contrary, there are many successful examples around the country, and they serve as an inspirational model for other communities. But there are clearly areas where the public or cooperative-only approach is not an option—and private markets are not working to deliver the needed investment. That leaves many communities to wonder how they can move past the challenges to get the infrastructure their residents and businesses need. As a result, the opportunity to make more modest investments and mitigate risk—while realizing considerable community benefit—might make the *Public Infrastructure/Private Service* model an attractive alternative for many communities. This is the topic of the next chapter.

4. The Business Case: Benefits of the *Public Infrastructure/ Private Service* Model

The *Public Infrastructure/Private Service* model holds the potential to combine the strengths of the private-only and public or cooperative-only models while minimizing their respective weaknesses.

The model offers policymakers a tool to act on multiple critical priorities, simultaneously and through a single investment. Cities and counties can invest in basic public infrastructure with a lifetime of decades (and far more in the case of conduit). Simultaneously, the model enables business opportunity and expansion for private-sector service providers who can compete over public infrastructure. It also creates construction jobs almost immediately, as well as permanent local operations jobs—a high priority at all times but particularly in the current moment as communities seek to recover from the fallout of COVID-19.

Most importantly, this model enables a locality to realize all the benefits of 21st century broadband infrastructure for health care, education, environment protection, civic participation, economic development, and so much more.

The model leverages the respective strengths of all parties. For local governments, it taps into their ability to access the capital markets at low cost. Furthermore, the community's capital investment is limited to the build-out of the infrastructure and not the rest of the service infrastructure. This means that the community's capital investment will spur further investment by its private ISP partners, increasing the impact of its capital.

The model also leverages localities' expertise at building and maintaining physical infrastructure in the public rights-of-way—tapping into their experience with a range of infrastructure assets from water/sewer/wastewater to roads and bridges to electricity.

On the private-sector side, the collaborating ISPs benefit by accessing new markets, fast, without the costs and effort associated with deploying infrastructure first. ISPs can focus on their core strengths of delivering services to the public rather than the need to finance and build infrastructure. Without the need for high up-front capital outlays, private ISPs can also scale their operations to more customers in more communities.

The model gives local government choice and influence in broadband decision-making. If the locality owns the underlying infrastructure over which ISPs provide service, the locality does not have to rely on the viability of single providers. It can seek out potential partners and give competing ISPs opportunity to enter the markets quickly by leasing access to the public infrastructure. And in some markets, there may be economic potential for more than one ISP to lease access to the infrastructure, securing the benefits of competition over a single network rather than requiring multiple, inefficient networks.

The model offers localities a prudent, lower-risk way to chart their own broadband futures. Because of the potential for creative risk-sharing within the *Public Infrastructure/Private Service* model, governments potentially get considerable bang for their broadband buck while taking on less risk than if they were trying to start up a broadband business on their own—or if they were providing subsidy money and hoping the recipient followed through on its promises.

Additionally, the *Public Infrastructure/Private Service* model provides a clear and familiar target for government investment: basic infrastructure. For the most part, the current modes of enabling broadband deployment involve federal, state, and local governments giving grants or loans to individual public or private network operators to build networks and deliver services over them. By contrast, the *Public Infrastructure/Private Service* model can provide a new way to focus investment on the basic infrastructure, built by localities with grants or low-cost public financing—much as the federal government has invested in transportation and other forms of basic infrastructure over the decades—and then offered to private providers at competitive cost.

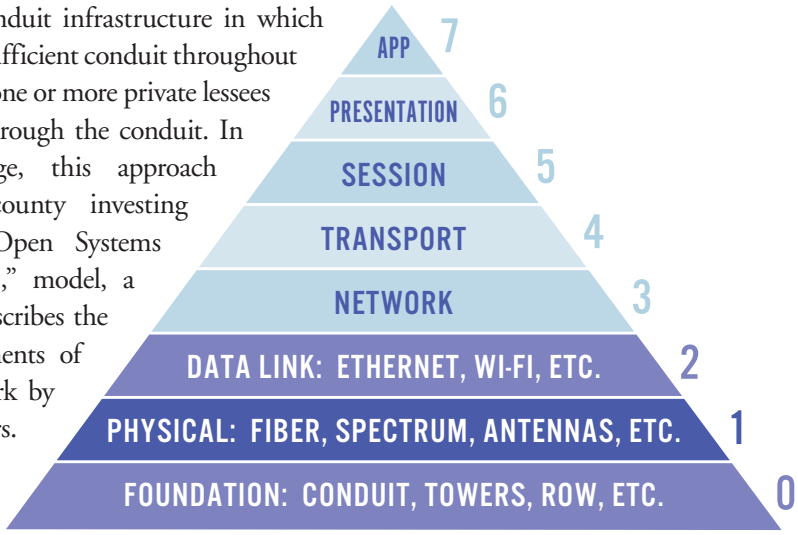
5. Technical Elements of the *Public Infrastructure/Private Service* Model

The Open Systems Interconnection (OSI) Model is the internationally accepted conceptual framework for understanding elements of a communications network and how they interoperate with each other. The model abstracts the network into seven layers: Physical, Data Link, Network, Transport, Session, Presentation, and Application. For the purposes of this paper, the key layers are 1 and 2. Layer 1 is the "Physical" layer, including infrastructure elements of the network such as optical fiber cables, wireless spectrum, antennas, and network hubs. Layer 2 is the "Data Link" layer, managing transfer of data over the Physical layer–basically, how the switches in the network speak to each other and manage traffic. Ethernet and Wi-Fi are examples of standard Layer 2 technologies. In addition, this paper describes what is sometimes referred to as "Layer 0," the underlying foundation of the network that includes conduit, wireless towers, and other physical assets that house or support the communications network.

The *Public Infrastructure/Private Service* model is structured to enable localities to use their experience, capabilities, and assets to build broadband infrastructure that can be made available to the private sector for competitive services and innovation. The public sector, in this structure, will be financing, building, and maintaining infrastructure but largely uninvolved in the operational roles related to service delivery to the public.

There are three primary technical approaches a community may consider under the "public" portion of the basic *Public Infrastructure/Private Service* model.

First, a new approach that appears poised for growth in coming years involves conduit infrastructure in which the city or county builds sufficient conduit throughout the community to enable one or more private lessees to pull their own fiber through the conduit. In communications language, this approach involves the city or county investing at "Layer 0" of the Open Systems Interconnection, or "OSI," model, a conceptual model that describes the relationships among elements of a communications network by abstracting them into layers.



The "Layers" of a Communications Network

Second, at Layer 1 of the OSI model, the local government builds fiber. This is the most common approach, by far. In this dark fiber infrastructure approach, the locality focuses only on building out a ubiquitous optical-fiber network to all premises in the community and leases strands of fiber to one or more lessees.

Third, at Layer 2 of the OSI model, the local government not only builds but also "lights" the dark fiber and then leases to its ISP lessees lit communications circuits rather than physical assets.

The simplest of these approaches is the one at the base of the OSI model stack—conduit. As the community's role rises up the stack—to dark fiber at Layer 1 and then to lit circuits at Layer 2—the complexity and cost of the community's effort increases.

The following is an overview of technical approaches and the relevant roles and responsibilities.

5.1. Dark Fiber Approach

The case studies below include several examples of this basic approach, including ones implemented by the cities of Westminster, Maryland; Huntsville, Alabama; and Holly Springs, North Carolina; the private investor-owned utility Alabama Power; and the Wilkes Telephone Membership Cooperative in North Carolina.

In this approach, the infrastructure provider is responsible for the physical fiber plant. This includes constructing the network, responding to and repairing fiber breaks, splicing new fiber, and performing ongoing maintenance tasks. Building and maintaining a dark fiber network also requires access to poles and/or conduit. The service provider lights the fiber and provides services, including the electronics at the customer premises (known as customer premises equipment, or CPE). When a new subscriber takes service, the infrastructure provider is typically also responsible for constructing the fiber "drop" cable from the street to the subscriber's home, where it connects to a network interface device at the premises.

5.2. Lit Fiber Approach

Though used widely in Sweden and some other European and Asian countries, this approach is rare in the United States. In a lit fiber approach, the infrastructure provider is responsible for the fiber network as well as for providing the network electronics required to light the fiber and deliver services from the service provider to the subscriber (terminating at an optical networking terminal located inside or on an outside wall of the customer premises). The lit fiber provider also creates a network operations center and performs ongoing maintenance and support tasks. The service provider sells services to subscribers using a virtual circuit over this lit network.

5.2.1. Technical Structure of the Dark and Lit Fiber Approaches

In the dark fiber model, the public entity would typically own the fiber-to-the-premises infrastructure from a fiber termination panel (where the fibers are terminated and made accessible to cross-connect to other fibers) in a network operations center to a network interface device at each residence and business. In the lit fiber model, the public entity would also be responsible for network electronics inside the network operations center and the optical networking terminal at the customer premises—and may also be responsible for the customer-premises equipment. Figure 2 shows the different elements of the network, with the additional components the public entity owns and operates under the lit fiber approach.

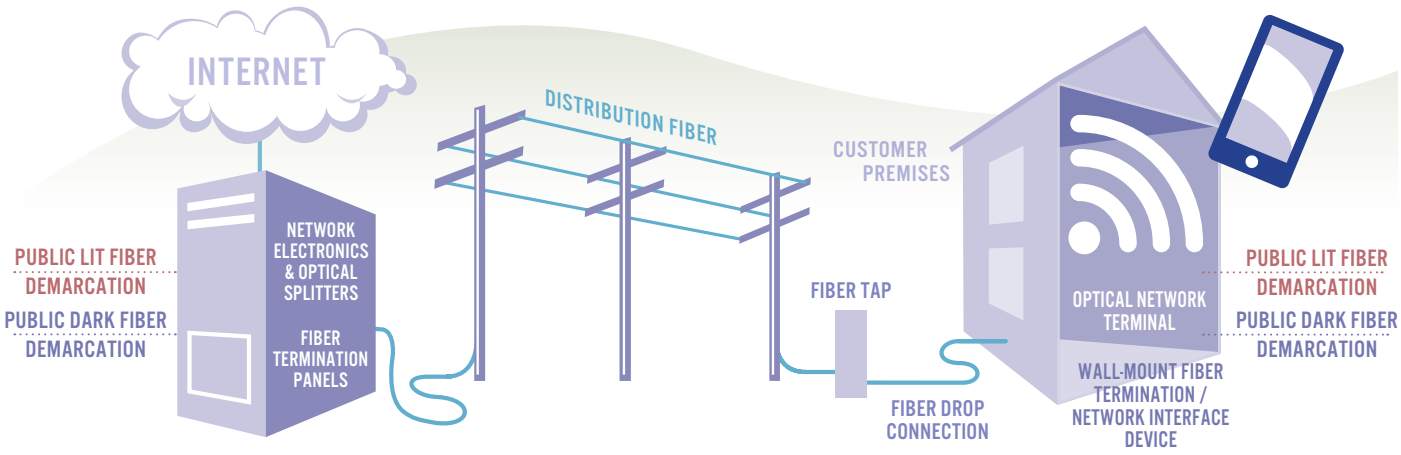


Figure 2: Typical Ownership Elements of Public Dark and Lit Fiber Approaches

If the public entity's role is limited to providing dark fiber, the service provider would be responsible for lighting the fiber (meaning, providing the electronics).

5.3. Conduit Approach

Among the case studies below, the West Des Moines project in Iowa is a leading example.

In a conduit approach, the public infrastructure provider is responsible for the physical conduit plant. This typically includes constructing the conduit network, responding to and repairing any conduit breaks, maintaining network documentation, and providing access points for the service provider. The service provider does the rest, pulling fiber through the conduit, lighting the fiber, and providing services.

5.3.1. Technical Structure of the Conduit Approach

In the conduit approach, the public infrastructure provider would typically build conduit to pass each premises and then build the section from the street to the customer premises (this part of the network is known as the "drop" or "service drop"), potentially when the network is first built or when the customer signs up for service. Public ownership of the drop conduit provides the flexibility to change or add providers in the future. As an alternative, the customer or the service provider also could be responsible for paying for the drops. This would have the advantage of reducing the locality's costs, but with the downsides of inhibiting sign-ups (if the customer must pay extra for the drop) or limiting the locality's control (if the service provider owns the drop).

Figure 3 illustrates a public conduit-to-the-premises approach. The ISP owns the fiber itself, as well as all the equipment in the home, while the conduit all the way to the home is owned by the city or county.

