COUNTRY CASE STUDIES

CROSS-SECTOR INFRASTRUCTURE SHARING TOOLKIT
9 Country case studies

640. This module sets out three case studies that focus on the overall cross-sector infrastructure of sharing experience three countries: Lithuania, South Africa and the United States.

9.1 Lithuania

9.1.1 Introduction

641. This case study examines infrastructure sharing in Lithuania, which is rooted in Lithuania’s regulatory framework. Widespread infrastructure sharing is credited with contributing to the high level of fiber deployment in the country. However, most infrastructure sharing still remains within the telecommunications sector and cross-sector infrastructure sharing has been limited.

9.1.2 Regulatory framework

642. In 1998, Lithuania enacted the Law on Telecommunications of the Republic of Lithuania (Telecommunications Law).\(^{226}\) This legislation included provisions regarding sharing of telecommunications infrastructure. The Telecommunications Law also established a new regulator, the Communications Regulatory Authority of the Republic of Lithuania (\(\text{Lietuvos Respublikos ryšiųreguliavimo tarnyba}\) (RRT), and designated as the entity responsible for enacting regulations and resolving disputes among telecommunications operators regarding such sharing. RRT became operational in 2001.

643. In parallel with the enactment of the Telecommunications Law, Lithuania’s incumbent state-owned fixed telecommunications operator, \(\text{Lietuvos Telekomas}\), was privatized in 1998 when the consortium Amber Teleholding A/S, established by Swedish Telia AB and Finnish Sonera Oy, acquired 60 percent of its shares.\(^{227}\) The new entity, later renamed TEO LT, AB (Teo), was kept intact and not bifurcated into a service provider and an infrastructure owner, as had been done in other countries in the region. Subsequently, approximately 30% of Teo’s shares were issued to employees or sold to local and international investors as part of an initial public offering.\(^{228}\) As of early 2016, TeliaSonera owned 88% of Teo.\(^{229}\)

644. In 1998, Teo was granted a monopoly to provide fixed telecommunications services which expired at the end of 2002. Beginning in 2003, as part of a telecommunications sector liberalization prompted by Lithuania’s anticipated entrance into the European Union, other operators were permitted to provide fixed telecommunications. In 2002, RRT enacted rules governing the common use of conduits, ducts, inlets, masts and towers of telecommunications operators. Reflecting the Telecommunications Law, these rules only governed sharing among telecommunication operators.

645. In 2004, Lithuania became a member of European Union and was required to harmonize its telecommunications regulatory framework with that of the European Union. Accordingly, in April 2004, Lithuania enacted the Law on Electronic Communications (EC Law) which contains

\(^{226}\) Unless otherwise indicated, information included in this case study was provided by the Communications Regulatory Authority of the Republic of Lithuania (RRT).

\(^{227}\) TEO website, “Historical Facts,” (as of Dec 2015).

\(^{228}\) Ibid.

\(^{229}\) TEO, “TEO in Brief,” (as of Dec 2015).
infrastructure sharing obligations for telecommunications as well as non-telecommunications infrastructure.

646. Articles 37 and 39 of the EC Law are most relevant for infrastructure sharing. Article 37 facilitates infrastructure sharing among telecommunications operators by requiring that parties engaged in the “construction of electronic communications networks” must “make public information about the start of construction works and about the possibility for other persons to participate in construction sharing.”

647. Article 39 facilitates shared use of infrastructure used for telecommunications and other in other sectors. It grants providers of public communications a means of accessing “electronic communications infrastructure” which is defined to include passive infrastructure such as pipes, ducts, towers, masts, and buildings, as well as other infrastructure such as pipelines, collectors, wells, pilings, structures bushings, and engineering systems of construction works, and other facilities. Ordinarily, the terms and conditions for infrastructure sharing are freely negotiated, and in practice, telecommunications operators are encouraged to contact the owners of the infrastructure directly and negotiate terms of access. However, under Article 39, if a provider of public communications cannot obtain the right to install its necessary electronic communications infrastructure or the costs of obtaining such right are disproportionately high, RRT may request that an infrastructure owner share its infrastructure on non-discriminatory terms, so long as the sharing is cost efficient and does not require significant additional work. Under Article 39 infrastructure owners are prohibited from refusing to conclude a contract for such use of the infrastructure except in limited circumstances.

648. In 2005, RRT enacted rules governing construction, installation of electronic communications networks and shared use of infrastructure. In 2011 provisions governing the marking of infrastructure were added to those rules. The regulations set out more detailed procedures to implement Articles 37 and 39 of the EC Law.

649. Lithuania is also subject to Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (the Directive). Article 3 of the Directive requires undertakings providing gas, electricity, heating, water and sewer, or transport services (including rail, road, port and airport) to “meet all reasonable requests for access to its physical infrastructure under fair and reasonable terms and conditions, including price.” Under Article 13, Member States are required to adopt and publish laws, regulations and administrative provisions necessary to comply with the Directive by 1 January 2016. At the time of writing, Lithuania was in the process of transposing the requirements of the Directive into national law.

9.1.3 Lithuania’s Infrastructure sharing experience

650. Infrastructure sharing in Lithuania is widely considered a success. It has been a catalyst for increased broadband access and, in particular, a high rate of fiber deployment to the premises.

Increased fiber deployment

651. The introduction of the rules governing installation, construction and sharing of infrastructure drove deployment of cable TV networks and fiber to the building (FTTB) by alternative operators using both existing and new infrastructure. Telecommunications operators took advantage of the opportunity to share the existing ducts of Teo. Also, for several years, and until around 2007, Teo focused on xDSL technology and not on fiber deployment. Competing
service providers invested in construction of new fiber facilities to compete with Teo’s xDSL service. Teo only followed suit a few years later in response to competitive pressure.\textsuperscript{230} In some instances, Teo has requested access to these new fiber facilities using the very regulatory framework that was designed to give access to its competitors. Fiber to the premises became the dominant broadband technology in Lithuania in mid-2008.\textsuperscript{231}

In 2014, 98\% of households had fixed broadband coverage and 58\% of households had fixed broadband take-up, as opposed to 97\% and 70\%, respectively in the overall EU.\textsuperscript{232} By 2014, the number of broadband Internet access subscribers per 100 residents was 43, reflecting the continuation of a trend towards increasing penetration.\textsuperscript{233} A national broadband plan adopted on 30 October 2014 anticipates that by 2020 100\% of households will have the ability to connect to the Internet at speeds of at least 30 Mbps.\textsuperscript{234}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure41.png}
\caption{Number of broadband Internet access service subscribers and penetration rate}
\end{figure}

653. In 2014, fiber optic lines remained the main technology utilized for provision of broadband communications services,\textsuperscript{236} with over 0.477 million FTTH or FTTB fiber lines in Lithuania, a 9.1 percent increase from the year before.\textsuperscript{237} Mobile connections and wireless communications lines were the second and third most popular means of accessing broadband Internet.\textsuperscript{238}

\begin{itemize}
\item \textsuperscript{230} Gelvanovska, Natalija et al. 2014. \textit{Broadband Networks in the Middle East and North Africa.}
\item \textsuperscript{231} Ibid.
\item \textsuperscript{232} European Commission. 2015. \textit{Implementation of the EU Regulatory Framework for Electronic Communication.}
\item \textsuperscript{233} Republic of Lithuania, Communications Regulatory Authority. 2014. \textit{RRT Annual Report 2014.}
\item \textsuperscript{234} European Commission. 2015.
\item \textsuperscript{235} Republic of Lithuania, Communications Regulatory Authority. 2014. \textit{RRT Annual Report 2014.}
\item \textsuperscript{236} Republic of Lithuania, Communications Regulatory Authority. 2014. \textit{RRT Annual Report 2014.}
\item \textsuperscript{237} Ibid.
\item \textsuperscript{238} Ibid.
\end{itemize}
654. While infrastructure sharing among telecommunications operators has flourished in Lithuania, cross-sector infrastructure sharing has been much more limited. This is largely due to the fact that Teo’s duct infrastructure extends nationwide affording other telecommunications operators a convenient and accessible trove of passive infrastructure. In addition, non-telecommunications infrastructure owners have not been incentivized to promote sharing of cross-sector infrastructure as it results in limited revenues as compared to their primary businesses.

655. A major exception to this trend is the Baltic Optical Network, a telecommunications network that traverses Estonia, Latvia and Lithuania. Lithuania’s portion of the BON utilizes the OPGW

---

239 Ibid.
240 Ibid.
network on the electricity infrastructure of Lietuvos Energija group, a state-controlled entity which, among other things, operates electricity infrastructure. In addition, there are some niche sharing opportunities, such as the leasing space on water supply towers from water treatment plants or space on chimneys of heating or electricity power plants for installation of base stations or other equipment.

Infrastructure mapping

656. To improve possibilities for cross-sector infrastructure sharing, RRT has led the creation of a GIS resource (http://e-infrastruktura.lt/lt) which serves as a single information point for mapping systems covering telecomm and other utilities’ infrastructure. The project was initiated in 2010 and requires municipalities to provide their own data on the nature and location of infrastructure. Success has been limited due to the difficulty of providing such information in a usable electronic form in many rural municipalities. At the time of writing, only the four largest of Lithuania’s sixty municipalities, Vilnius, Kaunas, Klaipeda and Panevėžys (containing the four largest cities) are included in the GIS resource.

657. RRT has not seen any clear impact of this resource on cross-sector infrastructure sharing yet. This may be due to its limited reach, or the reality that demand for passive infrastructure is often satisfied by existing ducts of Teo or other telecommunications operators. Lithuanian policy makers are exploring new initiatives to bring additional municipalities into the GIS resource. For example, in 2014 the Ministry of Agriculture established a working group to create mandatory obligations for updating topographical information and converting it into a usable form that can be shared.

9.1.4 Lessons learned

658. Lithuania’s strong legal and regulatory framework has encouraged infrastructure sharing both within the telecommunications sector and across sectors. This is largely credited with the widespread deployment of fiber to the home/building in Lithuania. However, cross-sector infrastructure sharing has been far more limited than sharing within the telecommunications sector, even despite initiatives by RRT. This is not a likely result of any policy or regulatory shortcoming. Rather, it likely reflects the ample opportunities for and widespread practice of sharing an extensive network of passive infrastructure within the telecommunications sector.

9.2 South Africa

9.2.1 Introduction

659. This case study examines the infrastructure sharing experience of South Africa. It summarizes the current telecommunications market and describes the regulatory and policy approach of the government. It then highlights three business models used to leverage shared infrastructure.
9.2.2  Background on the South African telecommunications market

660. South Africa has the most developed telecommunications market in Africa, leading most African countries in mobile and Internet penetration. At the time of writing, there are two fixed operators, four mobile operators and over twenty ISPs. South Africa has an extensive national fiber backbone network and terrestrial fiber links with Botswana, Lesotho, Mozambique, Namibia and Swaziland. It hosts landing points to five international submarine cable systems, serving as an access point for several of its land-locked neighboring countries. The fixed and mobile markets and the national fiber backbone networks are briefly discussed below.