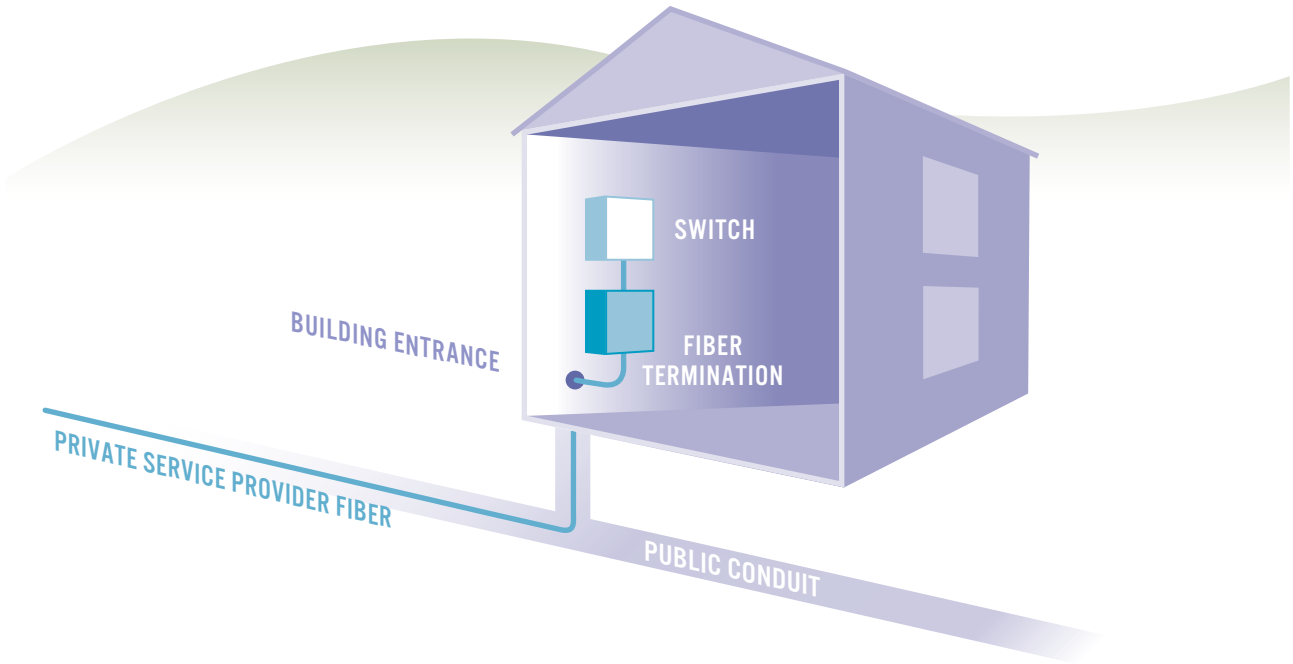


Figure 3: Typical Configuration at Customer Premises in Public Conduit Approach

6. Business Elements of the *Public Infrastructure/ Private Service* Model

In the *Public Infrastructure/Private Service* model, localities and their private collaborators create business arrangements under which the partners find creative ways to share the capital, operating, and maintenance costs of a broadband network—as well as the reward.

As localities evaluate proposed models, they will need to consider three general categories of risk and consider ways to mitigate, share, and avoid these risks in ways that are ideally targeted to their respective strengths and weaknesses and those of their private collaborators or lessees.

Construction risk: This category refers to risk associated with construction of the fiber or conduit infrastructure itself. The risk arises from challenges with underground or aerial construction that may sometimes be difficult to predict or foresee—and that could increase costs to the extent of making a project less viable than had been anticipated.

For example, construction costs for aerial fiber can balloon in situations where utility-pole owners are slow to issue permits or require expensive replacement of many utility poles by the entity seeking to attach its new cables to the pole. Similarly, costs for underground construction can grow based on complications of needing to dig through hard subsurface rock or avoid existing utilities already in a crowded right-of-way.

These risks can be mitigated through rigorous planning, detailed engineering, and robust construction management—and this area is one in which cities and counties frequently hold considerable expertise based on their public-works and transportation capabilities.

Performance risk: This risk concerns the challenges associated with operating the network on a day-to-day basis and delivering services adequately and in a way that meets the needs of customers; as such, it includes both technical and business execution elements.

For example, operating an optical network delivering marketable services takes capital, experience, and highly skilled personnel. Enormous expertise and organizational capacity are required for daily operations across a wide range of functions—such as, for example, engineers running a network operations center to monitor and manage services; field technicians responding to service calls and installing service for new customers; and customer service staff addressing consumer needs regarding both technical issues and billing questions. In the technical areas in particular, personnel with these skills are in great demand and can be challenging to recruit and retain as employees.

Risk regarding many of these performance element is sometimes better managed by private than by public entities. For example, it can be easier for private companies to hire and retain network engineers because of their greater flexibility with compensation. Similarly, private companies can sometimes more efficiently mitigate technical risk through scale—by spreading the costs of complex technical functions like network operations across networks in many communities.

On the other hand, public communications networks excel in some areas of operations. For example, they are renowned for superb customer service, in part because their employees are local. Public communications networks are renowned for superb customer service, in part because their employees

are local and knowledgeable of their own communities. In contrast, large ISPs are renowned for poor customer service, and this is an area in which their size works against them, making it difficult or costly (or simply not of interest to the company) to be responsive to the needs of their customers.

Market risk: Market risk is intimately related to performance risk and concerns the financial elements of securing sufficient revenues from customers to meet financial targets. For an internet service provider, this requires achieving and maintaining the necessary take-rates, at high enough price points, to achieve sufficient revenue to meet investment expectations.

An entity's ability to mitigate market risk depends on a wide range of factors, many of them external to operations. These include the level of existing competition in the market; changes in consumer preferences; demographic factors such as disposable income and age (which frequently align with how much consumers can spend on internet service); and the state of the national and local economy.

Market risk can be mitigated through successful efforts in sales, marketing, and customer service, but it frequently represents an area of risk that some localities prefer not to undertake or that is unfamiliar to them and that they would like to shift to private collaborators.[5]

6.1. The Model Allows for Creative, Mutually Beneficial Allocation of Risk

These factors are the key considerations not only for local governments considering a broadband initiative but also for private-sector ISPs that may be their collaborators. A successful partnership will align each side's needs and capabilities to allocate risk and responsibility efficiently.

Recent *Public Infrastructure/Private Service* projects demonstrate how this risk-sharing can be addressed.

RISK ALLOCATION in THE MODEL

	MARKET RISK	PERFORMANCE RISK	CONSTRUCTION RISK
ALLOCATION	Private	Private	Public
FUNCTIONS	Sales Marketing Service Delivery Customer Service	Network Operations	Engineering Constructions Maintenance
KEY FACTORS	Competition Demographics Consumer Preference	Access to Skilled Labor Technical Expertise	Utility Pole Access Make-ready Cost Right-of-way Congestion

In one scenario—illustrated in the case studies below regarding Huntsville, Alabama, and West Des Moines, Iowa—the city finances and builds the infrastructure itself using its public-works and utility expertise, taking on the construction functions and risk to which it is well suited. For both those cities, the private lessee of the infrastructure is Google Fiber, which has committed to pay the cities a lease fee for 20 years based on how much infrastructure is built. In Huntsville, the fee is based on the

mileage of fiber built, whereas in West Des Moines, it's based on the number of locations connected over conduit. In both cases, how much is built is in the control of the city, which can now predict and count on stable revenues. In this scenario, both cities have limited their risk to the capital cost of the infrastructure, while ensuring the provision of services to residents and businesses with operating and market risk falling to Google Fiber (and other ISPs that may also choose to lease fiber or conduit). For Google Fiber, construction risk is eliminated and it can focus on operations and building an ISP business in those cities.

In another scenario—illustrated in the case study below regarding Westminster, Maryland—a city builds the fiber and leases it to a private provider much as in Huntsville, but each party shares in the other's risk. In this case, the lease fee requires Westminster's private lessee, Ting Internet, to pay the city a monthly fee based on how much fiber has been built—thus ensuring the city a steady revenue stream to cover its costs of bonding for construction. But the company's payment is primarily based on how many customers Ting secures—thus allocating to the city some of Ting's operating and market risk. In addition, the parties agreed that in the event Ting's payments were insufficient for the city to cover its debt service obligations, Ting would cover some of those costs and be reimbursed in subsequent periods. As a result, while the construction function has been allocated to the city and operations functions to Ting, both parties share in each other's risk: The city's compensation is partially based on how successful Ting is developing customers (market risk), and Ting's obligations to the city including helping to cover shortfalls in debt service (construction risk).

6.2. The Model Requires Public Entities to Seek Revenues or Other Value From the Network to Meet Goals

Although the *Public Infrastructure/Private Service* model can enable localities to avoid the market risk as many of them prefer, this does not mean that they can expect ISP revenues from their lessees to necessarily cover all their costs. There is still a need for an entrepreneurial approach by the local government that owns the network, as well as creativity in ensuring that financial and other goals are met. How this need is defined and addressed should be based on the community's own requirements and values regarding broadband.

For some localities, the goal will be for the infrastructure to pay for itself. In that case, the community may seek as many lessees as possible for its infrastructure to maximize revenues. Citywide lessees (such as Allo Communications, Google Fiber, and Ting Internet and others described in the case studies below) will be most desirable because of the size of the lease payment, but leases of point-to-point infrastructure or assets in a single area of the community can help deliver additional revenues. Other localities seeking full cost recovery may decide that entering into an exclusive agreement with a single provider for a period of time is the best way to achieve that goal.

For some communities, some of the financial value will be defined based on new capabilities and functions the network can deliver to their own employees and agencies—and the avoided costs associated with having fiber of their own rather than paying costly lease fees to a telecommunications company. The financial metrics for success thus include the quantifiable value the locality secures by itself using some of the new assets for internal government uses, including municipal and municipal utility operations, and public safety. This is the case, for example, in Fort Morgan, Colorado, where

the city and its municipal electric utility use some of the fiber for internal operations, including as a promising platform for innovative smart-city and smart-utility applications.

And for many, the value will also be greatly supplemented by the positive externalities associated with the network—the community and economic benefits that flow from 21st century broadband but that don't necessarily provide a direct revenue stream. Indeed, most localities consider broadband investments not because they seek to make money from them but because they are a necessary tool for education, economic development, and other social goods. Thus, in a shared-investment *Public Infrastructure/Private Service* model, much of the community value may be realized through benefits that do not appear on the project's financial statements but that are the core reason for undertaking the project at all. In West Des Moines, for example, the city's investment in citywide conduit is based in part on the goals of securing broadband equity (among community members) and competition (among ISPs).

6.3. The Model Includes Potential for Multiple ISPs on a Single Network

Communities that build infrastructure assets have the option of allowing multiple service providers to compete over the same infrastructure—which can facilitate competition and avoid reliance on a single ISP.

Facilitating multiple providers on the same fiber can be effectuated by allocating different conduits or dark fiber strands to different providers, or by means of software that enables multiple virtual connections to be conveyed over a lit fiber network.

This approach has seen some success in smaller city-owned networks in parts of Europe (primarily in Sweden) and Asia (most notably in Singapore). But this outcome is less common in the United States, where thus far, most open conduit and dark fiber networks have found one ISP to lease the asset on a community-wide basis. This may be because the limited potential consumer revenues make it challenging to attract multiple ISPs who are willing to invest in providing high-speed services. As a result, in some markets the economics may still disfavor multi-ISP competition, even when the city or county provides the underlying infrastructure.

Faced with this reality, some localities choose to lease their dark fiber or conduit infrastructure only to a single service provider, using the potential for exclusive access as a means of attracting that provider in the first place (and potentially securing higher revenues from that provider in return for exclusivity). As is described below in the case study regarding Fort Morgan, for example, that city leased fiber to a single provider—Allo Communications—to enable Allo to meet its return-on-investment requirements.

7. Case Studies

The *Public Infrastructure/Private Service* model—and the alternative emerging approaches outlined herein—is hardly theoretical. Across the country, early actors are developing new partnerships to bring next-generation broadband to their communities. Each version includes a creative way for each partner to share the capital, operating, and maintenance costs of a broadband network. And interestingly, certain public-public, private-private, and cooperative-cooperative versions are emerging.

	ASSET LEASED	CITY/COUNTY ROLE	CASE STUDIES
LAYER 0	Conduit	Conduit Maintenance	West Des Moines Lincoln
LAYER 1	Dark Fiber	Fiber Maintenance	Westminster Springfield Huntsville Holly Springs Urbana-Champaign
LAYER 2	Lit circuits over fiber	Fiber Maintenance & Optical Network Operations	Utopia Ammon

7.1. Dark Fiber: Westminster with Ting Internet

The city of Westminster, Maryland, is a bedroom community of both Baltimore and Washington, D.C., long underserved by broadband. In 2010, the city saw an opportunity to build out last-mile infrastructure to provide high-speed broadband service to residents but did not have a municipal electric utility or the resources, expertise, or political will to develop a municipal fiber service by itself.

As the community evaluated its options, it became clear that the fiber infrastructure itself would be the city's most significant asset and that public-private collaboration would be the best way for the city to realize its goals and mitigate its risk. The challenge was to determine what part of the network implementation and operations the private partner would handle and what part could be the city's responsibility.

The hybrid approach that made the most sense required the city to build, own, and maintain dark fiber and to seek a partner or partners who would light the fiber, deliver service, and handle the relationships with residential and business customers. The city issued a request for proposals and eventually selected Ting Internet, then an upstart ISP with a strong track record of customer service as a mobile operator. Ting shared Westminster's vision of a true public-private partnership.

Under the terms of the partnership, the city built and financed all of the fiber (including drops to customers' premises) through a bond offering. What is so innovative about the Westminster approach

is how the risk profile is shared between the city and Ting. The city bonded and took on the risk around the outside plant infrastructure, but the negotiated payment mechanism is such that Ting is truly invested in the network's success. Ting pays two monthly lease fees. The first is a fee of $6 per premises passed, regardless of whether the customer subscribes. The second is a $17 fee for each subscriber. (There is also the potential that the $17 could rise if the average revenue per user rises past certain thresholds triggered by Ting adding video or other services, but this has not yet occurred.)

Because Ting pays Westminster a $6 fee for every home and business passed, Ting was financially obligated to the city from day one, even if it had no subscribers. This fee also gave the city confidence that Ting would not be a passive partner because Ting is incentivized to sell services to cover that cost. The $17 fee allowed the city to share in some of the upside of the network's success while enabling Ting to keep its obligations to the city lower as it ramped up to add customers.

Today, the city's revenue from Ting is close to meeting the city's debt service. (The city absorbs the operation and maintenance costs of the network, viewing this as akin to how it maintains roads and sidewalks and other basic infrastructure for the benefit of its residents.)

Perhaps most significantly, there is also a mechanism built into the contract that ensures that the two parties are sharing risk associated with the city's financing of the fiber infrastructure. Ting agreed to provide a debt service guarantee. If there is ever a quarter in which Ting's financial obligations to the city are insufficient to meet the city's debt service, the city will pay only the first $50,000 of a quarterly debt service deficit, then Ting is responsible for the next $100,000, and the city for everything after that. (This means the city can budget for up to $200,000 of debt service deficit in a year, confident that Ting has the next $400,000 covered.) And in subsequent quarters, if Ting's fees to the city exceed the debt service requirements, Ting will be reimbursed an equivalent amount. Fortunately, the business has been successful enough that these mechanisms have not been implemented.

Originally the network was conceived as an open-access network. The language of the agreement included a requirement that after two years, Ting could also serve as a wholesale provider to other potential entrants. Although the city had preliminary discussions with some potential entrants, no competing provider has emerged, partly because the details of how the wholesale-retail relationship would work—including the magnitude of fees and how those fees might be passed on—is not specified in the original contract. In any event, the market could prove too small for a second provider to succeed in the short term. But over the long term, the contract leaves a door open for additional providers to offer services to residents and businesses in Westminster.

7.2. Conduit: West Des Moines

The city council of West Des Moines, Iowa, voted in July 2020 to finance and build a ubiquitous underground conduit network throughout the city. The conduit infrastructure will connect all homes, businesses, and institutions.

The conduit network will be available on an open, nondiscriminatory basis for any company wishing to provide competitive services to consumers and businesses in West Des Moines. The city views this infrastructure as a means of ensuring best-in-class communications services over many decades.

The city stated three clear goals for the effort: First, equity—that the network would reach all members

of the community. Second, non-exclusivity—that it would be open to all ISPs for open and robust competition. Third, financial sustainability—that it would be a prudent and viable investment.

Google Fiber has agreed to become the first lessee of space within the conduit system on a nonexclusive basis. Google Fiber will build fiber within the conduit and deliver services throughout the city. It will pay the city based on the number of connections made to potential customers. The company committed to a minimum amount over the first 20 years of operation, which gives the city a predictable revenue stream.

This is the first ubiquitous, citywide conduit lease project to our knowledge, and it is likely to result in interest among other cities throughout the country, as will Google Fiber's high profile.

7.3. Dark Fiber: Huntsville Utilities and Google Fiber

In February 2016, the city of Huntsville, Alabama, a technology hub, announced that its municipal electric utility, Huntsville Utilities, would build a fiber network and that Google Fiber would lease strands of fiber throughout the city to provide gigabit services to residences and small businesses.

The announcement between Huntsville and Google Fiber is a variation on the approach pioneered in Westminster, though the payment terms are different and provide a key point of contrast. Google Fiber leases fiber from Huntsville based on a rate sheet that provides for various levels of pricing based on amounts and volume of fiber and related network infrastructure used. In contrast, Ting's obligations to Westminster are based in part on how many customers it secures and how much revenue it generates. As a result, Huntsville Utilities gains a stable and predictable revenue stream regardless of the success of Google Fiber in that market, but not the potential to share in the upside in the event that Google Fiber is highly successful.

The Huntsville approach holds the potential for competition among providers. Google Fiber does not have exclusive use of the fiber; other entities can also choose to lease fiber based on Huntsville Utilities' established rates. We anticipate that there will be other ISPs that use the city's fiber, particularly to serve larger businesses and institutions, though it's not clear whether the economics exist for another provider to compete against Google Fiber in the residential market, as least in the short term. Over the long term, however, market demand and structures may change and new opportunities for competition may arise. By building and owning its own fiber assets, the city of Huntsville has ensured that it will be able to react to those changes and maximize its benefits.

7.4. Urbana/Champaign and i3 Broadband

The University of Illinois and the cities of Urbana and Champaign, Illinois, have worked together over many years to expand their broadband infrastructure and connectivity. Those efforts included the development of the Urbana-Champaign Big Broadband (UC2B) network, which is now owned and operated by a not-for-profit corporation.

Through a range of different strategies and using local private capital, state funds, and federal funds, UC2B built fiber rings specifically engineered to enable fiber-to-the-premises deployment in the most cost-effective manner. It also built fiber-to-the-premises in neighborhoods with the lowest broadband

adoption rates, on the theory that those would be the last places that the private sector would deploy. UC2B's existing investment and willingness to share future risk in 2013 attracted a private partner, iTV-3, an Illinois company with fiber-to-the-premises experience. (The company was acquired by i3 Broadband in 2017.) The two partners entered into an agreement that gave iTV-3 access to UC2B fiber on a lease basis at no cost in return for meeting the community's goals of deploying additional fiber-to-the-premises with the following requirements:

- Gigabit service speeds
- Wholesale access on the network to competing companies
- All neighborhoods have equal opportunity to get services

Through the agreement, the cities of Champaign and Urbana also negotiated a right of first refusal to buy the network in the event that iTV-3 attempted to sell it. (The cities decided not to exercise this option when, in 2016, iTV-3's parent company chose to sell off all its fiber holdings and the buyer, i3 Broadband, agreed to honor the same commitments.) The community effectively receives 100 percent of the economic development, competition, and digital inclusion benefits it seeks in return for the investment it has already made in the existing fiber. The approach also means the community can focus on driving demand and adoption while relying on an experienced private partner to handle customer service, marketing, and operations.

7.5. Conduit: Lincoln with Allo Communications

Nebraska state law forbids municipalities from offering retail broadband services. But the state's laws don't say anything about cities building conduit—a key element of any urban fiber network. In 2012, the city of Lincoln took advantage of downtown redevelopment to deploy an extensive conduit network. After its completion, the 216-mile network, known as the Lincoln Technology Improvement System, initially attracted corporate customers that were primarily focused on providing broadband to large businesses.

Under city ordinances, private companies can access the conduit if they agree to pay fees and follow the city's broadband franchise ordinance, which requires providers to follow network neutrality principles and other policies. The city also requires companies that add conduit to make it available to the city and other ISPs. In 2015, the Nebraska-based telecommunications firm Allo Communications forged a partnership with the city that allowed Allo to lease dedicated space in the conduit network to build fiber to every home and business in the city.

As part of a 25-year agreement with the city, Allo has agreed that it will provide high-speed internet access to any residential or business address in the city, plus to government buildings and traffic lights, and the city agreed to continue investing in maintaining and updating the conduit network for another four years at $500,000 per year. Allo currently pays the city $3 per month for each residential customer who buys service from Allo—an amount that is scheduled to incrementally increase over time.

Lower-income users in the city are also beneficiaries of this partnership. Allo makes a high-speed, low-cost service tier available to qualifying households. Allo has also agreed to provide up to 150 nonprofit organizations with free broadband service.

7.6. Fort Morgan and Breckenridge with Allo Communications

In 2017, the city of Fort Morgan, Colorado, voted to pursue an arrangement that would balance the risks and responsibilities of bringing fiber service to the community. The city formed a partnership with Allo in which the city would build and own a fiber network and Allo would lease the fiber and then serve as the network operator and service provider. Although Fort Morgan and Allo's partnership closely parallels that of Huntsville and Google Fiber, a key distinction is that while Huntsville's network is available for additional service providers to lease, Allo has exclusive access to Fort Morgan's fiber.

Fort Morgan and Allo worked together to design a network that would pass every home and business in the city. The city financed, built, and owns the fiber, and it is responsible for ongoing network maintenance. Allo, as the network operator and service provider, funds and manages the drops that connect the network to individual premises, provides and maintains the electronics needed to light the network, performs installation services, and provides services. Allo retains all revenues and pays the city a monthly lease fee for use of the fiber. The partnership agreement was structured so that Allo's lease fees provide cost recovery to the city over the initial 20-year term of the agreement. (The agreement included a monthly cap on this lease fee in order to protect Allo in case construction costs were higher than expected.) The city and Allo jointly manage public education and economic development initiatives related to the network.

This partnership places both entities in roles that come naturally to them. Fort Morgan has a long history of building and maintaining local infrastructure and running the local electric, water, and gas utilities. In partnering with Allo for a 20-year exclusive-access lease term (with two options for 10-year renewals), the city was able to build a world-class infrastructure system with a level of financial certainty. And Allo, a service provider with experience offering services in about a dozen markets, was able to leverage a community-wide asset to reach a new market with less capital investment.

In June 2019, nearby Breckenridge, Colorado, selected Allo for an exclusive lease on the town's network in a similar agreement to bring high-speed broadband to its residents and businesses.

7.7. Springfield with CenturyLink

City Utilities, the municipal electric and gas utility for the city of Springfield, Missouri, began connecting its facilities to fiber in the 1980s. The fiber network, SpringNet, grew over the decades, and eventually City Utilities began offering internet service to businesses.

Springfield has now engaged in a collaboration with CenturyLink in which the city is expanding its fiber network and CenturyLink is becoming a lessee of that fiber, non-exclusively, in a model similar to that of Huntsville and Google Fiber. In this way, Springfield has been able to expand CenturyLink's services in the community through city deployment of fiber.

CenturyLink is the first private service provider to contract with the city to offer services over the publicly owned network. In the partnership, the city is financing and building the new network infrastructure—more than doubling the extent of the network with the addition of about 1,000 route miles—and CenturyLink will build the drops to premises, provide services, and manage customers. Lease revenues collected from CenturyLink will help fund network expansion.

As a result of the partnership, Springfield residents and businesses will receive a new, competitive option for service, and CenturyLink will expand into an additional market.

7.8. Dark Fiber: Holly Springs with Ting Internet

In 2013, Holly Springs, a town in the Research Triangle area of North Carolina, decided to build a municipal fiber network to better serve the town's needs and provide a foundation for a broadband network. The decision was based in part on the analysis that building town-owned infrastructure would cost Holly Springs about the same as, if not less than, continuing to lease comparable or less-capable services from incumbent providers. The town completed the 13-mile network the next year, connecting critical community facilities such as municipal buildings, schools, and hospitals.

While the network enabled Holly Springs to provide high-capacity connections to community facilities and to offer free Wi-Fi in public spaces, North Carolina state law prevented the town from offering commercial broadband service to residents and businesses. The town had been aware that state law limited its ability to provide broadband service and had added extra capacity in order to open up the potential for private providers to lease the infrastructure and provide residential broadband service.

In 2015, Ting Internet announced that it would be bringing service to Holly Springs. Ting signed a 20-year lease agreement to use the town's fiber and leveraged that backbone in order to build its own last-mile connections to homes and businesses throughout Holly Springs. As part of the deal, the town also committed to support and facilitate the project. In this straightforward arrangement, the municipality's risk was limited to building extra capacity in its backbone fiber and offering that extra fiber for lease to enable the private provider to get a strong start in building a local fiber-to-the-premises network and offering services.