Figure 44: Mobile and Internet penetration in South Africa

661. Until 2005, Telkom SA, the state owned provider of fixed telecommunications services, had a monopoly in the provision of fixed services. The monopoly was terminated after an investigation by the Department of Public Enterprises concluded that broadband development was hampered by high broadband costs attributable to the existence of a monopoly. In 2005, Neotel acquired a license to serve as the second national fixed operator. Originally and as discussed further below, the state owned companies, Eskom and Transnet collectively held a 30% stake in Neotel. In 2009, their shareholdings were sold to Tata Telecommunications which became the majority

Source: ITU data collated by Andrew Johnson

Fixed services

661. Until 2005, Telkom SA, the state owned provider of fixed telecommunications services, had a monopoly in the provision of fixed services. The monopoly was terminated after an investigation by the Department of Public Enterprises concluded that broadband development was hampered by high broadband costs attributable to the existence of a monopoly. In 2005, Neotel acquired a license to serve as the second national fixed operator. Originally and as discussed further below, the state owned companies, Eskom and Transnet collectively held a 30% stake in Neotel. In 2009, their shareholdings were sold to Tata Telecommunications which became the majority

---

shareholder. In July 2015, South Africa’s regulator approved the acquisition of Neotel by Vodacom, making Neotel a fully private actor.

Mobile services

662. South Africa’s four mobile operators are Vodacom, MTN, Cell C and Telkom Mobile. Vodacom and MTN have the largest market shares, together holding more than 80% of South Africa’s mobile market. Cell C and Telkom Mobile, a subsidiary of Telkom SA, share the remainder. In early 2014, MTN and Telkom SA entered talks regarding MTN taking over the management of the rollout and operation of Telkom’s radio access network but South Africa’s Competition Commission recently recommended prohibiting the proposed agreement.

National fiber backbone network

663. South Africa’s national fiber backbone network comprises a combination of fiber routes rolled out by the fixed operators Telkom SA and Neotel, mobile operators and public and private infrastructure companies. These can broadly be divided into public sector backbone networks (those established by public utilities) and private sector backbone networks (those established by private sector operators).

664. The public sector backbone networks comprise:

- Telkom SA’s fiber optic network. This network consists of over 36,000 km of fiber optic cable, the largest network in Africa, connecting all major population centers. In 2013, Telkom SA also started investing R12 billion in a next generation broadband network.

- A national long distance fiber optic backbone network of about 12,000 km belonging to state-owned companies Eskom, the national power utility, and Transnet (the national rail operator) and operated by Broadband Infraco SOC Ltd (BBI), an umbrella state-owned infrastructure company (further described below).

- An extensive fiber network owned by the freight rail subsidiary of Transnet. This network is used by Transnet for its own railway purposes and has spare capacity that is currently not leased to anyone.

---

245 Their holdings were sold to Tata Telecommunications in 2009 and 2011. Until the takeover by Vodacom in 2015, Neotel was held by Tata (68.5%), Nexus Communications (19%), and Communitel (12.5%).


249 Deloitte, APC. 2015. Unlocking Broadband For All.

250 Ibid.

251 Ibid.
• Eskom’s 2,600 km fiber optic network. This network links larger regional offices, generation stations, and transmission and distribution substations throughout South Africa and consists of OPAC and OPGW cable. ²⁵²

665. The private sector backbone networks comprise:

• Neotel’s fiber optic network, which was state-owned until 2009. This network consists of 15,000 km of fiber optic cable. Neotel has been spending approximately R500 million a year on infrastructure since 2009.²⁵³

• Dark Fibre Africa’s (DFA) 8,000 km of buried backbone fiber infrastructure along a route from Durban via Mtunzini and Mpumalanga to Johannesburg. DFA also has extensive intercity fiber between Johannesburg and Pretoria, as well as in other major cities in South Africa. Dark fiber on this network is leased to mobile operators and ISPs.²⁵⁴

• A 680 km national long-distance fiber network connecting Johannesburg, Cape Town and Durban owned by the NLD (National Long Distance) consortium, made up of MTN, Neotel, Vodacom and the National Roads Agency (SANRAL).²⁵⁵

• FibreCo’s 2,400 km long network between Johannesburg, Bloemfontein, and East London. Established in 2010, FibreCo is a joint venture among Cell C, Convergence Partners, an investment firm, and Dimension Data, an information technology services company. FibreCo is also building a fiber route along the cost north and south of East London.²⁵⁶

• The fiber networks of minor players. Liquid Telecom’s network is a short fiber network connecting to Zimbabwe and along a highway from Pretoria to Musina (483 km). Metrofibre Networx, Link Africa, SAS.²⁵⁷ Others operate in metropolitan areas.

---

²⁵² Johnson, Andrew. 2013.
²⁵³ Ibid.
²⁵⁵ Deloitte, APC. 2015.
²⁵⁶ FibreCo. 2015. Presentation.
²⁵⁷ Broadband Infraco. 2014.
9.2.3 Legal, regulatory and policy framework

Currently in South Africa, infrastructure sharing is governed by commercial agreements between telecommunications operators. Those agreements are regulated by the 2005 Electronic Communications Act N. 36 (EC Act)\(^{259}\) and the 2010 facilities leasing regulations.\(^{260}\)

There are no laws and regulations specifically governing cross-sector infrastructure sharing. However, as described below, South Africa’s national regulator, the Independent Communications Authority of South Africa (ICASA), recently began the process of developing an applicable regulatory framework.

The EC Act

The EC Act regulates infrastructure sharing among telecommunications licensees. Chapter 8 of the EC Act obligates telecommunications licensees to lease telecommunications facilities to other licensees upon request by negotiating and entering into a facilities leasing agreement. Chapter 8 also grants ICASA the authority to issue implementing regulations regarding facilities leasing agreements and resolve any disputes that may arise.


669. The facilities leasing regulations issued by ICASA address requirements of the facilities leasing agreements described in the Chapter 8 of the EC Act, including, agreement principles, timeframes and procedures to be followed by all parties for the submission, review and filling of agreements with ICASA. It also describes the dispute resolution processes and timeframes for filing disputes.

The National Broadband Policy

670. In 2013, South Africa issued a National Broadband Policy forecasting that by 2020, 100% of South Africans would have access to broadband services priced no higher than 2.5% of South Africa’s average monthly income. Moreover, the Government’s 2013 national development plan (NDP) foresees that by 2030 “a seamless information infrastructure will be universally available and accessible and will meet the needs of citizens, business and the public sector, providing access to the creation and consumption of a wide range of converged services required for effective economic and social participation at a cost and quality at least equal to South Africa’s main peers and competitors.”

671. To achieve South Africa’s broadband goals, the National Broadband Policy has called on ICASA, to encourage cross-sector infrastructure sharing. To answer these demands, on September 2015, ICASA published a Notice Discussion Document regarding the development of an infrastructure sharing regulatory framework in the South African Gazette. The document invites inputs from the broader public on a regulatory framework that would bring certainty on infrastructure sharing, both within the telecommunications sector and between sectors, in the context of the access to broadband services in South Africa. The document calls for public comment on such questions as the objectives and benefits of infrastructure sharing for different stakeholders, the definitions of passive and active infrastructure and the need to devise incentives to encourage infrastructure sharing.

Formation of BBI

672. A major policy choice of the Government was the formation of BBI, a state-owned enterprise established to share the fiber optic infrastructure of the state-owned electric and railway utilities. This is discussed in detail below.

9.2.4 Major Infrastructure Sharing Projects

673. As discussed above, infrastructure sharing in South Africa is largely achieved through negotiated commercial agreement, such as the electronic communications facilities leasing agreements, regulated under the EC Act. ICASA does not formally coordinate fiber rollouts. Rather, operators must obtain individual “wayleave” permissions from ICASA, other regulators

---


264 Ibid.
and municipalities. However, South Africa has examples of several models for infrastructure sharing, including cross-sector sharing of fiber, sharing of the trench and sharing of the fiber. The cross-sector sharing of servitudes has largely been facilitated by the Government of South Africa in a goal to enable larger and affordable broadband access. This module explores South African examples of these three different models.

Cross-sector sharing of fiber: BBI

674. BBI is a state-owned enterprise established in 2009\textsuperscript{265} to provide wholesale long-distance high-capacity connectivity to other licensed fixed and mobile network operators and ISPs under a legislative mandate. BBI is a manifestation of government policies to expand access to electronic communications and broadband infrastructure deployment, particularly in underdeveloped and underserviced areas that are not commercially viable to the private sector.

675. Upon its formation, the Government facilitated a transfer of telecommunications assets from Eskom and Transnet Freight Rail (a subsidiary of Transnet) to BBI. BBI now has access to 12,000 km of their combined fiber optic networks that it commercializes by leasing bandwidth services to private operators. Although BBI owns a number of fiber pairs on each route Eskom and Transnet Freight Rail remain responsible for the maintenance of the physical fiber networks.

676. For the first three years of its operation, BBI was required to lease most of its network to Neotel to facilitate its expansion as a second national fixed-line operator. Eskom and Transnet (a division of Transnet) participated in the formation of Neotel, collectively acquiring a 30% equity stake in the new operator.\textsuperscript{266}

677. In 2010, BBI wanted to expand its commercial services to other private telecommunications operators but because of a lack of coordination between its government shareholders, the Department of Public Enterprises and the Department of Communications, other wholesale companies decided to develop their own fiber networks.\textsuperscript{267} Today it is clear that BBI has struggled to build a reliable and effective network meeting the requirements of commercial customers. Much of the company’s network reaches end-of-life status on its fiber optic equipment as well as fiber itself and is in need of replacement.\textsuperscript{268} Furthermore the company is in financial difficulties and recently required an urgent cash injection of R243 million.\textsuperscript{269}

Sharing the Trench: The NLD Consortium

678. For more than 12 years, Vodacom and MTN were subject to the monopoly pricing of Telkom SA, the state owned provider of fixed telecommunications services, and were paying R1 billion annually to for use of its infrastructure. In 2009, the two operators joined Neotel, which was using BBI’s infrastructure (see above) and South Africa’ national roads agency (SANRAL), to form the NLD consortium, sign a co-build agreement and invest together in a single common 680 km trench to lay their individual fiber optic networks. The investment cost approximately R270 million,

\textsuperscript{265} BBI was established by a legislative mandate set out in the Broadband Infraco Act.33 of 2007 and it then obtain its telecommunications services license of 2009.
\textsuperscript{267} Deloitte, APC. 2015.
\textsuperscript{268} Johnson, Andrew. 2013.
shared equally among the three telecommunications entities, while SANRAL provided the right of way along the roads under which the cables are laid.\footnote{Deloitte, APC. 2015.} This model leads to cost savings in civil works while preserving independence and flexibility for each operator in the installation of their own fiber.

679. The project is runs along two major roads, linking up with landing points for submarine cables such as SEACOM, which is currently being laid, and EASSy.\footnote{SAinfro reporter. 2009. “MTN, Neotel to build national network.” SouthAfrica.info. Available at http://www.southafrica.info/business/economy/infrastructure/mtneotel-160109.htm#.VjYIJOmcGlw#ixzz3qF8e5kYK (last visited 11 Feb 2017).} NLD has plans to build a 5,000 km network (total plan) and to lay fiber along a third major road linking Durban to Cape Town, but work on this appears to have been delayed.

**Sharing the fiber: FibreCo**

680. As explained above, FibreCo was established in 2010, as a joint venture among Cell C, Convergence Partners, an investment firm, and Dimension Data, an information technology services company, to sell dark fiber and broadband services to mobile operators and ISPs. From the beginning, FibreCo operated under an “open access” principle, describing itself as a “carrier neutral, national network operator,” committed to generate economic and environmental benefits through infrastructure sharing.\footnote{FTTH Council, FibreCo Telecommunications, “The FibreCo difference” (undated). http://fibreco.co.za/About/The-FibreCo-Difference.html (last visited 11 Feb 2017).} At the time of writing, its network runs between Johannesburg, Bloemfontein, and East London and it is planning to build between Durban and Cape Town.

681. To enable the achievement of the national broadband policy goals at the regional level, FibreCo has devised a specific open access model that it has presented the government and that is pending approval at the time of writing. Under this model, fiber optic wholesale providers contribute fiber pairs to an open-access managed fiber network on a commercial basis in a cost effective way so as to minimize duplication and cost while strengthening the availability and reach of existing systems.\footnote{Johnson, Andrew. 2013.} This network would be owned by a SPV (Provincial NetCo), 100% owned by the Government, managed by a private sector entity (ManCo) that will be responsible for developing and managing the network, and financed by project finance as explained in Figure 46 below.

682. More specifically, in terms of deployment strategy, Provincial NetCo would rely on the most efficient approach to develop the required network assets with the goal to maximize returns and reduce risk. The options are:

- Lease fiber on available routes from other third party services
- Swap infrastructure on a like for like basis;
- Co-build by sharing infrastructure build costs with one or more party;
- Own-build in which NetCo would build and own the infrastructure alone.\footnote{FibreCo. 2015. Presentation to Free State ICT Summit, June 4.}
683. FibreCo notes that the last option would mainly be required in rural areas where there is limited attractiveness for commercial players. Provincial NetCo infrastructure would be viable due to of the aggregated demand from serving government requirements

Figure 46: FibreCo’s new business model

Source: Arif Hussein, FibreCo, 2015

9.2.5 Lesson learned

684. South Africa presents several interesting cases of infrastructure sharing, with some the result of government intervention on state owned companies and some the result of market forces. The regulatory framework is rather weak in terms of infrastructure sharing and has not played a role so far. It is however under reform to better enable cross-sector infrastructure sharing.

BBI, an example of cross sector infrastructure sharing resulting from government intervention, has generated a lot of inefficiencies due to monopoly pricing, duplication of infrastructure and unproductive political competition between state-owned enterprises. The private sector has reacted to these inefficiencies with alternative arrangements, including the co-build arrangement, wholesale providers of dark fibers and the multi-user open access arrangements. These alternative models of infrastructure sharing (largely within the telecom sector, except for land) seem to be the only viable solutions to the realization of the ambitious goals of rural broadband penetration of the National Broadband Policy. Cross-sector sharing has thus fallen short of its potential in South Africa.
9.3 United States

9.3.1 Introduction

This case study examines cross-sector infrastructure sharing in the United States, which has thrived since the genesis of telecommunications networks. It traces the development of cross-sector infrastructure sharing practices and policies, both voluntary and mandated, and provides several examples of significant modern cross-sector infrastructure sharing experiences. Due to the pioneering of modern telecommunications in the United States, the consistent tradition of private sector ownership of both telecom operators and infrastructure owners, and the relatively early and continuous legislative, regulatory and judicial involvement in defining the rights, privileges and duties of participants in cross-sector infrastructure sharing, a study of the United States provides valuable and nuanced insights for policymakers, regulators and other stakeholders elsewhere in the world who are today focused on ways to increase the incidence of infrastructure sharing to support the development of broadband.

9.3.2 Development of cross-sector infrastructure sharing practices and policies

As described below, the development of cross-sector infrastructure sharing practices and policies in the United States has involved a combination of financial inducements by government, voluntary sharing by market participants and sharing mandated by the government. From the outset of the telecommunications industry, the federal government provided significant financial incentives to spur innovation and investment. In addition, the federal and state governments have intervened in various ways within their respective roles under the federal system to afford telecommunications operators with sufficient land rights to build their networks. Since the latter part of the 20th Century, the federal government and a significant number of state governments have also mandated regulated access to utility poles through a complex system which allows states the option of administering access regulation, or, where states elect not to regulate access, confers authority to do so on the Federal Communications Commission (FCC). While access to other sharable infrastructure is also addressed to a lesser extent in federal and state law, the sharing of infrastructure other than land corridors and poles has largely been left by federal and state regulators to develop through a voluntary, market-based approach, and has worked sufficiently well that legislatures and regulators have typically taken a hands off approach.

The telegraph is introduced as a companion to the railroad

Cross-sector infrastructure sharing in the United States is as old as the telecommunications industry itself. In 1842, American inventor and entrepreneur Samuel Morse obtained an appropriation from the US Congress to establish a 40-mile commercial telegraph line along a railway connecting Washington and Baltimore. “The Baltimore & Ohio Railroad Company . . . granted permission on the condition that the line could be built ‘without embarrassment to the operations of the company’ and . . . demanded free use of the telegraph . . .”

States act to afford telegraph companies access to public and private lands

Following the introduction of the telegraph, state legislatures became quite active from the mid-1840s in their efforts to promote the expansion of this new means of communication. Led by

New York in 1845, a flurry of legislation was enacted to authorize the establishment and operation of telegraph companies.  

689. The early telegraph legislation was soon recognized as inadequate in several respects, including in respect of establishing the rights of telegraph companies to use existing public land corridors and to acquire easements over private lands to establish their own corridors. For example, New York’s 1845 law simply provided that “[t]he proprietors of the patent rights of Morse’s electromagnetic telegraph may be and hereby are authorized to construct lines of said telegraph from point to point and across any of the waters within the limits of this state, by the erection of posts, piers or butments for sustaining the wires of the same: Provided that the same shall not in any instance be so constructed as to endanger or injuriously interrupt the navigation of such waters; and provided also, that the private right of individuals shall be in no wise impaired by the provision of this act.” Thus, while the law provided the right to traverse waters, it made no mention of traversing public corridors over land or of acquiring rights of use of private property.  

690. Generally, installing permanent improvements and fixtures in public lands, such as telegraph poles and wires, is a privilege requiring express authorization in the United States. Similarly, the privilege to acquire easements over private land, where the owner will not voluntarily give consent, requires statutory conferring of the power of eminent domain (the American term for compulsory acquisition) in a manner consistent with constitutional protections of private property rights. The power of eminent domain is not inherent and must be conferred on a utility or telecom operator, whether investor-owned or government-owned, by legislation. Such rights of access to public and private lands were considered essential for the telegraph companies to establish and operate their infrastructure and networks.  

691. In 1848, New York was again an early mover, this time enacting the first comprehensive legislation conferring on telegraph companies the privileges of use of public lands and rights of eminent domain over private lands as a quid pro quo for undertaking certain public service obligations. The application for a charter required the organizers to describe the general routes for the proposed telegraph lines and the points to be connected. When the charter was granted, the telegraph company’s required public service obligations included a duty to serve all requesting customers (including other telegraph companies), non-discrimination between customers, good faith, and the transmission of messages in the order received (but allowing priority for newspaper dispatches). An 1850 amendment added a duty to maintain the privacy of messages. Section 5 of New York’s 1848 Telegraph Act conferred upon a telegraph company incorporated under and subject to the Act the privilege to construct its telegraph lines “along and upon any of the public roads and highways, or across any of the waters within the limits of this state, by the erection of the necessary fixtures . . . provided the same shall not be so constructed as to incommode the public use of said roads or highways, or injuriously interrupt the navigation of said waters. . . .”

---

280 Id. §3.  
281 Id. §§11 & 12.  
6 of the 1848 Act prescribed procedures by which landowners would be compensated for the use of their lands by a telegraph company, implicitly conferring a limited power of eminent domain.

692. Due to New York’s importance as the major center of commerce in the United States, its 1848 statute became a de facto model for similar legislation adopted in other important industrial states, including California (1850), Connecticut (1848), Illinois (1849), Maryland (1852), Michigan (1851), Missouri (1851) and Virginia (1852). In addition, a number of states did not model their laws after New York’s, but nonetheless followed a similar approach of tying the conferring of privileges to the undertaking of public service obligations. These included Iowa (1851), Kentucky (1847), Louisiana (1848), Massachusetts (1849), New Jersey (1853), Pennsylvania (1849) and Wisconsin (1848).

693. Several states (and territories which were not yet states), mostly in the south and west, did not initially adopt comprehensive telegraph statutes which required the undertaking public service obligations as a condition to enjoyment of specified privileges, but nonetheless enacted laws providing telegraph companies with privileges to use public roads. These included Alabama (1855), Florida (1849), Georgia (1847), Kansas Territory (1859), North Carolina (also conferring the power of eminent domain, 1875), Minnesota (1860), Montana Territory (1870), Texas (1871) and Wyoming Territory (1869).

694. Ironically, the telegraph companies made relatively little use of the land rights conferred to them under these laws, usually limited to use of public streets in metropolitan areas. Instead, following Morse’s early example, as the nascent telegraph industry flourished, telegraph lines continued to be installed primarily along railroad rights of way with the express permission of the railroads. As discussed in Module 1, there was a natural affinity between the railroad and the telegraph. Railroads also provided more efficient inter-city corridors for installing telegraph lines than roads and highways due to the lack of adjacent uses between cities and towns and the convenience of using automated railway cars to carry the poles and wires to construction sites. By obtaining permission of the railroad companies to piggyback on their existing land corridors, the telegraph companies were thus able to avoid the time and cost of assembling their own corridors using the privileges which had been conferred upon them by statute and had use of a more economical corridor. Nonetheless, the state telegraph laws developed in the mid-1850s established the principle of reciprocity between granting land use privileges to private enterprise, and the enterprise undertaking public service obligations, which would eventually form the foundation for land use rights by all telecommunications operators.

Federal Government acts to support telegraph expansion

695. During the westward expansion of the United States, Congress made the construction of a transcontinental telegraph line a national priority, so much that its completion preceded the construction of a transcontinental railroad. The first transcontinental telegraph line, funded by a grant from Congress under the Pacific Telegraph Act of 1860, connected then-existing eastern lines in Omaha, Nebraska with existing western lines in Carson City, Nevada. The new line,
completed on 24 October 1861, was built by a consortium led by Western Union Telegraph Company in less than four months along a corridor used for horses and wagons.\textsuperscript{287}

Figure 47: Wood engraving depicting construction of the US transcontinental telegraph in 1861

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{construction.png}
\caption{Wood engraving depicting construction of the US transcontinental telegraph in 1861}
\end{figure}

\textit{Source: Harper's Weekly}\textsuperscript{288}


\textsuperscript{288} 2 November 1867. Republished in Engineering and Technology History Wiki.
Figure 48: Map of final segments of first transcontinental telegraph line completed in 1861

Source: Robert L. Thompson

Six years later, prompted by a financial stimulus from the United States Congress, Western Union relocated its telegraph lines from the wagon trail to share a corridor with the first transcontinental railway. Congress induced this decision to co-locate railways and telegraphs through the grant of rights of way over public lands and appropriations made for the purchase of both transport and communications services. As part of an Act passed by Congress on 2 December 1861 and signed into law by President Abraham Lincoln on 1 July 1862, the United States Government had commissioned the combined construction of a new transcontinental railroad and telegraph lines to connect the Missouri River to the Pacific Ocean and to provide the Government with communications and transport for postal, military and other purposes.

Under the Pacific Railway Act, as it was known, the proprietors of the railroad were expressly authorized “to enter into an arrangement with the Pacific Telegraph Company, the Overland Telegraph Company, and the California State Telegraph Company, so that the present line of telegraph between the Missouri River and San Francisco may be moved upon or along the line of said railroad and branches as fast as said roads and branches are built; and if said arrangement be entered into, and the transfer of said telegraph line be made in accordance therewith to the line of said railroad and branches, such transfer shall, for all purposes of this act, be held and considered a fulfilment on the part of said railroad companies of the provisions of this act in regard to the

289 Robert L. Thompson, Wiring a continent: the history of the telegraph industry in the United States, 1832-1866 (1947)
The original transcontinental telegraph was relocated to the transcontinental railway rights of way on their completion in 1869.  