In January 2020, Ting announced the completion of its build. Ting has also now begun expansion to neighboring Fuquay-Varina, building off the company's Holly Springs infrastructure.

Ting offers a range of services in Holly Springs, including a low-cost plan, residential gigabit service, and commercial packages for businesses.

7.9. Dark Fiber and Wireless Infrastructure: Garrett County with Declaration Networks Group

Rural Garrett County, in far western Maryland, is a relatively remote Appalachian community bordered by West Virginia and Pennsylvania. The county has struggled to get broadband in a number of its remote, mountainous areas. Where internet access is available, it is inadequate DSL service. The incumbent provider has not made any plans to expand or upgrade service offerings.

Though mobile broadband is available in some parts of the county, data caps and throttling mean that it is not viable for economic or educational activities. (Parents who homeschool their children can run through their monthly bandwidth allotment in one day of downloading educational videos.) Beyond these challenges for residents, the county has struggled to attract and retain businesses and teleworkers.

In response, the county has gradually and incrementally built out fiber in some areas, with a focus on

connecting specific institutions. And in 2015, the County Council approved a contract with a private partner to leverage some of that fiber and additional public funding to support the deployment of a fixed-wireless network to bring service to 3,000 then-unserved homes in the most remote parts of the county. Declaration Networks Group (DNG) used county funds to build network assets that are owned by the county and leased by DNG to deliver internet services to the public.

The county's outlay of $750,000 was matched by a grant from the Appalachian Regional Commission (ARC)—and augmented by DNG's commitment of both capital and operating funds. DNG raised private capital and secured grants and loans to expand the network and takes all operating and market risk associated with the network.

The partnership involves cost to the county to fund the assets leased to DNG, but it also produces massive benefit for residents and businesses in the newly served areas. The resulting speeds won't match those available in metro markets but are vastly better than the previous slow DSL service and represent a huge economic development achievement from the county's standpoint.

The relatively modest county contribution made the economics of this opportunity very attractive to DNG and secured a network build-out for an area that would otherwise not be attractive for private-sector broadband investment. From an economic-development perspective, the county's investment represents enormous value for the dollar. This investment is enabling residents in 3,000 homes to buy cost-effective, previously unavailable internet service.

7.10. Alternative Partner Case Studies

The key feature of the *Public Infrastructure/Private Service* model described herein is that it splits between two entities the provision of infrastructure and the provision of services. This is not limited to public-private collaboration. Public-public and private-private use of similar structures demonstrate the usefulness—and replicability—of the model. The following examples illustrate how other types of entities have developed such structures.

7.10.1. A Dark Fiber Private-Private Partnership: Alabama Power with C-Spire

In Alabama, an all-private version of the basic *Public Infrastructure/Private Service* model recently emerged when Alabama Power, an investor-owned utility serving 1.4 million residents across the state, announced a partnership with Mississippi-based C-Spire, a privately held and well-established company providing gigabit internet access and related services to thousands of consumers, businesses, and local and state government operations in the region.

In the partnership, C-Spire will use Alabama Power fiber to reach customers in large parts of metropolitan Birmingham, Shelby County, and other parts of Alabama. The details of the financial and contractual terms are private. The partnership is noteworthy for its novelty and its potentially large scale. Like other investor-owned electric utilities, Alabama Power has an enormous reach with infrastructure and fiber and can get to market quickly. It is a force multiplier in that partnership. This effort has the potential to be replicable nationwide, particularly to address rural broadband gaps.

7.10.2. A Dark Fiber Public-Public Partnership: Westfield Gas & Electric with 12 Rural Massachusetts Towns

In western Massachusetts, an example of a regional public-public partnership is playing out in 12 rural towns that were historically served only by slow DSL. The 12 poorly served towns in the Berkshire region are part of a larger group of 32 towns that received grants from the Commonwealth of Massachusetts equal to about one-third the cost of building fiber networks. Some of these 32 towns chose to provide the money to cable companies to finish build-outs; others built and operate stand-alone businesses. But 12 of them closed their broadband gaps by forming public-public partnerships with the municipal electric utility in the nearby small city of Westfield.

Westfield Gas & Electric (WG&E) has long provided fiber broadband service to businesses and government in Westfield under its "Whip City Fiber" division—a name that refers to Westfield's history as a maker of buggy whips until the late 19th century. Westfield is now constructing fiber networks in each town (the resulting networks are town-owned) and subsequently operating and providing services over those networks. WG&E is thus expanding its customer base throughout a wide region.

Construction is underway. Through these partnerships, the towns of Alford, Ashfield, Chesterfield, Cummington, New Ashford, New Salem, Otis, Plainfield, Rowe, Washington, and Windsor will all be customers of WG&E's broadband services. But the arrangement is functionally no different than if a private provider were providing the service for these towns.

7.10.3. Dark Fiber Cooperative-Cooperative Partnership Pilots: Wilkes Telephone Membership Cooperative

In an emerging cooperative-cooperative partnership, the broadband subsidiary of the Wilkes Telephone Membership Cooperative, based in Wilkes County, North Carolina, is working with electric member cooperatives (EMCs) to plan broadband pilot projects in a handful of rural communities.

Wilkes Telephone has been delivering communications services to Wilkes County since 1951. In 2006, the cooperative's telecom subsidiary, Wilkes Communications, began offering broadband services to its members, and has since upgraded to a full fiber-to-the-home network. In 2014, Wilkes created a new subsidiary, RiverStreet Networks, in order to expand access to broadband beyond Wilkes's service area. In 2019, RiverStreet formed a partnership with the North Carolina Electric Membership Corporation (NCEMC) to pursue pilot projects with participating EMCs to explore fiber and fixed wireless partnerships.

The collaboration between RiverStreet and each participating EMC is slightly different. RiverStreet makes use of the partner EMC's existing physical assets—which can include middle-mile fiber, conduit, or poles—and then will build whatever other infrastructure is necessary to complete the network. EMCs also bring intangible assets, such as marketing power, to the table.

For most of the pilot projects, RiverStreet will serve as the ISP. RiverStreet's approach involves revenue-sharing agreements with partner EMCs, not paying to lease physical assets. This model scales some aspects of RiverStreet's cost in parallel with revenues, which makes entry into new, high-cost markets more accessible. Though these pilot projects are new, they illustrate the power of creative collaboration.

7.11. Public Lit Fiber Infrastructure Providers

While the vast majority of public entities partnering with private providers do so with dark fiber, at least two American entities are doing so with lit fiber: the multi-city UTOPIA Fiber network in Utah, and the city of Ammon, Idaho.

7.11.1. Utopia Fiber Network, UT

In the early 2000s, leaders in several Utah cities asked incumbent broadband providers to upgrade existing networks. When the request was met with little response, 11 cities banded together to form the Utah Telecommunication Open Infrastructure Agency (UTOPIA) and deploy and operate a fiber-to-the-premises network. The network today passes about 100,000 premises and has about 30,000 subscribers, providing residential service in 15 cities and business services in 50 cities.

As an open-access network operator, UTOPIA owns and operates the fiber middle-mile and last-mile network but does not itself provide services. Instead, UTOPIA operates a lit fiber network and charges customers a flat fee of $30 per month for network access. ISPs—which purchase bandwidth from UTOPIA—offer internet services for prices that are generally $35 per month for 250 Mbps symmetrical service or $48 per month for 1 Gbps symmetrical service, for a total, including the $30 flat fee, of between $65 and $78 per month. (UTOPIA also recently started offering 10 Gbps service.) UTOPIA welcomes any provider that agrees to service-level guarantees. Beehive Broadband, SumoFiber, Veracity Networks, and XMission are among the providers. (Large ISPs like Comcast and CenturyLink could also provide services over UTOPIA's network but have elected not to do so.) All told, 11 ISPs offer residential service and about 30 ISPs offer business services on UTOPIA's network.

The UTOPIA approach is unusual in the United States in that it provides public infrastructure to spur private broadband-service deployments. By creating a consortium of communities and a lit fiber network footprint that passes a large number of premises, UTOPIA is able to attract more competitors than might be viable in any of the single communities on their own. Additionally, the consortium is able to spread operating costs and other overhead among its member cities, achieving economies of scale. UTOPIA suffered low take-rates and corresponding financial problems in its early years. But UTOPIA says that debt service on every project it has begun since 2009 is being covered by subscriber revenues. The network is growing rapidly, passing an average of a thousand new homes per month.

7.11.2. Ammon Fiber-Optics

The city of Ammon, Idaho, began planning a municipal fiber network in 2008, initially building for the city government's internal purposes. That network was expanded to connect various private wireless ISPs and local businesses. Then, in 2016, the city—which was served by cable and DSL providers—started connecting its first residential neighborhood with fiber-to-the-home service.

The city funded this rollout through a local improvement district (LID) model, in which residents of selected neighborhoods are asked to join the new network. Those who participate pay a one-time charge of $3,000, either paid up front or amortized over 20 years as a special assessment tax on the property—a $17 monthly cost to the homeowner. The city operates the network and charges a monthly utility fee of $16.50 for access to the city network with city information and services.

Users can then use a web interface to choose between ISPs for access to the wider internet. These ISPs do not need to install any hardware at their customers' premises; they offer their services via virtual networks running on the city's lit fiber. As of the end of 2019, about 900 of the town's 4,500 residences had joined the network and services were being offered by three providers: Sumo Fiber Internet and Phone, Fybercom Fiber Speed Internet, and Direct Communications.

8. Legal Issues in a Broadband Public-Private Partnership Project

This section[6] addresses the major legal issues that may arise in a broadband public-private partnership project, from early planning through the negotiating stage.[7] The focus is on the *Public Infrastructure/Private Service* model, but many of the general legal principles are relevant for any party considering participating in a broadband public-private partnership project. We write primarily with a public-sector audience in mind, but the considerations discussed should also be of great interest to potential private participants in community-led broadband initiatives.

Three subsections here collectively address the three main stages in the public-private partnership development process: confirmation of authority, pre-negotiation project planning and finding potential private partners, and negotiation of the agreement.

The first subsection focuses on the public entity's legal authority to enter into a broadband public-private partnership and on the procedural requirements that the entity may have to meet to act on that authority. Nearly all states now have laws that specifically address public-private partnerships, and several states have constitutional or statutory provisions that may grant, restrict, or specify how a public entity can participate in such a project. Local charters, ordinances, franchises, or agreements may also impose important substantive or procedural requirements. Parties considering a public-private partnership must not only read the text of these measures; they must also analyze the relevant case law. Even after thorough analysis, not every state will have laws—statutory or otherwise—that implicate broadband public-private partnerships. In such cases, state rules for addressing statutory gaps or ambiguities will come into play. Some states are permissive, some states are restrictive, and some states are permissive in some situations and restrictive in others. Careful, early legal research is important, not only because it may avoid costly and protracted litigation but also because public entities that identify legal barriers soon enough might be able to develop alternative ways to achieve their goals.

The second subsection addresses the key factors that parties typically consider in framing the general structure of the partnership. Public-private partnerships can take many forms, depending on multiple factors, and in this second stage, the parties work through the options and select the one that works best for them. The considerations include various alternative financing mechanisms; how the services in question will be regulated; potential access to grants, low-interest loans, and other incentives of various kinds; access to public rights-of-way and facilities; organizational/governance issues; tax issues; and much more.

Early in the second stage, public entities will typically obtain a wealth of high-level information about broadband initiatives, including projects in comparable communities. Eventually, they are likely to want more specific and targeted information about the community's own goals, needs, and assets; who might be interested in partnering with the community; and how such a partnership might work. At this point, public entities often issue solicitations, such as a Request for Information or a Request for Qualifications, that are not constrained by formal procurement requirements. Extensive informal communications then follow between the public entity and potential partners, covering the range of issues noted herein. Thus armed with a highly refined understanding of what it wants, what it can get,

and from whom, the public entity can then issue a formal Request for Proposals or engage in whatever other procurement process applicable state and local laws require.

The third subsection provides an overview of the negotiation stage. As discussed in the business portion of this paper, there are several approaches for broadband public-private partnerships, and the complexity and amount of time needed to complete the negotiation process will depend on the model and the size of the project. In particular, the parties typically consider who is best suited to handle responsibilities like building, operating, and marketing the network. They must also consider what risks are involved in the project and who will bear which risks. For example, there may be dozens of different kinds of contingencies, ranging from squirrels nibbling fiber lines to previously undiscovered environmental factors to natural disasters. As a result, the negotiation stage will likely be the most time-consuming part of the partnership development process.

Finally, advanced communications networks can simultaneously provide benefits. These may include not merely revenues but also less readily quantifiable benefits. For example, a municipality might be especially interested in promoting economic development, educational opportunity, enhanced public safety, smart transportation, and open access to broadband. A new provider may be willing to forgo some immediate revenues in order to develop a track record from which it may benefit in future projects. In short, each project is different, and there will be multiple ways in each one to reach "win-win" outcomes for all concerned.