Figure 49: Simultaneous construction of transcontinental railroad and adjacent telegraph poles in 1868

Source: The Bancroft Library, University of California, Berkeley

---


293 In this photograph, one can see the poles for the telegraph lines which have already been installed along the right side of the railroad right of way.

Figure 50: Installing the telegraph lines on poles along the railway

Source: Southern Pacific Railway, Alfred A. Hart Photograph

---

698. Just five years after passage of the Pacific Railway Act, Congress on 24 July 1866 passed a more generally applicable law entitled “An Act to aid in the construction of telegraph lines, and to secure to the government the use of the same for postal, military, and other purposes” (the 1866 National Telegraph Act or simply the 1866 Act).297 Among other things, the Act conferred upon telegraph companies the following rights under federal law298:

[A]ny telegraph company now organized or which may hereafter be organized under the laws of any state in this Union shall have the right to construct, maintain, and operate lines of telegraph through and over any portion of the public domain of the United States, over and along any of the military or post roads of the United States which have been or may hereafter be declared such by act of Congress, and over, under, or across the navigable streams or waters of the United States, provided that such lines of telegraph shall be so constructed and maintained as not to obstruct the navigation of such streams and waters, or interfere with the ordinary travel on such military or post roads. And any of said companies shall have the right to take and use from such public lands the necessary stone, timber, and other materials for its posts, piers, stations, and other needful uses in the construction, maintenance, and operation of said lines of telegraph, and may preempt and use such portion of the unoccupied public lands subject to preemption through which its said lines of telegraph may be located as may be necessary for its stations, not exceeding forty acres for each station; but such stations shall not be within fifteen miles of each other.

And be it further enacted, that telegraphic communications between the several departments of the government of the United States and their officers and agents shall, in

---

297 Ch. 230, 14 Stat. 221 (1866).
298 Id. §§1-4.
their transmission over the lines of any of said companies, have priority over all other business, and shall be sent at rates to be annually fixed by the Postmaster General.

And be it further enacted that the rights and privileges hereby granted shall not be transferred by any company acting under this act to any other corporation, association, or person, provided, however, that the United States may at any time after the expiration of five years from the date of the passage of this act, for postal, military, or other purposes, purchase all the telegraph lines, property, and effects of any or all of said companies at an appraised value, to be ascertained by five competent disinterested persons, two of whom shall be selected by the Postmaster General of the United States, two by the company interested, and one by the four so previously selected.

And be it further enacted, that before any telegraph company shall exercise any of the powers or privileges conferred by this act, such company shall file their written acceptance with the Postmaster General, of the restrictions and obligations required by this act.

699. As a condition to the rights conferred under the 1866 National Telegraph Act, a telegraph company had to accept the conditions it imposed by lodging a written acceptance with the Postmaster General. This was effectively a regulatory contract, or license, by which the telegraph company voluntarily submitted itself to federal regulation in exchange for benefitting from the privileges conferred under the Act. The conditions imposed by the Act required the telegraph company to give priority to U.S. government communications and charge the government rates fixed by the Postmaster General, and, and any time at least five years after the date of the Act, allowed the United States to purchase the telegraph company’s assets at appraised value.

*Early telegraph litigation over cross-sector infrastructure sharing*

700. The courts were soon called upon to resolve disputes over access by telegraph companies to land corridors over public and private property. The following highlights some of the more significant cases during this period, decided by the United States Supreme Court, to provide a flavor of the competing arguments raised by telegraph companies and those who controlled existing land corridors, and how the courts resolved these issues.

701. Access to land corridors in the United States must be understood in the context of the division of powers and responsibilities between the federal government and the state governments. Broadly speaking, the federal government, through acts of Congress, has limited express powers under the United States Constitution. All matters of legislation and regulation not expressly granted to the federal government are reserved to the state governments. The view of the source and scope of federal powers has evolved and expanded over time. At the time of the Pacific Railway Act, the focus was limited to war powers and postal powers. After the end of the American Civil War in 1865, the understood scope of federal powers gradually expanded to include more overt references to interstate commerce (even when military and postal discourse were not involved). Reserved state powers were generally viewed throughout this time to include the power to regulate intrastate commerce and land rights involving private property.

702. The National Telegraph Act of 1866 was invoked not long after its passage in a dispute between Western Union Telegraph Company and Pensacola Telegraph Company which was eventually heard and decided by the United States Supreme Court.299 The core issues before the

299 See Pensacola Telegraph Co. v. Western Union Telegraph Co., 96 U.S. 1 (1877).
Court stemmed from a conflict between the federal government’s grant of operating rights to Western Union under the 1866 Act and the State of Florida’s grant of exclusive operating rights to Pensacola Telegraph under an 1866 state law. However, the dispute also played out in litigation over land rights between the two competing telegraph operators and the successive owners of a railroad along which they both had installed telegraph lines.

703. In 1859, Pensacola Telegraph Company had erected a telegraph line from Pensacola, Florida to Pollard, Alabama along the right of way of the Alabama and Florida Railroad. Pensacola Telegraph operated the entire line until 1862, when its southern portion was removed during Confederate occupation in the American Civil War. Pensacola Telegraph abandoned the entire line in 1864 after Union Troops seized and occupied the area in which it was located.

704. A period of uncertainty over ownership and conflicting assertions of rights arose during the reconstruction period following the Civil War. The Florida legislature in December 1866 granted exclusive rights to a resurrected and newly recapitalized Pensacola Telegraph Company, as part of granting its corporate charter, to operate a telegraph line in the two westernmost counties of Florida. Soon thereafter, Pensacola Telegraph secured permission from the Alabama and Florida Railroad to use its rights of way and erected and began operating a telegraph line within the railroad rights of way. Meanwhile, in June 1867, Western Union notified the Postmaster General that it accepted the provisions of the Federal Act of 1866. The Florida legislature also later, in February 1873 and February 1874, granted renewed railroad rights to Pensacola and Louisville Railroad Company, which had acquired the assets of the defunct Alabama and Florida Railroad. These assets included the rights of way in which Pensacola Telegraph’s lines were located. The Florida legislature’s grant to the Pensacola and Louisville Railroad included the right to construct, maintain and operate a telegraph line along its railroad rights of way. This grant directly conflicted with the Florida legislature’s 1866 grant to Pensacola Telegraph.

705. In June 1874, Pensacola and Louisville Railroad granted Western Union the right to use its rights of way to erect a new telegraph line, pursuant to the 1873 and 1874 Florida acts, and Western Union commenced construction immediately. Pensacola Telegraph promptly brought suit in July 1874 to enjoin Western Union from completing and operating its competing telegraph lines, relying on the Florida legislature’s previous grant of exclusivity in 1866. The case was litigated for several years, leading to a decision by the United States Supreme Court in 1877. In a 5-3 decision, Chief Justice Waite, for the majority, after noting that the 1866 federal Act fell within Congress’s undisputed power to regulate interstate commerce and post roads, made the following remarks regarding the land use rights conferred by that Act:

... The statute of July 24, 1866, in effect, amounts to a prohibition of all State monopolies in this particular. It substantially declares, in the interest of commerce and the convenient transmission of intelligence from place to place by the government of the United States and its citizens, that the erection of telegraph lines shall, so far as State interference is concerned, be free to all who will submit to the conditions imposed by Congress, and that corporations organized under the laws of one State for constructing and operating telegraph lines shall not be excluded by another from prosecuting their business within its jurisdiction, if they accept the terms proposed by the national government for this national privilege. To this extent, certainly, the statute is a legitimate regulation of commercial intercourse among the States, and is appropriate legislation to carry into execution the powers of Congress over the postal service. It gives no foreign corporation the right to enter upon private property without the consent of the owner and erect the necessary
structures for its business; but it does provide, that, whenever the consent of the owner is obtained, no State legislation shall prevent the occupation of post-roads for telegraph purposes by such corporations as are willing to avail themselves of its privileges.

It is insisted, however, that the statute extends only to such military and post roads as are upon the public domain; but this, we think, is not so. The language is, “Through and over any portion of the public domain of the United States, over and along any of the military or post roads of the United States which have been or may hereafter be declared such by act of Congress, and over, under, or across the navigable streams or waters of the United States.” There is nothing to indicate an intention of limiting the effect of the words employed, and they are, therefore, to be given their natural and ordinary signification. Read in this way, the grant evidently extends to the public domain, the military and post roads, and the navigable waters of the United States. These are all within the dominion of the national government to the extent of the national powers, and are, therefore, subject to legitimate congressional regulation. No question arises as to the authority of Congress to provide for the appropriation of private property to the uses of the telegraph, for no such attempt has been made. The use of public property alone is granted. If private property is required, it must, so far as the present legislation is concerned, be obtained by private arrangement with its owner. No compulsory proceedings are authorized. State sovereignty under the Constitution is not interfered with. Only national privileges are granted.

706. In a dissenting opinion, Justice Field joined by Justice Hunt focused on the limited scope of land use rights granted by the 1866 federal Act and the prerogative of the Florida legislature to grant a limited period of exclusivity to incentivize private sector investment in telegraph lines. He offered the following reasoning:

There can be no serious question that the State of Florida possessed the absolute right to confer upon a corporation created by it the exclusive privilege for a limited period to construct and operate a telegraph line within its borders. . . . The exclusiveness of a privilege often constitutes the only inducement for undertakings holding out little prospect of immediate returns. The uncertainty of the results of an enterprise will often deter capitalists, naturally cautious and distrustful, from making an investment, without some assurance that, in case the business become profitable, they shall not encounter the danger of its destruction or diminution by competition. It has, therefore, been a common practice in all the States to encourage enterprises having for their object the promotion of the public good, such as the construction of bridges, turnpikes, railroads, and canals, by granting for limited periods exclusive privileges in connection with them. Such grants, so far from being deemed encroachments upon any rights or powers of the United States, are held to constitute contracts, and to be within the protecting clause of the Constitution prohibiting any impairing of their obligation.

The grant to the complainant [Pensacola Telegraph Company] was invaded by the subsequent grant to the Pensacola and Louisville Railroad Company. If the first grant was valid, the second was void, according to all the decisions of this court . . . . The court below did not hold otherwise, and I do not understand that a different view is taken here; but it decided, and this court sustains the decision, that the statute making the first grant was void, by reason of its conflict with the act of Congress of July 24, 1866.
With all deference to my associates, I cannot see that the act of Congress has anything to do with the case before us. In my judgment, it has reference only to telegraph lines over and along military and post roads on the public domain of the United States. . . . The portion of the public domain which may be thus used is designated by reference to the military and post roads upon it. . . . The conclusion reached by the majority of the court . . . implies that Congress intended to give aid to the telegraph companies of the country, those existing or thereafter to be created, not merely by allowing them to construct their lines over and along post-roads upon the public lands, but also over and along such roads within the States which are not on the public lands, where, heretofore, it has not been supposed that it could rightfully exercise any power.

The only military roads belonging to the United States within the States are in the military reservations; and to them the act obviously does not apply. And there are no post-roads belonging to the United States within the States. The roads upon which the mails are carried by parties, under contract with the government, belong either to the States, or to individuals, or to corporations, and are declared post-roads only to protect the carriers from being interfered with, and the mails from being delayed in their transportation, and the postal service from frauds. The government has no other control over them. It has no proprietary interest in them or along them to bestow upon any one. It cannot use them, without paying the tolls chargeable to individuals for similar uses; it cannot prevent the State from changing or discontinuing them at its pleasure; and it can acquire no ownership or property interest in them, except in the way in which it may acquire any other property in the States, namely, by purchase, or by appropriation upon making just compensation. . . .