While all community broadband projects require careful attention to legal issues, this is especially true of broadband public-private partnership projects—particularly complex *Public Infrastructure/Private Service* projects requiring extensive commitments by the public and private sectors over many years.[8] Next, we address the key legal issues that arise in each of the three major stages of the development of a public-private partnership deal: confirmation of authority, pre-negotiation project planning, and negotiation of the agreement.

8.1. Confirmation of Authority

As an initial step, a local government contemplating a broadband public-private partnership must determine whether it has authority to participate in such a venture and, if so, whether there are any limitations on its authority or procedural steps that it must take to perfect its authority (e.g., hearings, referenda).

It is critically important to sort out authority issues at the outset, because mistakes can be costly—and are often avoidable. Also, incumbent carriers, threatened with loss of business, have often challenged public communications initiatives for alleged lack of authority or failure to comply with required procedures.[9]

Federal law encourages local governments to provide communications services of all kinds, but it does not affirmatively empower them to do so. For such authority, local governments must look to state and local law.[10] Moreover, if a public entity is providing services or facilities as part of a broadband public-private partnership, it must have authority to do so.[11]

In the remainder of this section, we discuss how state and local laws can affect a local government's ability to enter into broadband public-private partnership projects.

8.1.1. State Constitutions

State constitutions typically establish political subdivisions—counties, local governments, towns, villages, special districts, and so on—and prescribe the powers that such entities can exercise. The scope of authority a state constitution grants a local government varies from state to state, both in terms of overall authority conveyed and the specificity used to describe that authority.[12] Some local governments have broad grants of authority under their state constitutions that allow localities to undertake a wide range of responsibilities, while other constitutions are more limited. In the latter case, the localities rely on the state legislature to expand the scope of their authority. In addition, the constitutional language alone is not always definitive. Sometimes the language of a state constitution appears to give municipalities broad powers, but the courts interpret the relevant provision narrowly.[13] Sometimes the reverse is true. So, it is essential to review the case law surrounding the relevant constitutional provisions.[14]

State constitutions also often contain language restricting the financial interactions between local governments and the private sector. In fact, more than 40 state constitutions have some language that prevents cities, towns, or counties from investing in or lending or pledging their credit to private businesses or corporations.[15] Most of these provisions originated in the 19th century as a response to a spate of railroad failures that jeopardized the financial stability of hundreds of local governments that had invested in them.[16] As originally interpreted, these provisions effectively prohibited the public sector from engaging financially with private companies.

Eventually, however, courts across America reinterpreted many of these provisions to allow for public lending and partnerships with the private sector when doing so was in the public interest and served a public purpose.[17] Many state legislatures have codified the "public purpose" exception to the constitutional limitations on public-private partnerships,[18] and the courts of many states have interpreted that term liberally. In fact, the majority of state supreme courts have upheld at least some economic-development programs that involve direct assistance to the private sector in the form of cash grants, low-interest loans, and tax breaks.[19]

8.1.2. State Statutes

State laws may also affect a local government's authority to participate in a broadband public-private partnership. This includes laws that address public-private partnerships directly and laws that address a local government's authority to provide or facilitate the provision of particular kinds of communications services.

8.1.2.1. State Public-Private Partnership Statutes

During the past three years, numerous states have enacted or expanded public-private partnership statutes, including many with a broadband focus.[20] As a result, a substantial majority of states now have such statutes, although they vary greatly in scope and breadth. Many are geared toward certain specific types of public-private partnership projects or prescribe a particular process for procuring, financing, and/or operating the network.

Some states have public-private partnership-enabling statutes that specifically address broadband expansion,[21] while other states have broad public-private partnership-enabling statutes.[22] Maryland is among the latter group, as it enacted a public-private partnership-enabling statute that is held out

as model legislation for a state looking to foster responsible public-private partnerships. Maryland's statute authorizes public-private partnership projects "for any public infrastructure asset" and provides guidelines for engaging in a public-private partnership project."[23]

Most public-private partnership statutes are substantially more restrictive. Several states have public-private partnership legislation that provides authority only for particular types of infrastructure projects—normally transportation-related projects.[24] Some states have enacted public-private partnership legislation that only provides authority for specific projects such as a single bridge or toll road.[25] A few states only provide authority for a limited number of "pilot" or "demonstration" public-private partnerships.

Public-private partnership-enabling statutes may also dictate the public-private partnership procurement process. For example, a few states require that government agencies not engage in performance-based procurements but instead award contracts to the "lowest responsive price."[26] Some states allow government entities to prioritize other financial considerations, such as return on equity, rather than price.[27] A few public-private partnership-enabling statutes prohibit a public entity from accepting unsolicited bids.[28] Others prescribe specific guidelines for bidding procedures and the criteria with which to review bids.[29]

8.1.2.2. State Statutes That Expressly Address Local Government Authority to Engage in Communications-Related Activities

Several states have enacted laws that deal explicitly with the authority of local governments to provide or facilitate the provision of communications services. Some of these laws are permissive; others are restrictive. Some are permissive for some services (e.g., dark fiber or wholesale lit fiber) and restrictive for other services (e.g., retail consumer services).

For example, Illinois expressly authorizes cities and counties to "undertake local broadband projects and the provision of services in connection therewith … lease infrastructure that it owns or controls … serve as a retail provider of telecommunications services … [with] appropriate certification from the Illinois Commerce Commission."[30] California empowers cities to establish public utilities, which are permitted to "acquire, construct, own, operate, control, or use" the facilities to supply their inhabitants with "light, water, power, heat, transportation, telephone service, or other means of communication…"[31]

In contrast, at least 19 states have laws that hamper the ability of local governments to provide or partner for the provision of communications services.[32] Typically promoted by incumbent communications service providers, these laws vary from state to state. They range from outright bans on a public entity's provision of certain services to measures that are supposedly necessary to protect the private sector from unfair competition.[33]

8.1.2.3. Home Rule versus Dillon's Rule

Even after conducting extensive due diligence, a local government may sometimes still not be certain that it has authority to enter into a broadband public-private partnership under state law. In those cases, the outcome will probably be governed by whether the state applies "Home Rule" or "Dillon's Rule" in interpreting statutory gaps or ambiguities.

There are many judicially recognized shades of Home Rule and Dillon's Rule, but in general, local governments possessing "Home Rule" authority may undertake any activity not prohibited by the

state constitution or the state legislature, and gaps and ambiguities must be interpreted in favor of the existence of local government authority. In contrast, local governments subject to "Dillon's Rule" are deemed to have only those powers that the state constitution or the state legislature has expressly provided them or that are necessarily and reasonably implied by other expressly granted powers.[34] Dillon's Rule also requires that all statutory gaps or ambiguities be interpreted against the existence of the power in question.

Today, approximately 40 states apply some form of Dillon's Rule, while about 30 states have some form of Home Rule.[35] The total exceeds 50 because some states apply Dillon's Rule in some circumstances and Home Rule in other circumstances. For example, some states apply Home Rule to local governments with populations exceeding certain specified amounts and Dillon's Rule to local governments in smaller communities.[36] Some states apply Home Rule to cities and counties but Dillon's Rule to publicly owned utilities.[37] In short, it is necessary to carefully examine the specific form of Home Rule, Dillon's Rule, or both that a particular state may apply.

8.1.3. Local Restrictions

Even if a local government has ample state-granted power to participate in a broadband public-private partnership, it may still be constrained by self-imposed limitations. Such restrictions may appear in the local government's charter or ordinances, or in franchises, municipal pole attachment agreements, contracts, or other local undertakings. The limitations may be direct (e.g., contractual noncompete clauses) or indirect (e.g., constraints on financing). A full due diligence review of local authority must therefore also include potential restrictions at the local level. When such limitations are identified early on, there may be time to remove them by local action or state legislation, depending on the applicable process in the state in question.

8.2. Pre-Negotiation Project Planning

Once a local government has confirmed its authority and established the zone within which it believes it can operate lawfully, it can turn to exploring the options that it may realistically have within that zone. In this section, we discuss several important legal issues that may affect these options.

8.2.1. Financing

Some communities consider public-private partnership projects desirable primarily because of the financial resources that a private partner can bring into the partnership. To attract a private partner, however, a local government may itself have to contribute substantial financial resources. This is particularly true of *Public Infrastructure/Private Service* projects. Here, we discuss the legal issues affecting the ability of local governments and private partners, working individually or together, to take advantage of available funding resources.

8.2.1.1. Funding Available to Local Governments

Numerous financing options are available to local governments. For example, a local government can finance a project itself, raise capital using various financial instruments, or utilize any number of tools to make itself more attractive to investors. The following section explores many of these concepts but is by no means exhaustive.

8.2.1.2. Public-Sector Project Financing

If state law permits public subsidies of communications networks, local governments can invest surplus revenues from other sources (e.g., municipal utility revenues) in communications networks. For various legal, political, financial, and other reasons, local governments have rarely used this approach, but some exceptions exist. For example, the town of Leverett, Massachusetts, has used property tax revenues to invest in its broadband project.[38] The UTOPIA cities have used sales tax revenues, not to finance their projects directly, but as collateral for their bonds.[39] Similarly, Texas and other states authorize local governments to impose taxes to help fund economic-development initiatives.[40]

Both federal law and the laws of a number of states also encourage communities to use tax incentives to attract private-sector investments. For example, federal tax law encourages local governments to use Tax Incremental Financing (TIF) to stimulate private investment in geographic areas that require revitalization. In essence, TIF works by committing the anticipated increases in real estate taxes over 20 to 25 years from the "TIF District"—the revitalized area and a substantially larger area surrounding it—to pay for the costs of the revitalization. TIF is based on the expectation that the increased property taxes will more than offset the tax benefits offered as incentives to investments in those areas.[41]

The New Markets Tax Credit Program is an important tax-driven financing tool used in initiatives such as the OneCommunity project in northeastern Ohio. The program provides tax credits of 39 percent of amounts invested in certified Community Development Entities, which, in turn, invest in industrial and community facilities and commercial development in qualifying Low Income Census tracts.[42] The program also supports direct loans and equity investments for operating businesses. The program was due to expire, but the Consolidated Appropriations Act of 2016 and the Protecting Americans From Tax Hikes Act of 2015 extended it through 2019 at $3.5 billion annually. The Fiscal Year 2020 appropriations bill (H.R. 1865), signed into law on December 20, 2019, extended the program again through 2020.

Another important tax-based funding tool for stimulating economic development is the Qualified Opportunity Zone (QOZ), a mechanism established by the Tax Cuts and Jobs Act of 2017, Pub.L. 115–97, on December 22, 2017. QOZs are certain designated economically distressed areas where new investments may be eligible for preferential tax treatment. The program enables investors in QOZs to defer or even eliminate federal taxes on previously taxable gains, depending on how long these investors hold on to the property in the QOZ in which they invest.[43] Interested parties should explore with their tax advisers whether and under what circumstances it may be possible to stack benefits under the New Markets Tax Credit and Opportunity Zone programs.[44]

A local government that does not have sufficient funds from other sources to pay for a network itself—and for legal, political, or other reasons is unwilling to tax the public—can use debt financing to help pay for the project. This is usually done through general obligation bonds or revenue bonds.

A general obligation bond is debt for which repayment is guaranteed by the full faith and credit of the local government.[45] Such bonds are the least risky to investors and therefore bear relatively low interest rates, but they must typically be approved through a public vote. There may also be debt limits on general obligation bonds imposed by state law.[46]

Revenue bonds are paid for from a specific source of revenue. Pledged revenues may come from the operation of the financed project, grants, mortgages on property, or excise or other specified taxes.[47]

Taxpayers are not at risk in the event of project failure, so voter approval is generally not required for issuance of a revenue bond, and any debt limits are generally imposed through contract. Because the risks to investors are greater, interest rates are higher.

Local governments also sometimes finance communications networks by issuing Certificates of Participation. Such instruments essentially enable investors to purchase a share of the revenues from leasing the facilities developed with project funds.[48] In order for the Certificate of Participation interest to be tax exempt, the city must be the lessee.[49] Like revenue bonds, Certificates of Participation are payable only out of project revenues and assets, do not expose taxpayers to risk of project failure, and generally do not require voter approval.

A community may also choose to crowdfund a network by borrowing small amounts from local investors.[50] Crowdfunding tends to be a slow and labor-intensive process—the monetary values of individual promissory notes are often small, and it can be difficult to reach out to potential participants.[51] But crowdfunding may have some advantages. First, the promissory notes are not subject to many securities regulations because they are unsecured and privately placed.[52] Second, the community may be able to obtain favorable terms for paying back the notes.[53]

Depending on state law, local governments have many other tools that they can use to finance a project and/or stimulate private investment, including contributing, selling, or leasing real property as part of encouraging a fiber build.[54] Local governments may also be able to stimulate investment through more complicated means—for example, by creating revolving loan funds that lend money to qualifying businesses at lower interest rates, for longer terms, and under more flexible conditions (such as allowing less restrictive equity requirements, deferred principal payments, and subordinate collateral positions to other lenders).[55]

In some states, local governments may be able to form councils of governments to undertake economic-development initiatives on their collective behalf. One common joint economic-development initiative involves gaining designation of the region as an "economic development district" under federal law. Such councils enable participants to pool their resources to plan and develop programs aimed at economic improvement. Councils of governments may also form Small Business Administration Section 53 Certified Development Corporations. These corporations are authorized to make long-term financing available through the Small Business Administration's 504 loan program.[56]

Finally, even before the outbreak of the coronavirus pandemic, there were already dozens of federal and state funding programs seeking to encourage and support broadband deployment.[57] Now that the pandemic and the vast economic and social disruptions it has wrought have underscored the critical importance of affordable access to robust broadband capabilities, several new federal programs, and a skyrocketing number of state programs, have emerged to address this challenge.[58]

For example, the FCC distributes funds to broadband service providers through its Connect America Fund (CAF),[59] to providers of broadband services for health care networks through the Healthcare Connect Fund,[60] and to providers of broadband services or facilities to schools and libraries through the E-Rate program.[61] These programs have annual spending caps ranging from several hundred thousand dollars to several billion dollars.

In 2018, Congress passed the Consolidated Appropriations Act establishing the Rural eConnectivity Pilot Program. The ReConnect Program offers loans, grants, or combinations thereof to facilitate

broadband deployment in areas of rural America that don't currently have sufficient access to broadband.

Federal funding for broadband service providers was further expanded in 2020 through the FCC's Rural Digital Opportunity Fund (RDOF) and the Coronavirus Aid, Relief, and Economic Security (CARES) Act. Using a two-phase reverse auction mechanism, the FCC is set to distribute more than $20 billion over the next decade from the RDOF to broadband service providers for the development of broadband in unserved rural areas.[62] The CARES Act allocates billions of dollars for distance learning, telehealth, and remote work requiring enhanced broadband infrastructure and connections.[63]

Faced with so many potential sources of funding to support broadband deployment, adoption, and use, local governments and potential partners can be well rewarded for learning how they can qualify for and use available funding resources, individually or in combination.

8.2.1.3. Private-Sector Project Financing

As a general rule, the more a local government contributes to the financing of a project, the greater its influence will be in the management of the project. To some communities, however, public financing options are not attractive, either because they require more public involvement than the local government wishes to provide or because they believe that the private sector is better suited to acquiring and managing project financing.

A full discussion of private-sector project financing is well beyond the scope of this paper. For present purposes, suffice it to say that private partners have a wide range of options to acquire financing for the project directly or indirectly, including through equity, debt, contributions of equipment and facilities, in-kind services, third-party co-builds, and fiber-for-pole attachment deals.

By depending primarily on private-sector capital to finance a project, local governments can avoid adding to their direct long-term debt obligations. This does not mean, however, that the users of the system may not bear higher costs or that the public sector will avoid additional budgetary restrictions. One way or another, the local government will bear a share of the costs of the project. Private financing does, however, shift much of the initial burden of financing, building, and maintenance costs to the private sector.

8.2.2. Access to Public Rights-of-Way

Broadband service providers typically require access to public rights-of-way (PROW) in order to install their fiber and facilities on poles or in underground conduit. To obtain such access, they must get permission from the federal, state, or local regulatory authority that owns or controls the particular PROW in question. In recent years, providers have increasingly complained that application processes are too long and cumbersome and that application fees and annual PROW charges are too high. In response, Congress, numerous state legislatures, the Federal Communications Commission (FCC), and other agencies have sought to establish or interpret rules in ways that balance the interests of the many stakeholders involved.

For example, since 1996, Section 253(a) of the federal Communications Act has barred state and local governments from adopting statutes, regulations, or other legal measures that "may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service." Enacted at the same time, Section 253(c) has reaffirmed the right of

state and local governments "to manage the public rights-of-way or to require fair and reasonable compensation from telecommunications providers, on a competitively neutral and nondiscriminatory basis, for use of public rights-of-way on a nondiscriminatory basis, if the compensation required is publicly disclosed by such government."

Concepts such as "may prohibit or have the effect of prohibiting," "fair," "reasonable," "competitively neutral," and "nondiscriminatory" are highly fact-dependent, and they often mean different things to different stakeholders. Not surprisingly, a large body of case law interpreting these terms has emerged over the past two decades. Moreover, during the past three years, the FCC has been particularly aggressive in issuing new and revised interpretations that have upset local governments.[64]

Given the critical importance of rapid build-out to developers of fiber broadband projects, efficient PROW access can be a central issue for a broadband partnership. In general, local governments may consider various steps to streamline the PROW access process. They can, among other things, develop accelerated timetables for permitting, preapprove specific techniques (e.g., micro-trenching), and make dedicated inspectors available. Local governments can also consider reducing fees associated with PROW access.[65]

In considering whether to take such actions for a potential private broadband network developer, a local government should be mindful of its duty to be "competitively neutral" and "nondiscriminatory" and of the potential precedential implications for other current and future occupants of the PROW. Some degree of discrimination is appropriate and may even be necessary, as treating differently situated entities the same can be just as discriminatory as treating similarly situated entities differently. But drawing distinctions may often be difficult and controversial. So, local governments must be cautious in framing the PROW benefits that they can offer as part of a public-private partnership deal.

8.2.3. Access to Infrastructure and Facilities

Existing or new infrastructure and facilities are among the most important assets that local governments may be able to bring to a broadband public-private partnership.[66] Facilities may include fiber, poles, ducts, conduits, sewers, streetlights, towers, rooftops, collocation space, and other property. Local government-owned land can also be an important and valuable asset to contribute to a partnership. Not all local governments will have the same assets to bring to the table, but there will usually be at least some assets that are already available for inclusion in the broadband public-private partnership—or that can be developed in the future for inclusion in the partnership. Taking stock early of a city's inventory of current and potential future infrastructure will be tremendously important to a local government as it considers whether and how it can best leverage those assets.

Until recently, local governments were widely viewed as possessing broad proprietary power to control access to the physical infrastructure and facilities they own. This power was considered distinct from the power to control access to the PROW, as it was based on the local government's ownership of property, not its police powers or regulatory powers. Local governments were also generally treated as having substantially more latitude in controlling access to their own infrastructure and facilities than they had in regulating access to the PROW. That is, federal and state laws requiring local governments to provide access to the PROW on nondiscriminatory and competitively neutral terms and conditions were generally deemed inapplicable to local governments acting in a proprietary capacity in managing their infrastructure or facilities.[67,68] Recent developments have blurred this distinction.

In September 2018, the FCC issued an order—commonly called the "Small Cell Order"—that required local governments, when reviewing applications for access to their PROW to install and operate small cell wireless facilities, to comply with several new federal requirements.[69] In the same order, the FCC also for the first time established maximum rates, deadlines for review, and other requirements that local governments must meet when reviewing requests by operators of small cell wireless facilities for access to their poles and other facilities in the PROW.[70] The FCC explained that it was adopting its new requirements pursuant to its authority under Section 253 of the Communications Act to prevent state and local governments from erecting barriers to entry, that Section 253 does not distinguish between regulatory and proprietary barriers, and that, in any event, when managing public poles and other facilities in the PROW, local governments act in a regulatory capacity.[71] On appeal, a panel of the United States Court of Appeals for the Ninth Circuit agreed with the FCC.[72]

The panel's decision may be the last word on the legality of the Small Cell Order, and in any case, it applies only to poles and facilities that support attachments of small cell wireless facilities. As a result, local governments still have considerable flexibility in managing their infrastructure and facilities so as to achieve their broadband goals. In doing so, however, local governments should anticipate that interested parties may claim that the nondiscrimination and competitive neutrality provisions of Section 253 apply not only to local government management of access to the PROW but also to management of access to public infrastructure and facilities in the PROW.

8.2.4. Other Access Issues

Aside from PROW and infrastructure/facilities access issues, there are many other kinds of access and related issues that can arise in the context of a public-private broadband partnership. These include access to towers, sides and rooftops of buildings, private easements, distributed antenna system (DAS)/small cell sites, wetlands, historical or other protected properties, environmental issues, and much more. Each is governed by its own history, rules, administrative precedents, case law, and politics. It is therefore important for the public and private partners to have access to expertise in all of these areas. A detailed discussion of these issues is beyond the scope of this paper.

8.2.5. Regulatory Compliance

When considering the types of services that the public-private partnership will offer and who will be responsible for them, it is important to consider how those activities will be regulated at the federal and state levels. This will depend on multiple factors, including the nature of the services provided, the manner in which they are offered, and the current state of ever-evolving law.[73]

Of greatest importance is that the parties identify all applicable regulatory requirements and make sure that at least one of them assumes responsibility for timely compliance with each requirement. Typically, the party that is best positioned to achieve and document compliance with a particular requirement should be the one to undertake it. In some cases, cooperation between the parties will be necessary—e.g., where one provides connectivity and the other provides the residential end-user service—and this should be spelled out in the agreement between the parties.

8.2.6. Organizational Issues

In addition to considering how the broadband public-private partnership itself will be structured, it is

important for a local government to consider how it will organize and run its side of the partnership—including whether to use an existing branch of government to oversee the project; whether to create a new division, commission, authority, nonprofit, or cooperative; and how to involve the key stakeholders, including the school system and the municipal utility (if the local government has one).

How a public entity chooses to organize itself may be based on political, legal, and practical considerations. For example, a local government may simply not have the authority to create a new agency and will thus have to operate within its existing structure. A public entity may also choose its organizational structure based on governance issues, particularly if the project will involve multiple public entities. All parties benefit when there is a clear chain of command and decision-making process in place, regardless of the organization structure.

8.2.7. Other Considerations

There will, of course, be many other issues that merit careful consideration, especially because no two public-private partnership projects are the same. Given the nature of public-private partnership projects and the possibility of using tax-advantaged municipal or state bonds to help finance the project, it is particularly important to understand the potential tax implications of the public-private partnership models under consideration. For example, under the "private business use" exception, the federal tax advantages of municipal bonds can be lost if the private entity benefits in ways that exceed certain limits set forth in the tax code.[74] Considerations such as these may also be appropriate during the contracting stage.

8.3. Finding Potential Partners

Early in a typical fiber project, a group of local champions emerges and launches an exploratory process to determine whether and how the community can obtain an advanced communications system. The champions often include local government officials, business leaders, educators, health care professionals, young people, and a wide range of others. These champions tend to be individuals with lots of positive energy and an ability to inspire and encourage others to follow their lead.

At first, the champions commonly invest many hours obtaining high-level information about fiber broadband initiatives, particularly from individuals who have participated in such projects in comparable communities and are eager to share their experiences. Eventually, the process will reach the point at which more specific information is necessary to understand the community's unique combination of broadband goals, assets, needs, opportunities, challenges, and potential partners.

At this point, many local governments have found it useful to solicit input through a "Request for Information," a "Request for Qualifications," or a similar process (collectively "RfX" processes) that are not constrained by formal procurement requirements.

A good RfX process can be beneficial on multiple levels. First, the process of designing the RfX requires the community's leaders to form and build consensus around imaginative new visions of the community's potential. Second, the RfX allows the community to market these visions, not just to prospective partners but also to the community's businesses, institutions, and residents. Third, the process allows for extensive informal communications between the local government and

potential partners, who often compete with each other to win the local government's support. These communications might not only help the local government test the validity of its going-in assumptions but might also open its mind to even better ideas.

By the end of the RfX process, a local government should have a well-refined understanding of what it wants to do; what it realistically can get and must give in return; what the approximate costs, revenues, and other benefits and burdens will be; and with whom it would like to partner. With this knowledge, the local government can issue a formal Request for Proposals or engage in whatever other procurement process applicable state and local law require it to follow.

8.4. Negotiating the Agreement

Once the local government has developed its short list of the potential partners, negotiations to finalize the agreement can commence. Depending on state and local procurement requirements and the local government's preferences, the negotiations may proceed with one bidder at a time or with multiple bidders simultaneously.[75] Either way, the local government's objective will be to achieve the best possible allocation of risks, responsibilities, and rewards for the community.

8.4.1. Allocation of Risks

As major long-term capital projects, fiber broadband partnerships will inevitably encounter delays, disruptions, or other challenges at some point during the life of the project. Such problems can result from many causes, including construction delays, natural disasters, hidden environmental hazards, cyberattacks, terrorism, vandalism, strikes, bankruptcies, inadequate performance, insufficient demand, new market forces, and changes of law. Allocating the risks of these potential problems is typically the most difficult part of negotiating a public-private broadband partnership agreement.