The public streets in some of our cities are post-roads, under the declaration of Congress . . . and it would be a strange thing if telegraph lines could be erected by a foreign corporation along such streets without the consent of the municipal and State authorities, and, of course, without power on their part to regulate its charges or control its management. Yet the doctrine asserted by the majority of the court goes to this length: that, if the owners of the property along the streets consent to the erection of such lines by a foreign corporation, the munificence and the State are powerless to prevent it, although the exclusive right to erect them may have been granted by the State to a corporation of its own creation.

If by making a contract with a party to carry the mails over a particular road in a State, which thus becomes by act of Congress for that purpose a post-road, Congress acquires such rights with respect to the road that it can authorize corporations of other States to construct along and over it a line of telegraph . . ., it must have the right to authorize them to condemn private property for that purpose. The act under consideration does not, it is true, provide for such condemnation; but if the right exist to authorize the construction of the lines, it cannot be defeated from the inability of the corporations to acquire the necessary property by purchase. The power to grant implies a power to confer all the authority necessary to make the grant effectual. It was for a long time a debated question whether the United States, in order to obtain property required for their own purposes, could exercise the right of eminent domain within a State. It has been decided, only within the past two years, that the government, if such property cannot be obtained by purchase, may appropriate it, upon making just compensation to the owner . . .; but never has it been
suggested that the United States could enable a corporation of one State to condemn property in another State, in order that it might transact its private business there.

707. Following its decision in *Pensacola Telegraph*, the United States Supreme Court was asked in *St. Louis v. Western Union Telegraph* to decide whether a municipal government could charge a telegraph company for use of the public streets without violating the 1866 federal Act.\(^\text{300}\) The Court answered in the affirmative, explaining its ruling as follows:

... Has the city a right to charge this defendant [Western Union] for the use of its streets and public places? And here, first, it may be well to consider the nature of the use which is made by the defendant of the streets, and the general power of the public to exact compensation for the use of streets and roads. The use which the defendant makes of the streets is an exclusive and permanent one, and not one temporary, shifting, and in common with the general public. The ordinary traveler, whether on foot or in a vehicle, passes to and fro along the streets, and its use and occupation thereof are temporary and shifting. The space he occupies one moment he abandons the next to be occupied by any other traveler. This use is common to all members of the public, and it is a use open equally to citizens of other states with those of the state in which the street is situate. But the use made by the telegraph company is, in respect to so much of the space as it occupies with its poles, permanent and exclusive. It as effectually and permanently dispossesses the general public as if it had destroyed that amount of ground. Whatever benefit the public may receive in the way of transportation of messages, that space is, so far as respects its actual use for purposes of a highway and personal travel, wholly lost to the public. By sufficient multiplication of telegraph and telephone companies, the whole space of the highway might be occupied, and that which was designed for general use for purposes of travel entirely appropriated to the separate use of companies and for the transportation of messages.

We do not mean to be understood as questioning the right of municipalities to permit such occupation of the streets by telegraph and telephone companies; nor is there involved here the question whether such use is a new servitude or burden placed upon the easement, entitling the adjacent lot owners to additional compensation. All that we desire or need to notice is the fact that this use is an absolute, permanent, and exclusive appropriation of that space in the streets which is occupied by the telegraph poles. To that extent, it is a use different in kind and extent from that enjoyed by the general public. Now when there is this permanent and exclusive appropriation of a part of the highway, is there in the nature of things anything to inhibit the public from exacting rental for the space thus occupied? Obviously not. Suppose a municipality permits one to occupy space in a public park for the erection of a booth in which to sell fruit and other articles; who would question the right of the city to charge for the use of the ground thus occupied, or call such charge a tax, or anything else except rental? So in like manner, while permission to a telegraph company to occupy the streets is not technically a lease, and does not in terms create the relation of landlord and tenant, yet it is the giving of the exclusive use of real estate, for which the giver has a right to exact compensation, which is in the nature of rental. We do not understand it to be questioned by counsel for the defendant that, under the constitution

\(^{300}\) *St. Louis v. Western Union Telegraph*, 148 U.S. 92 (1893).
and laws of Missouri, the City of St. Louis has the full control of its streets, and in this respect represents the public in relation thereto.

It is claimed, however, by defendant [Western Union] that under the Act of Congress of July 24, 1866, and by virtue of its written acceptance of the provisions, restrictions, and obligations imposed by that act, it has a right to occupy the streets of St. Louis with its telegraph poles. . . .

It is a misconception, however, to suppose that the franchise or privilege granted by the act of 1866 carries with it the unrestricted right to appropriate the public property of a state. It is, like any other franchise, to be exercised in subordination to public and to private rights. While a grant from one government may supersede and abridge franchises and rights held at the will of its grantor, it cannot abridge any property rights of a public character created by the authority of another sovereignty. No one would suppose that a franchise from the federal government to a corporation, state or national, to construct interstate roads or lines of travel, transportation, or communication, would authorize it to enter upon the private property of an individual and appropriate it without compensation. No matter how broad and comprehensive might be the terms in which the franchise was granted, it would be confessedly subordinate to the right of the individual not to be deprived of his property without just compensation. And the principle is the same when, under the grant of a franchise from the national government, a corporation assumes to enter upon property of a public nature belonging to a state. It would not be claimed, for instance, that under a franchise from Congress to construct and operate an interstate railroad, the grantee thereof could enter upon the statehouse grounds of the state and construct its depot there without paying the value of the property thus appropriated. Although the statehouse grounds be property devoted to public uses, it is property devoted to the public uses of the state and property whose ownership and control is in the state, and it is not within the competency of the national government to dispossess the state of such control and use or appropriate the same to its own benefit or the benefit of any of its corporations or grantees without suitable compensation to the state. This rule extends to streets and highways; they are the public property of the state. While for purposes of travel and common use they are open to the citizens of every state alike, and no state can by its legislation deprive the citizens of another state of such common use, yet when an appropriation of any part of this public property to an exclusive use is sought, whether by a citizen or corporation of the same or another state or a corporation of the national government, it is within the competency of the state, representing the sovereignty of that local public, to exact for its benefit compensation for this exclusive appropriation. It matters not for what that exclusive appropriation is taken, whether for steam railroads or street railroads, telegraphs or telephones, the state may, if it chooses, exact from the party or corporation given such exclusive use pecuniary compensation to the general public for being deprived of the common use of the portion thus appropriated. . . .

Another matter is discussed by counsel which calls for attention, and that is the proposition that the ordinance charging five dollars a pole per annum is unreasonable, unjust, and excessive. Among other cases cited in support of that proposition is Philadelphia v. Western Union . . ., in which an ordinance similar in its terms was held unreasonable and void by the Circuit Court of the United States for the Eastern District of Pennsylvania. We think that question, like the last, may be passed for further investigation on the subsequent
trial. *Prima facie*, an ordinance like that is reasonable. The court cannot assume that such a charge is excessive, and so excessive as to make the ordinance unreasonable and void, for, as applied in certain cases, a like charge for so much appropriation of the streets may be reasonable. If, within a few blocks of Wall Street, New York, the telegraph company should place on the public streets 1,500 of its large telegraph poles, it would seem as though no court could declare that five dollars a pole was an excessive annual rental for the ground so exclusively appropriated, while, on the other hand, a charge for a like number of poles in a small village, where space is abundant and land of little value, would be manifestly unreasonable, and might be so excessive as to be void. Indeed, it may be observed, in the line of the thoughts heretofore expressed, that this charge is one in the nature of rental; that the occupation by this interstate commerce company of the streets cannot be denied by the city; that all that it can insist upon is, in this respect, reasonable compensation for the space in the streets thus exclusively appropriated, and it follows in the nature of things that it does not lie exclusively in its power to determine what is reasonable rental. The inquiry must be open in the courts, and it is an inquiry which must depend largely upon matters not apparent upon the face of the ordinance, but existing only in the actual state of affairs in the city.

708. Eleven years after upholding the right of municipalities to charge telecom operators for use of public rights of way, the Supreme Court reaffirmed a point made by both the majority and dissent in *Pensacola Telegraph*. Specifically, in *Western Union Telegraph Co. v. Pennsylvania Railroad Co.*, the Court held that the 1866 Act did not divest a railway owner of its power to exclude a telegraph operator from using its rights of way.

709. In about 1864, Western Union had installed telegraph lines along Pennsylvania Railroad’s right of way between Philadelphia and Jersey City. In September 1881, Western Union and Pennsylvania Railroad had entered into a 20-year contract (superseding all prior agreements) that permitted Western Union’s continued use of Pennsylvania Railroad rights of way for its telegraph lines in consideration of US$ 75,000 in annual rents, payable in monthly installments of US$ 6,250, and the provision of concessionary messaging service for the railroad. The contract came up for renewal in September 1901, and following failed negotiations between the parties over the renewal rental, Pennsylvania Railroad notified Western Union in May 1902 that it was terminating the contract and demanded that Western Union remove its poles and lines within six months.

710. Finding itself suddenly without the necessary land rights for the continued operation of its existing telegraph lines, Western Union brought suit in federal court, relying on the 1866 National Telegraph Act as the primary basis for its claim. Among other allegations, Western Union contended that the lines along the Pennsylvania Railroad were essential to connect its western telegraph offices with the City of New York and that it had no alternative means to do. Because the agreement was meant to expire in September 1901, there was some disagreement between the parties over whether Pennsylvania Railroad had tacitly renewed the agreement by continuing to accept monthly payments from September 2001 through June 1902. Western Union also alleged that Pennsylvania Railroad had refused to renew the contract, and wanted Western Union’s lines removed, because it intended to contract with a competing telegraph company to install its lines

---

though not mentioned in the case syllabus, it appears that Pennsylvania Railroad had received a better offer from Western Union’s competitor for use of its rights of way. In this sense, Pennsylvania Railroad was not withdrawing joint use of its rights of way from the market, but rather was simply offering their continued use to the highest bidder.

711. Speaking for the majority opinion in a 7-1-1 decision, Justice McKenna confirmed that the privileges granted to Western Union under the 1866 Act did not override the property interests of Pennsylvania Railroad in its rights of way:

... The right of way of a railroad is property devoted to a public use, and has often been called a highway, and as such is subject, to a certain extent, to state and federal control, and for this many cases may be cited. But it has always been recognized, as we have pointed out, that a railroad right of way is so far private property as to be entitled to that provision of the Constitution which forbids its taking, except under the power of eminent domain and upon payment of compensation. The right of way of a railroad was recognized as private property in the Pensacola case, and we are brought back to the main question – the interpretation of the Act of July, 1866, and upon that we have sufficiently dilated.

It follows from these views that the act of 1866 does not grant the right to telegraph companies to enter upon and occupy the rights of way of railroad companies, except with the consent of the latter, or grant the power of eminent domain. Nor does the statute of New Jersey make those rights of way public property so as to subject them to such occupation under the provisions of the act of 1866.

It is admitted that the statutes of New Jersey do not confer the right of eminent domain upon the telegraph company.

... On account of those restraints, it may be, and finding no impediment in the rights of property, interstate commerce by telegraph has marched to a splendid development, although in the acquisition of the means for its exercise it has relied on the consent of the owner of private property, or the power of eminent domain conferred by the states. We cannot but feel, therefore, that there is something inadequate in the argument which is based on the apprehension that the Act of July 24, 1866, construed as we construe it, gives a sinister power to railroad companies. It gives no power to those companies but that which appertains to the ownership of their property.