As the case studies presented here show, parties to broadband partnerships are taking advantage of many imaginative ways to push fiber projects forward. In some cases, local governments have attracted substantial private investment by utilizing their ability to treat fiber projects as bondable long-term public-works projects. In some cases, local governments have persuaded private partners to pay access-based fees that mitigate some or all of the local governments' initial risks of fiber deployments. Conversely, in some cases, local governments have entered into financial or other arrangements, such as allowing temporary exclusivity, that make the partner's participation feasible.

As a general principle, when it comes to allocating risks, the parties will be best served by allocating particular risks primarily to the party that is in the best position to avoid or minimize the problem that creates the risk, and to provide that party reasonable compensation to undertake that risk.

8.4.2. Allocation of Responsibilities

Allocating responsibilities in a fiber broadband partnership project is generally simpler and more straightforward than allocating risks, because both parties largely know what responsibilities they are taking on from the outset of the deal. When a public entity puts out an RFP, it is generally for a specific set of responsibilities—so both parties are generally aware of their responsibilities. The following Brookings Institution[76] chart depicts four models of responsibility-sharing.

One of the main advantages of a public-private partnership is the expertise that the private partner brings to the table. The private partner may have experience designing and constructing a network and/or delivering service—experience that the public entity either lacks or prefers not to use for the project at issue. Therefore, the public entity may decide that the private-sector party is in the better position to handle multiple responsibilities under the deal.

In assigning responsibilities, the parties should also consider potential cost savings. For example, assigning related responsibilities to a party can provide it an incentive to capture cost savings across the various phases of the contract.[77] Similarly, making one of the parties—usually the private party—responsible for both constructing and maintaining the outside plant may encourage that party to use more expensive, higher-quality fiber, knowing it is harder for animals to chew through that fiber jacket and, thus, that the fiber will minimize maintenance costs down the road.

8.4.3. Allocation of Rewards

A successful fiber broadband partnership will produce benefits for both the public and private parties. Some of the benefits may be what we consider traditional benefits—e.g., revenue the network produces from user fees. If the network is producing traditional monetary benefits, the parties may agree to a mechanism for sharing the rewards/revenue.

Benefits may also take the form of cost savings. For example, if the public entity is also a system user, it may benefit by obtaining higher-capacity broadband at lower costs from the partnership than it had been able to obtain from the prior service provider.

Fiber broadband partnerships also offer substantial benefits that are not as easy to measure as user fees or cost savings. For example, a public entity's primary goal may not be to produce significant revenue or induce material cost savings from the network but to give the community prompt and affordable access to all of the features, applications, and other advantages that a fiber network will support. In economic terms, these are called "positive network externalities."

More specifically, a growing number of local governments are coming to see fiber broadband networks as essential infrastructure for the 21st century, infrastructure that is capable of driving and supporting simultaneous progress in just about every area of significance to their communities. This includes economic development, education, health care, environmental protection, energy, transportation, government services, digital equity, and much more. While such benefits may be difficult to measure in monetary terms—as is also true of the monetary benefits of roads, sidewalks, electricity, sewers, and water—they are real nonetheless. For many communities, these benefits are likely to be the primary reasons for entering into a public-private partnership.

Although positive network externalities are difficult to measure precisely, a growing body of literature is emerging on useful ways to estimate them. For example, Dr. Bento Lobo, an economist at the University of Tennessee, has estimated that the municipal fiber utility in Chattanooga, Tennessee, produced more than $1.3 billion in economic and social benefits in its first five years and is likely to produce even greater benefit in the years ahead.[78] A local government that is significantly motivated by the desire to obtain positive externalities should familiarize itself with these studies and reports.

Endnotes

1 Jon Sallet, "Too Big to be Left Unnoticed: America's Uncompetitive Broadband Market," Blog, Benton Institute for Broadband & Society, Dec. 5, 2019, https://www.benton.org/blog/too-big-be-left-unnoticed-americas-uncompetitive-broadband-market

2 "Fiber Broadband Association Research Shows Record Fiber Broadband Growth in North America," Press Release, Fiber Broadband Association, Dec. 17, 2019, https://www.fiberbroadband.org/blog/fiber-broadband-association-research-shows-record-fiber-broadband-growth-in-north-america

3 For further reading please see "The Emerging World of Broadband Public–Private Partnerships: A Business Strategy and Legal Guide," published by the Benton Foundation and Coalition for Internet Choice. That paper provides additional insights on established strategies for public facilitation or subsidization of private broadband providers, and for public-only deployment of middle- and last-mile networks. https://www.ctcnet.us/wp-content/uploads/2017/06/Broadband-Public-Private-Partnerships-CLIC-Benton-May-22-2017.pdf

4 This represents a conservative estimate derived from the channel widths of the 1285 to 1330 nm and 1525 to 1575 nm bands in G.652 industry-standard single-mode fiber optics.

5 It's critical to note that this is not the case for all cities and counties. Many localities are very comfortable with both market and operations risk and navigate both ably. For those entities, the municipal broadband model is usually more attractive than the *Public Infrastructure/Private Service* model, as they can manage all these areas of risk and themselves undertake all the functions of building and operating a communications network.

6 The authors gratefully acknowledge the assistance of former Baller Stokes & Lide associates Ashley Stelfox and McKenzie Schnell with the legal section of this paper.

7 Disclaimer: This paper does not provide legal advice and should not be interpreted or used as legal advice. For legal advice, readers should consult qualified legal counsel.

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9 *See, e.g., City of Bristol, VA, v. Earley,* 145 F.Supp.2d 741 (W.D. Va. 2001); *BellSouth Telecommunications, Inc. v. City of Lafayette,* 919 So.2d 844 (3d Cir. 2006); *Cequel III Communications I, LLC v. Local Agency Formation Com. of Nevada County,* 57 Cal.Rptr 3d 32, 149 Cal.App.4th 310 (Cal. App., Third Dist. 2007).

10 *Nixon v. Missouri Municipal League,* 541 U.S. 125, 133-34 (2004).

11 For example, in *City of Bristol, VA v. Earley,* 145 F.Supp.2d 741, 745 (W.D. Va. 2001), the court held that the City has authority to provide telecommunications services, and in *Marcus Cable Associates, L.L.C. v. City of Bristol,* 237 F.Supp.2d 675, 678-79 (W.D.VA 2002), the same court held that the City does not have authority to provide cable television service. According to the court, the critical difference was that Virginia's statute authorizing localities to establish "public utilities" applied to telecommunications services but not to cable television.

12 For example, the Ohio constitution grants local governments broad general authority "to exercise all powers of local self-government" but it also goes on to grant local governments specific authority to purchase, operate, maintain, and sell utilities and to issue bonds to finance them. See Ohio Constitution Art. XVIII §§ 3, 6 (1912).

The California constitution gives charter cities primacy in addressing "municipal affairs" or "municipal functions," even in the face of restrictive state measures on the precise matter in issue. In matters "of state concern," however, charter cities cannot act in a manner that is inconsistent with any state requirement. Furthermore, the California Constitution empowers both charter cities and non-charter cities to establish public utilities, including those that provide for "means of communication." *See* California Constitution Art. XI §9.

In contrast, Arizona's constitution reserves very little authority for municipalities explicitly. The constitution authorizes cities with more than 3,500 citizens to create a charter. Otherwise, most provisions related to cities/municipalities are restrictive. The Arizona Constitution limits the amount of debt a municipality can assume to six percent of the municipality's "taxable property" and requires that all franchises be approved by electors. *See* Arizona Constitution Art. XIII §§ 2, 4.

13 For example, Washington State's constitution sets forth the authority of cities to "make and enforce within [their] limits all such local police, sanitary and other regulations as are not in conflict with general laws." (Washington Constitution Art. XI § 11). The Constitution also gives certain classes of cities the power to create a city charter, ostensibly giving those cities Home Rule authority. (Id. at Art. XI § 10). But the Washington courts have blurred the Home Rule distinctions for cities finding "the general rule is that [municipal corporations' powers] are limited to those powers expressly granted by statute, those powers necessarily or fairly implied in or incident to powers expressly granted, and those powers essential to the declared purposes and objects of the corporation … If there is a doubt as to whether the power is granted, it must be denied." *(Port of Seattle v. Wash. Utils. & Transp. Comm'n,* 92 Wn.2d 789, 794-95, 597 P.2d 383 (1979)). Recent court decisions have extended this decision to cities in various circumstances regardless of whether they have a charter calling into question cities' Home Rule authority.

14 *See also* the discussion of Home Rule v. Dillon's Rule in Section 8.1.2.3.

15 *See, e.g.,* Idaho Constitution Art. VIII § 4 ("No county, city, town, township, board of education, or school district, or other subdivision, shall lend, or pledge, the credit of faith thereof directly or indirectly, in any manner, to or in aid of any individual, association, or corporation, for any amount or for any purpose whatever or become responsible for any debt, contract, or liability of any individual, association or corporation in or out of this state.").

16 *See, e.g., Frank v. City of Cody,* 572 P.2d 1106, 1112 (Wyo. 1977) (quoting the Wyoming Constitution's statement that neither the state nor a political subdivision "shall loan or give its credit or make donations to or in aid of any individual, association, or corporation, except for the necessary support of the poor…").

17 For example, the Washington State Supreme Court determined that there are two situations in which a public entity could lend to or partner with the private sector: first, if the public expenditure carries out a fundamental governmental purpose; or second, if the local government receives valuable consideration in exchange for the expenditure. (CLEAN v. State, 928 P.2d 1054 (1996)). In either situation, the partnership is permitted even if the private party will incidentally benefit as a result. *(King County v. Taxpayers of King County,* 949 P.2d 1260 (1997)).

18 *See, e.g.,* Wash. Rev. Code. § 35.21.730 (1998) (allowing cities to create public corporations that can work with the private sector for a public purpose).

19 See Richard Briffault, "Foreword: The Disfavored Constitution: State Fiscal Limits and State Constitutional Law," 34 Rutgers L.J. 907, 913 (2003). *See also Maready v. City of Winston-Salem,* 467 S.E.2d 615, 627 n.1 (N.C. 1996) (noting that "courts in forty-six states in addition to North Carolina have upheld the constitutionality of governmental expenditures and related assistance for economic development incentives").

20 According to the National Conference of State legislatures, in the 2020 legislative session alone, at least 23 states enacted broadband-related legislation. NCLS, "Broadband 2020 Legislation" (August 20, 2020), https://tinyurl.com/y635ssgq Many of these statutes addressed public-private partnership issues. Id.

21 A partial list of such statutes includes FL Stat. § 288.0655 (authorizing public-private partnership and broadband facilities as infrastructure eligible for use of the Rural Infrastructure Fund); KY Stat. § 154.15-020 (authorizing the Kentucky Communications Networks Authority to manage public-private partnership between the Commonwealth and private partners for broadband network); ME Stat. T, 30-A § 2203 (authorizing parties to enter into a public-private partnership to establish a regional municipal utility district to support the provision of broadband services); N.H. Stat. § 33:3-g (authorizing municipalities to issue bonds to finance broadband infrastructure which may be the subject of public-private partnerships); VA Stat. § 15.2-5114 (authorizing entities providing public and essential governmental functions to enter into public-private partnerships for establishment and operation of systems and install, lease, or own pipe or conduit to retail providers of broadband services); WY Stat. § 9-12-1501 (authorizing public-private partnerships as applicants eligible for funding from a broadband funding program).

22 A partial list of such statutes includes: Fla. Stat. Ann. §287.05712 (authorizes public–private partnerships for projects not limited to those listed in the statute); Md. Code Regs. §10A-103 to 402 (authorizes public–private partnerships for any public infrastructure asset); IN Code Ann. §§ 5-23-1-1 (authorizes public–private partnerships for public facility projects but defines a public facility as a "facility located on, or to be located on, real property owned or leased by a governmental body and upon which a public service is or may be provided"); ; ND Cent. Code §§ 48-02.1-01 et seq. (authorizes public–private partnerships for a fee-based facility); Tex. Gov. Code Ann. § 271.181 to 271.199 (authorizes design-build public–private partnerships for a broad set of civil works projects).

23 Md. Code. Regs §10A-103-402.

24 Edward Fishman, "Major Legal Issues for Highway Public–Private Partnerships" at 26, *Legal Research Digest* (January 2009), http://goo.gl/UTL5CJ.