712. Thus, the United States Supreme Court in a series of four cases, including Pensacola Telegraph v. Western Union, St. Louis v. Western Union, Western Union v. Ann Arbor Railroad and Western Union v. Pennsylvania Railroad, had firmly established that state law governs the rights of telegraph operators to access state and municipal public rights of way and to acquire rights over private land by consent of the owner or by eminent domain.

302 Id., 195 U.S. at 542-46.
303 Id., 195 U.S. at 573-75. See also Western Union Telegraph Co. v. Ann Arbor Railroad Co., 178 U.S. 239 (1900).
Introduction of the telephone to the equation

713. The invention and commercialization of the telephone followed closely on the heels of the telegraph, with the first telephone exchange opening in New Haven, Connecticut in 1878.\textsuperscript{304} The United States again played a leading role in the development of the telephone, and related cross-sector infrastructure sharing practices and policies.

714. As was true around the world and has been discussed in Module 1, in the United States telephone lines in local exchanges were typically installed along roadways so they could easily reach customer premises. Early inter-exchange (intercity) telephone lines in the United States were typically co-located with existing telegraph lines along railways, typically using the same poles.

States act to support telephone company use of public and private land

715. As had been anticipated for the telegraph a few decades earlier, proprietors of the telephone required access to public streets and rights of way, and the privilege of eminent domain over private property, to ensure they could construct and operate their networks. Initially, there was no federal law governing the rights and responsibilities of telephone companies, and hence no federal right of eminent domain for them either. Thus, as telegraph companies had, telephone companies looked to state law for the right to obtain involuntary easements over private property when acquiring or perfecting the land corridors to build, operate and maintain their networks.

716. Most states responded to the need to support the development of the telephone as a medium of communication by legislative or judicial extension of statutory rights granted to telegraph companies to telephone companies.

Municipalities begin to regulate the use of public streets

717. Because intra-exchange and inter-exchange telephone lines were initially made of uninsulated wires, they could not share poles with electric distribution lines and could not be buried. As the telephone business grew, the number of aerial lines in public streets proliferated. Telephone companies faced increasing pressure to improve quality of service and reduce the clutter by burying their lines in densely populated areas.

718. As early as 1884, the City of New York had passed a law ordering all utilities – including electricity, telegraph and telephone – to bury their wires. Most utilities ignored the law, saying it was too expensive. Only Edison Illuminating Co. complied. However, following a blizzard in 1888, the City again ordered all utilities to bury their wires. In an order issued by the new mayor on 1 January 1889, the utilities were given 90 days to remove their poles and wires or they would be removed by the City. Compliance was limited.

---

719. As forewarned, in mid-April 1889, the City of New York began sawing down all remaining poles and rolling up and removing the wiring. Within a few months, all the poles and wires had been removed. Reportedly, Western Union had already installed a new set of telegraph lines in conduits, but allowed the City to remove its old poles and wires to avoid the cost of doing so itself.305

Figure 53: Removal of telegraph and telephone poles and lines in New York City in 1889

Insulated telephone cables expand infrastructure sharing options

720. By 1914, it was reported that telephone engineers had designed a new type of cable which contained 2,400 wires capable of serving 1,200 telephone circuits and that the cable could be used in underground ducts with a minimum three-inch diameter. This new cable design was meant to solve overhead congestion issues at local exchanges in dense areas. At about the same time, AT&T had reported successfully completing construction and beginning operations of a buried 430-mile long distance line, using similar cable, from Boston to Washington.307

721. In addition, the railways along which the telegraph lines and inter-exchange telephone lines were installed began to recognize the benefits of supplementing their internal telegraph communications with internal telephone service. This prompted expansion of intercity telephone lines along railways. For example, in 1905, the Lehigh Valley Railroad completed the installation of telephone service by installing telephone lines on telegraph poles along all of its railway lines


from New York City to Buffalo. The railroad also reported so-called composite lines where the same wiring was simultaneously used to transmit both voice and telegraph signals. That same year, the Baltimore & Ohio Railroad reported significant progress in installing telephones along its railway system.308

722. It should be noted that the telegraph did not disappear until long after the telephone was introduced. However, once the telegraph lines were built on all the major routes, there was very little activity which called for further development of infrastructure sharing practices and policies. For example, founded in 1851,309 by 1915 Western Union operated 1.6 million miles of telegraph wires310, largely installed along railways. Although Western Union and competing telegraph companies gradually slowed the pace and eventually stopped installing new telegraph lines after the advent of the telephone, they had covered virtually every railroad line in the interim. The telephone would eventually overtake the telegraph, but not for nearly a century. Western Union did not discontinue its telegram/telegraph service in the United States until 2006. Throughout the United States, one can still see the abandoned telegraph lines in place along many rural railways, standing as monuments to early cross-sector infrastructure sharing.

**Congress passes the first federal telephone legislation**

723. In 1910, the Mann-Elkins Act of 1910 amended the Interstate Commerce Act of 1887 to include interstate “telegraph, telephone and cable companies (whether wire or wireless) engaged in sending [interstate] messages” as common carriers.311 These amendments required the rates of these carriers to be “just and reasonable.”312 The Interstate Commerce Commission, a regulatory body initially established under the Interstate Commerce Act to regulate railroads, was given jurisdiction to investigate complaints order carriers to comply with the Act.313 These amendments were eventually superseded by the Communications Act of 1934. However, neither the Mann-Elkins Act or, as initially enacted, the Communications Act made any provision for telecommunications companies to have access to land corridors or to improvements and fixtures in those corridors. Land rights and access to cross-sector infrastructure were thus left to be dealt with as matters of state law only.

**Voluntary sharing of poles by electric utilities and telephone companies**

724. Following the introduction of insulated telephone cables, the tradition of voluntary infrastructure sharing by telephone companies in the United States extended from railways, roadways and telegraph companies to include electricity utilities. Voluntary utility pole sharing between electric utilities and local telephone companies can be traced back to the early 1900s. This development of telephone companies and electric distribution utilities voluntarily sharing poles came into practice after the use of insulated telephone cables reduced the risk of induction

---

312 Ibid.
313 Id. at §12.
or contact between uninsulated telephone wires and energized electricity lines. A strong affinity between telephone companies and electric utilities ensued.

725. The need to address safety and reliability issues arising from the systematic and pervasive sharing of utility poles by electric utilities and telephone companies quickly led to the development of common industry safety standards for joint use of poles. In 1914, to address the growing practice of pole sharing, the National Bureau of Standards prepared the first National Electrical Safety Code (NESC) for ensuring safety and reliability in joint use of poles. The NESC has to this day remained the standard which “sets the ground rules for practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. It contains the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions.”\(^{314}\) The NESC became a consensus-based standard in 1960, and has since 1972 been administered by the Institute of Electrical and Electronics Engineers (IEEE), periodically being updated and improved to reflect new technologies for power and telecommunications and improved experience-based safety practices.

726. Without any federal or state legal or regulatory compulsion to do so, electric utilities and telephone companies continued voluntarily sharing poles used to support electricity distribution lines and telephone lines throughout the remainder of the 20\(^{th}\) Century. Even the passage of the comprehensive Communications Act in 1934, which transferred federal authority over interstate telephone services from the Interstate Commerce Commission (under the Mann-Elkins Act) to the newly formed FCC, did not mandate or regulate the sharing of poles or other cross-sector infrastructure.

727. From the early days of both businesses until 1996, nearly all electric utilities and telephone companies were regulated monopolies subject to similar ratemaking proceedings (which were, in most states, applied by the same regulator, often known as a public service commission or public utilities commission). Both electric utilities and telephone companies found sufficient benefit to engage in comprehensive joint use of poles even though it required significant coordination and added to the cost of each company in servicing its poles. They did this because it reduced the potential for conflict between separate lines installed in the same corridors (primarily along roadways) and because it reduced the capital required for each to extend its lines into new coverage areas. Because they were similarly situated and regulated monopolies, each requiring and assured of recovery of costs prudently incurred, they were content with a simple cost-sharing arrangement and did not seek to profit from providing pole access.

728. The typical pole sharing arrangement between an electric utility and a telephone company would be established in a pole attachment agreement with symmetrical terms in which both parties were pole owners and pole users. These standard pole attachment agreements provided for each party annually to pay the other for half of the average annual carrying costs of all jointly used poles owned by the other party. Because both parties owned some poles used by the other, there was also a netting arrangement whereby the amounts owed by each party to the other were netted and the party with the larger liability to the other paid the net amount. While electric utilities typically owned more jointly used poles than telephone companies, both owned significant numbers, with telephone companies owning as many as a third of all jointly used poles in some geographic areas.

Electric and telephone companies voluntarily share poles with CATV operators

729. The advent of cable television in the United States in the late 1940s brought the need to accommodate a third wire (or set of wires) to each customer premises. At the time, there was no competition between cable television and telephone, so all three wire owners (electric, telephone and cable) did not compete with each other and could in principle compatibly share the same poles on a voluntary basis in the same way that electric utilities and telephone companies had shared poles. Indeed, they did share poles, voluntarily. As noted by the Eleventh Circuit Court of Appeals in *Gulf Power Co. v. FCC*:

> From its inception, the cable television industry has attached its cables to the utility poles of power and telephone companies. They have done so because factors such as zoning restrictions, environmental regulations, and start-up costs have rendered other options infeasible. Despite this dearth of alternatives, the attachment agreements between cable television companies and utility companies have generally been voluntary.

730. The prevailing practice of electric utilities and telephone companies had been to charge cable companies *make ready costs* plus an annual rental equal to one third of the carrying cost of the pole (including the incremental carrying costs incurred due to the presence of three attachers). Thus, with the exception of the one-time recovery of costs for modifying poles and installing cables, the annual rents charged by utilities were generally calculated in a similar manner to those which had been charged by electric utilities and telephone companies to each other.

731. Notably, from their entry into the market until 1984, cable television operators often enjoyed a *de jure* monopoly over the provision of cable television service in their service territories under the franchises awarded to them by municipalities authorizing the use of public streets. In any event, they almost always enjoyed a *de facto* monopoly because no cable operator was willing to overbuild another cable operator’s system. These franchise agreements also authorized cable companies, if they wished, to install their own poles or ducts. Nonetheless, the cable television operators opted to share existing utility poles, at the rates offered by the electric utilities and telephone companies, because that was less expensive than their other options.

---

315 *Gulf Power Co. v. FCC*, 208 F.3d 1263 (11th Cir. 2000).
Congress regulates utility pole sharing with cable television companies

732. Cable operators, through a well-organized trade association, continued to complain that the rates charged by pole owners who accommodated their attachments were excessive and they sought relief from Congress. “In response to arguments by cable operators that utility companies were exploiting their monopoly position by engaging in widespread overcharging, Congress in the Pole Attachments Act authorized the FCC to fill the gap left by state systems of public utilities regulation.” 317 The so-called Pole Attachment Act was enacted by Congress as part of the Communications Act Amendments of 1978, which added a new section 224 to the Communications Act of 1934. 318 Its passage marked the beginning of federal regulation of cross-sector infrastructure sharing in the United States.

As originally enacted, the Pole Attachment Act had a relatively narrow application, authorizing and directing the FCC to regulate the rates, terms and conditions for cable television attachments to electric and telephone utility poles. While articulated through a relatively complex set of nested definitions, the intended beneficiaries of the regulation were limited to owners of cable television systems, and the intended regulated entities were limited to investor-owned electric utilities and telephone companies, referred to as “utilities” in the Act.\(^{319}\) On its face, the 1978 Act did not require a utility to grant a cable company access to its poles, but regulated the terms of access and rates if it did. As a practical matter, however, because all cable companies had already installed extensive attachments to electric and telephone poles under the existing voluntary arrangements, the utilities were left to choose between the unacceptable public relations option of ejection those cable companies from their poles or succumbing to the new regulated rates.

Two features of the 1978 Pole Attachment Act are noteworthy. First, a reverse state-preemption provision declared the Act’s regulation of pole attachment rates, terms and conditions inapplicable “in any case where such matters are regulated by a State.”\(^{320}\) Any state relying on this exemption was required to certify to the FCC that it regulated pole attachment rates, terms and conditions, and that, in doing so, it considers the interests of cable television subscribers as well as electricity and telephone customers. This provision clearly reflected one of the many idiosyncrasies of the U.S. federal system, in its deference to the prerogative of states to regulate such matters, but it also had significant impact on the continuing development of practices and policies for cross-sector infrastructure sharing in the United States. In reliance on the Pole Attachment Act’s deference to state sovereignty, a significant number of states elected to continue (or begin) regulating pole attachments themselves.\(^{321}\) This has led to multiple threads of law and regulatory policy which are not necessarily harmonized across the United States.

Second, the Act prescribed, for an initial five-year period, a mandatory range within which pole attachment rates would be considered “just and reasonable.” The minimum just and reasonable amount was a rate which “assures the utility the recovery of not less than the additional costs of providing pole attachments.” This floor effectively only allowed the pole owner to recover make ready costs. These may include such items as the initial capital expenditures, if any, to make the pole ready for attachments, such as rearranging existing attachments to create space or avoid interference between attachments and strengthening the pole or its supports to handle the extra load. It would also include any ongoing increase in operation and maintenance costs, such as increased time for work crews in changing out damaged or aging poles. In short, the pole owner was not allowed to recover any of its sunk capital costs or existing operations and maintenance expenses from the attacher. Put another way, the pole owner would receive no compensation for use of its poles but simply an indemnity of any additional costs incurred by allowing use of them.

\(^{319}\) The Act required the FCC to “regulate the rates and terms and conditions for pole attachments.” A “pole attachment” is defined as “any attachment by a cable television system to a pole duct, conduit or right-of-way owned or controlled by a utility.” “Utility” is defined as “any person whose rates or charges are regulated by the Federal Government or a State and who owns or controls poles, ducts, conduits, or rights-of-way used, in whole or in part, for wire communication” and expressly excludes “any railroad, any person who is cooperatively organized, or any person owned by the Federal Government or any State.” Pub. L. 95-324, sec. 6, text of sec. 224(a)(1), (a)(4) & (b)(1).

\(^{320}\) Pub. L. 95-324, sec. 6, text of sec. 224(c)(1).

\(^{321}\) As of 2000, 18 states or territories had self-certified to the FCC that they regulated pole attachments. These included Alaska, California, Connecticut, Delaware, District of Colombia, Idaho, Illinois, Kentucky, Louisiana, Maine, Massachusetts, Michigan, New Jersey, New York, Ohio, Oregon, Utah, Vermont and Washington.
It was clearly an unsustainable rate if the pole owner were not otherwise compelled to install and maintain poles for its own business.

736. The maximum just and reasonable rate was “an amount determined by multiplying the percentage of the total usable space . . . which is occupied by the pole attachment by the sum of the operating expenses and actual capital costs of the utility attributable to the entire pole.” This formula, if applied to the sharing arrangements between the electric utilities and telephone companies, would have deemed the rates they had charged each other for 70 years to have been unjust and unreasonable. This is because the traditional sharing formula was based on dividing total costs between the actual number of pole users (two when it was only electric and telephone, and increasing to three when cable was added). The maximum rate permitted under the Pole Attachment Act, on the other hand, was based on the maximum theoretical number of pole users, rather than the actual number. Thus, if a pole could accommodate six attachers, then the cable company could only be required under the formula to pay a maximum of one-sixth of the total costs, rather than one-third, even if there were only three attachers.

737. The 1978 Pole Attachment Act directed the FCC to promulgate its regulations within 180 days after 21 February 1998, the date of enactment. On 8 August 1998 the FCC, in the first of a series of orders, adopted regulations defining a just and reasonable rate in the same way as the statute.\textsuperscript{322} The FCC subsequently interpreted the statute to provide that when it acts to reduce the contract rate for pole attachments, it will only reduce to the maximum rate allowed under the statute, i.e., the recovery of fully allocated cost, including the actual cost of capital.\textsuperscript{323}

738. Although municipal utilities were excluded from the definition of “utility” under the Pole Attachment Act, and thus not subject to regulation of pole attachments, they are nonetheless subject to some federal regulation of their pole attachment practices. In particular, the federal Communications Act of 1934 prohibits local governments from creating barriers to entry and are required to manage public rights of way on a competitively-neutral and non-discriminatory basis.\textsuperscript{324} Local government practices in respect of pole attachments therefore may potentially be subject to challenge by an aggrieved person before the FCC or the courts if they constitute unreasonable or discriminatory barriers to entry.

739. As initially enacted, section 224 applied to not only to attachments to utility poles, but also applied (and continues to apply) to any “duct, conduit or right of way controlled by a utility.” Notwithstanding the listing of these additional infrastructure types, which appear to have been added to the bill at the last minute, section 224 was in practice primarily intended and applied to regulate attachments of coaxial cable television cable and associated equipment to electric and telephone company utility poles. Because the electric utilities and telephone companies generally did not own the rights of way in the last mile streets where the cable companies sought access, the provision regulating access to rights of way was superfluous. Similarly, because cable companies operated predominantly in suburban and rural areas in 1978, where almost all electric and

\textsuperscript{322} 68 FCC 2d 1585. The new 47 USC §1.409 adopted by the FCC in this First Report and Order states that a rate is just and reasonable “if it assures a utility the recovery of not less than the additional costs of providing pose attachments, nor more than an amount determined by multiplying the potential percentage of the total usable space, or the percentage of the total duct capacity, which is occupied by the pole attachment by the sum of the operating expenses and actual capital costs of the utility attributable to the entire pole, duct, conduit, or right of way.”


\textsuperscript{324} 47 U.S.C. §253.
telephone facilities were installed above ground on poles, the provisions regulating access to existing electric and telephone ducts and conduits were also superfluous. However, these seemingly dormant clauses of the Pole Attachment Act would become more relevant over time, and the FCC would eventually begin to exercise its authority to regulate the use of ducts (and conduits) and rights of way.

740. In the ensuing years after passage of the 1978 Act, Congress made some relatively minor adjustments to the Pole Attachment Act. First, in 1982, prior to the expiration of the five-year sunset of the prescribed range of just and reasonable rates, Congress repealed the sunset provision in the Communications Amendments Act of 1982.\footnote{Pub. L. 97-259, title I, §106, Sept. 13, 1982, 96 Stat. 1091.} This extended the statutory rate floor and ceiling indefinitely. Second, in 1984, Congress amended section 224(c), in the Cable Communications Policy Act of 1984, to restrict the ability of states to reverse-preempt FCC regulation of pole attachment rates where they had not issued effective rules and regulations to implement their authority or had failed to act on complaints within a timely manner.\footnote{Pub. L. 98-549, §4, Oct. 30, 1984, 98 Stat. 2801.}

741. However, the more significant aspect of the Cable Communications Act of 1984, insofar as cross-sector infrastructure sharing was concerned, was its introduction of competition in cable television by prohibiting municipalities and states from granting exclusive franchises and its deregulation of cable television rates.

Litigation over federal regulation of pole attachment rates

742. Section 224 required the FCC to regulate the rates and terms and conditions of attachments and to ensure that they were “just and reasonable.” Utilities could only recover a portion of the expenses and capital costs attributable to the pole, duct, conduit or right of way. This portion would equal the percentage of “usable space,” or space which could be used for attachments, occupied by the cable television operator’s attachment.

743. Both electric utilities and telephone companies believed the pole attachment fees permitted by the FCC in interpreting the Pole Attachment Act were highly skewed toward the cable television operators. The electric utility or telephone company could only recover the portion of usable space actually used by the cable television operator. If the usable space could accommodate more attachments, the costs of these were borne entirely by the utility or telephone company.

In 1986, following a heavy period of litigation before the FCC and the lower federal courts, Congress’s authority to mandate pole sharing with cable companies and the adequacy of the compensation allowed by the FCC to the regulated utilities were finally addressed by the United States Supreme Court in FCC v. Florida Power.\footnote{Florida Power Corporation, 480 U.S. 245.} In that case, the Court reviewed the decision of a lower court that the FCC’s regulation of pole attachment rates was a confiscatory taking of property in violation of the US Constitution. The Court noted that:\footnote{FCC v. Florida Power Corporation, 480 U.S. at 247-248.}

The Pole Attachments Act . . . was enacted by Congress as a solution to a perceived danger of anticompetitive practices by utilities in connection with cable television service. Cable television operators, in order to deliver television signals to their subscribers, must have a physical carrier for the cable; in most instances underground installation of the necessary
cables is impossible or impracticable. Utility company poles provide, under such circumstances, virtually the only practical physical medium for the installation of television cables. Over the past 30 years, utility companies throughout the country have entered into arrangements for the leasing of space on poles to operators of cable television systems. These contracts have generally provided for the payment by the cable companies of a yearly rent for space on each pole to which cables were attached, the fixed costs of making modifications to the poles and of physical installation of cables being borne by the cable operators. In many States the rates charged by the utility companies for these attachments have not been subject to regulation.

In response to arguments by cable operators that utility companies were exploiting their monopoly position by engaging in widespread overcharging, Congress in the Pole Attachments Act authorized the Federal Communications Commission to fill the gap left by state systems of public utilities regulation.

744. The Supreme Court’s reference to utility companies “exploiting their monopoly position” is understood as referring to their dominance over poles capable of joint use and not their enfranchised monopolies as electric distribution utilities and local telephone companies.

745. The Court ultimately overturned the lower court ruling and determined that the Act was not in violation of the US Constitution as it did not mandate access, it only regulated the price. Utilities were free to deny cable companies’ requests for attachments or terminate or refuse to renew existing attachment arrangements. In addition the Court found that it could not “seriously be argued” that the “recovery of fully allocated cost, including the actual cost of capital, is confiscatory.”

746. As to the propriety of ex ante regulation, the Florida Power ruling accords with currently accepted international best practices. This is based on the premise that poles are essential facilities and that pole owners have a dominant market position. However, rather than being hard-coded in the law, the authors of this toolkit believe this determination ought to be a question periodically revisited by the FCC through a market assessment. This would allow the FCC to adjust its level of regulation based on the evolution of market conditions, which is today considered best practice for telecom regulators.

747. As to the level of compensation, however, it is hard to square the FCC’s formula, as approved by the Supreme Court, with accepted best practice for ensuring there are no mandated cross subsidies. As discussed above, the electric utility or telephone company could only recover the portion of usable space actually used by the cable television operator even if usable space could accommodate more attachments. Accordingly, despite the Court’s decision, on their face, the rates allowed by the FCC formula appear to be confiscatory.

Congress extends regulated pole access right to telecom operators

748. The regulation of pole attachments was eventually extended to reach all telecommunications operators in the Telecommunications Act of 1996, and corresponding state legislation, and

The Telecommunications Act of 1996 introduced competition in local telephone services. To ensure new entrants in the liberalized telephone market had access to sharable infrastructure, Congress revisited and enlarged the scope of the Pole Attachment Act. It extended the benefits of section 224 beyond cable television operators to include all “telecommunications carriers.” However this term was defined to expressly exclude incumbent local exchange carriers (ILECs). It also expanded the obligations of utilities beyond just and reasonable rates to mandatory “non-discriminatory access to any pole, duct, conduit, or right-of-way owned by it,” except in limited circumstances.