25 *See* Alaska Stat. §§ 1905 (authorizing the Knik Arm Bridge and Toll Authority to use a public–private partnership to finance, design, construct, operate, and maintain a bridge in Anchorage). *See, e.g.,* Cal. Stat. & Hwy. Code § 143(A), Cal. Gov't Code § 5956; Ind. Code § 8-15.5; Mo. Rev. Stat. §§ 238:300-238:367; N.C. Gen. Stat. §§ 136-89.180-136.89.197.

26 *See, e.g.,* Florida Statutes Annotated § 287.057(1)(a)1.a.4 (requiring that contracts "be awarded to the responsible and responsive vendor who submits the lowest responsive bid.").

27 *See, e.g.,* Colo. Rev. Stat. §§ 43-1-1201-1209, 43-4-801-812; Or. Rev. State. §§ 383.001-383.019; Utah Code Ann. §§ 63-560502.5, 72-6-118, 72-6-201-206.

28 *See, e.g.,* Georgia Code Ann. §§32-2-78, 80 (requiring the DOT to solicit proposals); Ind. Code Ann. §§5-23-1-1 to 5-23-7-2.

29 *See, e.g.,* CT ST § 4-258 (when conducting the competitive procurement process for public-private partnership, agency must include information on the scope of the project, material terms and conditions; provide public notice; and publish evaluation and selection criteria); LA R.S. 48:2084.13 (authority's guidelines when selecting private entity for public-private partnership should be based on factors such as the probable scope, complexity, and priority of the project which will later be stated in writing).

30 20 Illinois Compiled Statutes 661/35.

31 Cal. Pub. Util. Code §16461

32 https://www.baller.com/wp-content/uploads/BallerStokesLideStateBarriers7-1-20.pdf

33 In 2015, in the course of preempting North Carolina's and Tennessee's barriers to public broadband initiatives, the FCC found that such laws can have the practical effect of making public projects unduly time-consuming, burdensome, and prohibitively costly. *In re City of Wilson, North Carolina,* 30 FCC Rcd. 2408, 2015 WL 1120113 (2015). On appeal, the United State Court of Appeals for the Sixth Circuit did not "question the public benefits that the FCC identifies in permitting municipalities to expand Gigabit Internet coverage," but it ruled that the FCC lacked authority to preempt such laws. *State of Tennessee v. Federal Communications Commission,* 832 F.3d 597, 613 (6th Cir. 2016).

34 *See Merriam v. Moody's Ex'rs,* 25 Iowa 163, 170 (1868). In his treatise, *Dillon, Commentaries on the Law of Municipal Corporations,* (5th ed. 1911), Judge Dillon described the rule as follows: "[A] municipal corporation possesses and can exercise the following powers and no others: First, those granted in express words; second, those necessarily or fairly implied in or incident to the powers expressly granted; third, those essential to the accomplishment of the declared objects and purposes of the corporation—not simply convenient, but indispensable." Id. at § 237.

35 Nebraska Legislative Research Office, "Dillon Rule and Home Rule: Principles of Local Governance" (Feb. 2020), https://nebraskalegislature.gov/pdf/reports/research/snapshot_localgov_2020.pdf; *see also* Adam Coester, "Dillon's Rule or Not?," National Association of Counties, Jan. 2004, https://tinyurl.com/yxljpkrx (providing a survey of Dillon's Rule and Home Rule states).

36 See, e.g., Illinois Constitution Art. VII §6(a)("…any municipality which has a population of more than 25,000 are home rule units").

37 Washington State Office of the Attorney General, "Authority of Cities, Towns, and Counties to Provide Telecommunications Services," AGO 2003 No. 11 (Dec. 2003), http://goo.gl/Bwbzae ("With respect to all municipal corporations, the general rule is that they are limited to those powers expressly granted by statute, those powers necessarily or fairly implied in or incident to powers expressly granted, and those powers essential to the declared purposes and objects of the corporation. *Port of Seattle v. Wash. Utils. & Transp. Comm'n,* 92 Wn.2d 789, 794-95, 597 P.2d 383 (1979) … [T]his general rule does not apply to cities and counties that have adopted charters pursuant to the Washington Constitution (Const. art. XI, §§ 4, 10) or to cities operating under the optional municipal code ('code cities') …These municipalities, often described as having 'home rule' powers, do not need express or implied statutory authority to enact local legislation.").

38 Otelco, "Fiber to the Premises in Leverett, MA Offers an Excellent Public Private Partnership Model," (March 9, 2017), https://www.otelco.com/fiber-to-the-premise/.

39 "Fiber Coming to 11 Utah Cities" *Government Technology* (Feb. 2014), http://goo.gl/VcdX1b.

40 Texas Municipal League, "Texas Municipal League Economic Development Handbook," at 2-7 (Jan. 2015), https://www.tml.org/DocumentCenter/View/1471/2020-Economic-Dev-HDBK-_Final.

41 "Economic Development Authority Handbook," Minnesota Economic Development Foundation, et. al., p. 20-22 (Oct. 2011), https://mnedf.org/wp-content/uploads/2014/12/EDA-Handbook.pdf; "Tax Increment Financing Program," City of Chicago, http://goo.gl/UYx2nR.

42 Tony Q. Smith, "TIF and New Markets Tax Credits: Economic Development Finance Tools with Applicability for Broadband," S.B. Friedman & Co. (Nov. 2013), http://goo.gl/f6MsFW.

43 See Internal Revenue Service, "Opportunity Zones Frequently Asked Questions," https://www.irs.gov/credits-deductions/opportunity-zones-frequently-asked-questions

44 Brian Blacker, "Stacked Incentives: NMTC Eligibility and Opportunity Zones" (September 16, 2019), https://tinyurl.com/y6kudkcb.

45 Municipal Securities Rulemaking Board, Glossary of Municipal Security Terms, "General Obligation or GO Bond," http://goo.gl/UcK2HP.

46 See, e.g., Missouri Constitution Art. VI §26(b)("Any county, city, incorporated town or village or other political corporation or subdivision of the state, by vote of the qualified electors thereof voting thereon, may become indebted in an amount not to exceed five percent of the value of taxable tangible property therein…").

47 Municipal Securities Rulemaking Board, Glossary of Municipal Security Terms, "Revenue Bond," http://www.msrb.org/glossary/definition/revenue-bond.aspx.

48 "Introduction to Tax-Exempt Bonds," Internal Revenue Service, p. 12, http://goo.gl/bkzDy6.

49 *Id.*

50 This is a developing area of law so local governments should consider applicable federal and state securities laws.

51 "Financing Fiber Networks," Broadband Communities Magazine, p.51 (May/June 2015), http://www.bbpmag.com/Features/0515feature-Financing-Fiber-Networks.php.

52 *Id.*

53 *Id.*

54 Minnesota Economic Development Foundation, "Economic Development Authority Handbook," at 23 (Oct. 2011), https://mnedf.org/wp-content/uploads/2014/12/EDA-Handbook.pdf;. *See also* League of Minnesota Cities, "Handbook for Minnesota Cities: Chapter 14: Community Development and Redevelopment, https://tinyurl.com/y48d4gs7.

55 *Id.* at 24.

56 *Id.* at 170.

57 The National Telecommunications & Information Administration maintains an excellent searchable compendium of federal broadband funding programs. NTIA, "Broadband Funding Guide," https://tinyurl.com/yxzqxmlp, NTIA also has searchable database of state broadband programs. NTIA, State Broadband Programs, https://tinyurl.com/yysxytlx. Other valuable resources for locating funding are Fiber Broadband Association, "Funding," https://tinyurl.com/yyllv8jb; Rural Health Information Hub, "Funding By Topic: Broadband," https://tinyurl.com/y5hupff5 .

58 National Association of Telecommunications Officers and Advisors, "Cares Act Addresses Broadband, Local Government," https://tinyurl.com/yyqjsb5m; National Conference of State Legislatures, "Broadband 2020 Legislation," (August 20, 2020), https://tinyurl.com/y635ssgq; Kara Mullaley, "Help Is on the Way: Rural Broadband Funding Update," Broadband Communities (March/April 2020), https://tinyurl.com/ya2dkezj; Kathryn de Wit and Anna Read, "How States Are Expanding Broadband Access," Broadband Communities, July 2020), https://tinyurl.com/y4dl6oko.

59 FCC, "Connect America II FAQs," https://tinyurl.com/y54epk75.

60 FCC, "Connect America II FAQs," https://tinyurl.com/y54epk75.

61 FCC, "E-Rate - Schools & Libraries USF Program," https://tinyurl.com/y3yzw3up.

62 FCC, "Implementing the Rural Digital Opportunity Fund (RDOF) Auction," https://tinyurl.com/y5fclthd.

63 Benton Institute for Broadband and Society, "How Does the CARES Act Connect Us" (April 3, 2020), https://tinyurl.com/y4gt9ve9.

64 *See, e.g.,* FCC, *In the Matter of Accelerating Wireless Broadband Deployment By Removing Barriers to Infrastructure Investment, Declaratory Ruling and Third Report and Order,* ¶¶ 42-91, 33 FCC Rcd. 9088 (F.C.C.), 33 F.C.C.R. 9088, 2018 WL 4678555 (rel. September 27, 2020); FCC, *In the Matter of Implementation of State and Local Governments' Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012,* Declaratory Ruling and Notice of Proposed Rulemaking, 35 FCC Rcd. 5977 (F.C.C.), 35 F.C.C.R. 5977, 2020 WL 3166242 (rel. June 10, 2020); FCC, Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as Amended by the Cable Television Consumer Protection and Competition Act of 1992, *Third Report and Order,* 2019 WL 3605129 (rel. August 2, 2019).

65 See also Heather Burnett Gold, More Fiber, Less Waiting (Nov. 2015), https://tinyurl.com/y6l84rsz (describing the "*One-Touch" pole attachment process; see also Next Century Cities, "One Touch" Make-Ready Policies: The "Dig Once" of Pole Attachments* (Jan. 6, 2016), https://tinyurl.com/y37j4kn4.

66 For example, the City of Westminster, Maryland, was able to attract a private partner, Ting, by offering to build, own, and maintain its fiber—enabling Ting, in turn, to light the fiber, operate the network, and offer services to the public.

67 For example, in October 2014, the FCC purported to clarify portions of the Spectrum Act (Pub. L. No. 112-96 § 6409(a), 126 Stat. 156 (2012)), that addressed alleged problems with state and local government processing of applications for wireless broadband. The FCC directed state and local governments to approve applications for modification of "an existing wireless tower or base station" (including addition, removal and replacement of equipment) that will not result in a "substantially change." *(Wireless Siting Order,* ¶ 182 et seq.). Notably, the FCC, citing several cases, found that Section 6409(a) does not apply to a state or local government acting in a proprietary capacity as a facility owner, as distinguished from acting as a land use regulator.

68 There may, however, be other state laws addressing how a local government may sell or lease property, or grant a concession, that can limit the ability of a local government to grant preferential treatment in respect of access to infrastructure or facilities.

69 FCC, *In the Matter of Accelerating Wireless Broadband Deployment By Removing Barriers to Infrastructure Investment, Declaratory Ruling and Third Report and Order,* ¶¶ 42-91, 33 FCC Rcd. 9088 (F.C.C.), 33 F.C.C.R. 9088, 2018 WL 4678555 (rel. September 27, 2020).

70 *Id.,* at ¶¶ 92-97.

71 *Id.,* at ¶ 96.

72 *City of Portland v. United States,* 2020 WL 4669906, at *14-*15 (9th Cir. August 12, 2020).

73 Baller Stokes & Lide each year publishes a compliance memorandum and check list that discusses the federal regulatory requirements that apply to the various categories of communications service providers may encounter. It is available here: http://goo.gl/doQQmj.

74 "Private business use of tax-exempt bond financed facilities," Notice 2014–67 (Nov. 10, 2014), http://goo.gl/H5Lliz.

75 If there is no clear choice between the top candidates and state and local law allows simultaneous negotiations, this method of negotiation may be more time-consuming and expensive, but it may also create a competitive environment from which the local government may benefit.

76 Patrick Sabol and Robert Puentes, "Private Capital, Public Good: Drivers of Successful Infrastructure Public–Private Partnerships," Brookings Institution (Dec. 2014), http://goo.gl/MGF4T1.

77 "Expanding the Market for Infrastructure Public–Private Partnerships," U.S. Department of Treasury, p. 7.

78 David Flessner, "2020 Trend: Gig City's second decade will deliver more speed, innovation," Edge, https://tinyurl.com/y6kq2lx5 (Dec. 31, 2019; See also Fiber Broadband Association, "Economic Impact: Fiber Speeds = Improved Economic Importance," https://tinyurl.com/y363u7s3; NTIA, "Measuring the Economic Impact of Broadband, https://tinyurl.com/y457b597 (Sept. 18, 2019); Institute for Local Self Reliance, "Municipal Networks and Economic Development," https://tinyurl.com/y2kamgll.

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