Under the expanded section 224, the FCC initially applied a different rate formula to telecom attachments than for cable attachments. Unlike the cable attachment rate, the telecom rate took into account the costs of “unusable” space on the pole, i.e., space which cannot be used for attachments, for example due to low height. This resulted in higher telecom attachment rates than cable attachment rates. In addition, the FCC in separate regulatory proceedings under the Communications Act of 1934 adopted the position that Internet access was neither a telecom service (which fetched the higher pole attachment rate) nor a cable service (which fetched the lower pole attachment rate), but instead an information service (the pole attachment rates for which were not regulated).

As both telephone companies and cable companies began to offer Internet, this created unanswered questions about the regulatory status of their pole attachments. This disparity, coupled with convergence in the industry, engendered numerous legal and regulatory controversies that continue today after nearly two decades. It has been criticized as an unnecessary subsidy to a now robust cable television industry at the expense of electricity rate payers. In addition, the provision of broadband Internet and other telecommunication services by cable television operators has raised questions about how to apply these rate formulas to cable television operators.

In 2002, the United States Supreme Court addressed the application by the FCC of cable rates to attachers which provided by cable television and high-speed Internet services in National Cable & Telecommunications Association v. Gulf Power Company. Leading up to the case, the FCC determined that such attachments were still considered attachments “by a cable television system” and therefore subject to regulation by the FCC under the Act. The Supreme Court agreed with the FCC’s statutory interpretation and found it to be reasonable, overruling a lower court. The Court noted that its interpretation was more sensible as a matter of policy:

This result is more sensible than the one for which respondents contend. On their view, if a cable company attempts to innovate at all and provide anything other than pure television, it loses the protection of the Pole Attachments Act and subjects itself to monopoly pricing. The resulting contradiction of longstanding interpretation – on which

---

332 47 USC §224(a)(5)
333 47 USC §224(f)
335 Gulf Power Company, 534 U.S. 327 at 331-332.
cable companies have relied since before the 1996 amendments to the Act — would defeat Congress’ general instruction to the FCC to “encourage the deployment” of broadband Internet capability and, if necessary, “to accelerate deployment of such capability by removing barriers to infrastructure investment.” . . . This congressional policy underscores the reasonableness of the FCC’s interpretation: Cable attachments providing commingled services come within the ambit of the Act.

753. Even following Gulf Power, the convergence issues were further complicated as both telephone companies and cable companies began offering triple-play telephone, Internet and television programming such that they were direct competitors across all services offered, differentiated only in the technology they used but not the services they offered. There was increased pressure on the FCC to bring all pole attachment rates in line to a single rate for all communications attachers.

754. Most commentators and industry participants eventually expected the FCC to raise the cable rate to the telecom rate. However, in a surprising move in November 2015, the FCC reduced the telecom rate to the cable rate and added ILECs to the list of beneficiaries of the new uniform lower rates. This move restored competitive neutrality among telecom operators but also, so the electric utilities have contended, expanded the scope of the mandated cross-subsidy provided by electric utility customers and shareholders to telecommunications and cable customers and shareholders.

755. With permanently subsidized rates for pole attachments by all telecommunications attachers, electric utilities are now the only market participants who can afford to invest in poles. This is only because they are guaranteed a rate of return on their investment through their electricity tariffs. The potential eventually to move aerial infrastructure into ducts would seem therefore to have been permanently suppressed. Because they do not bear anywhere near the proportionate cost of the infrastructure they are using, all attachers to electric utility poles have no incentive to contribute toward a joint investment in a shared duct system as this would increase their costs. This is but one of many economic distortions of the market and of potential improvements in infrastructure which have flowed from the current regulation of pole attachment rates in the United States.

FCC extends pole attachment regulation to include wireless attachments

756. In Gulf Power, the Supreme Court also addressed whether wireless attachments, i.e., those used by wireless carriers, would be subject to the Pole Attachment Act. The Court held that such wireless attachments were pole attachments under the Act. The Court acknowledged that it relied on an entirely textual interpretation of the term “associated equipment” under the statute and the reasoning was divorced from a sensible economic analysis338.

Respondents must demand a distinction between prototypical wire-based “associated equipment” and the wireless “associated equipment” to which they object. The distinction, they contend, is required by the economic rationale of the Act. The very reason for the Act is that -- as to wires -- utility poles constitute a bottleneck facility, for which utilities could otherwise charge monopoly rents. Poles, they say, are not a bottleneck facility for the siting of at least some, distinctively wireless equipment, like antennas. These can be located anywhere sufficiently high.

The economic analysis may be correct as far as it goes. Yet the proposed distinction -- between prototypical wire-based “associated equipment” and the wireless “associated equipment” which allegedly falls outside of the rationale of the Act -- finds no support in the text, and, based on our present understanding of the record before us, appears quite difficult to draw. Congress may have decided that the difficulties of drawing such a distinction would burden the orderly administration of the Act. In any event, the FCC was not unreasonable in declining to draw this distinction; and if the text were ambiguous, we would defer to its judgment on this technical question.

757. As the Court appeared to acknowledge, in the case of wireless attachments, there is no evidence that utility poles are essential facilities (as they are in the case of wired cable television attachments) or that pole owners are in a dominant market position to justify ex ante regulation. In that sense, the Court’s decision to allow such an expansive reading of the statute, as well as the FCC’s decision to pursue ex ante regulation of wireless attachments, appear to be wrong both as a matter of economics and law.

Proliferation of telecom operators reopens debate over land access policy

758. The introduction of competition in local access networks initially resulted in public policy and legal questions about whether multiple competing service providers ought to severally have the powers of eminent domain. Generally, the answer has been yes.

759. However, the use of eminent domain in private development projects has stirred public outrage in some parts of the country. Although telecommunications are not typically the focus of this outrage, the overall sentiment has prevented state legislators from updating state eminent domain laws to the benefit of telecommunications operators.

760. Also, with the proliferation of telecommunications use of existing rights of way, private land owners have increasingly objected to the expansion of such granted rights to include telecommunications. Although telecommunications operators may obtain consent from a utility to use its existing rights of way through private land, such use may exceed the rights granted by the underlying owners of the land. For example, the use of railway rights of way for buried fiber optic cable has been the subject of extensive litigation over scope of rights to use easements throughout the United States for nearly two decades. As one court described the circumstances:

This case concerns Maine’s part in a nationwide phenomenon in which telecommunications companies bargained with railroads for the right to place fiber optic cables through rights of way owned by the railroads. In the 1990s, owners of property underlying the railroads’ rights of way began taking action against what they perceived to be trespass by the telecommunications companies on their property. Whether or not there was a trespass was informed by the grant of rights to the railroads, which often did not include a right to use the right of way for non-railroad purposes. In some cases, the right of way may have even lapsed through disuse and all rights once owned by the railroad may have reverted to the owners of the fee underlying the right of way. . . Decades of litigation

in numerous jurisdictions involving various railroads and telecommunications companies ensued.

9.3.3 **Examples of modern cross-sector infrastructure sharing experiences**

Some of the most successful telecommunications networks in the United States can be traced to early deployment of telecommunications equipment on existing infrastructure from other sectors. Other initiatives have not led to the same level of commercial success, but have demonstrated the potential for collaborative activity involving infrastructure sharing. The following are a sample of noteworthy cross-sector sharing businesses and projects in the United States in recent years.

*Sprint Corporation*

761. Sprint Corporation (Sprint) is a global telecommunications company providing mobile and fixed voice and data services. At the time of writing, Sprint is the fourth largest mobile operator in the United States.\(^{340}\) Cross-sector infrastructure sharing utilizing railway rights of way is a critical part of Sprint’s history.

762. Sprint traces its origins to the Brown Telephone Company, founded in 1899 by Cleyson Brown in Kansas.\(^ {341}\) However, a critical moment in the evolution of Sprint’s network came in 1983 when its predecessor, GTE Corporation (GTE) acquired Southern Pacific Communications Corporations (SPCC) to form GTE Sprint Communications.\(^ {342}\)

763. SPCC was a division of the Southern Pacific Railroad, a major railroad system in the Southwestern United States founded in 1865 that eventually grew to encompass over 13,000 miles of rail.\(^ {343}\) The Southern Pacific Railroad initially installed telegraph wires on poles along its tracks, enabling dispatchers to monitor trains and communicate with train engineers.\(^ {344}\) This system was updated to carry voice communications, including the installation of switches and multiplexing equipment, and eventually became a sprawling long-distance network.\(^ {345}\)

764. SPCC was formed in 1970 to commercialize excess capacity on Southern Pacific Railroad’s fiber network, which employees referred to internally as “Southern Pacific Railroad Internal Network Telecommunications (SPRINT).”\(^ {346}\) As a result of regulatory changes allowing access to local exchanges, SPCC began providing long distance services in the late 1970s and by 1981 had 200,000 customers and was handling 60,000 long-distance calls per day.\(^ {347}\)

---


\(^{344}\) Funding Universe, “Sprint Corporation History.”

\(^{345}\) *Id.*


\(^{347}\) Ibid.
In 1983, GTE acquired SPCC (and the SPRINT name) to expand its existing network.\textsuperscript{348} While the aging copper line network had been functionally replaced by a more economical microwave system, GTE was more attracted to the lateral corridors on the railway’s rights of way which connected major cities.\textsuperscript{349} Access rights to these corridors was therefore included in the package of rights acquired with SPCC from Southern Pacific Railroad. In accordance with this plan, the new GTE Sprint Communications completed the installation of fiber optic cable along the routes started by SPCC.\textsuperscript{350} By 1988, the network was entirely fiber.\textsuperscript{351} GTE eventually spun off its long distance network from its access networks, and the spun off entity’s name was shortened to SPRINT.

\textit{Williams Telecommunications Systems, Inc.}

In the early 1990s, Williams Telecommunications Systems, Inc. (WilTel), a subsidiary of The Williams Companies, Inc., was the fourth largest long distance carrier in the United States.\textsuperscript{352} The success of WilTel can be traced back to cross-sector infrastructure sharing with petroleum pipelines.

Brothers S. Miller Williams, Jr. and David Williams founded a construction business in 1908 which later grew into a leading global pipeline engineering and construction firm.\textsuperscript{353} In 1985, WilTel began retrofitting decommissioned petroleum pipelines with fiber optic cable.\textsuperscript{354} By 1989, WilTel had approximately 11,000 miles of fiber optic cables, the fourth largest fiber network in the United States.\textsuperscript{355} The shielding provided by the pipelines helped make the network more reliable than those of most competitors.\textsuperscript{356}

In 1995, WilTel sold the long distance portion of its telecommunications business to Long Distance Discount Service, which eventually became WorldCom and then MCI WorldCom.\textsuperscript{357} WilTel’s parent company retained a small portion of its fiber optical cable which it transferred to another subsidiary. A new WilTel subsidiary emerged in 1998 focusing on wholesale markets and this business was acquired by Level 3 Communications Inc. in 2005.\textsuperscript{358}

\textit{Major electric utility successfully employs 3 different business models}

Southern Company is the largest public utility holding company in the United States, and is regulated under the federal Public Utility Holding Act of 1940 (PUHCA). It conducts a vertically integrated electricity supply business, engaging through its subsidiaries in electric power generation, electric transmission and distribution, and retail sales of electricity.

\textsuperscript{348} Funding Universe, “Sprint Corporation History.”
\textsuperscript{349} Ibid.
\textsuperscript{350} Ibid.
\textsuperscript{351} Ibid.
\textsuperscript{353} Ibid.
\textsuperscript{354} Ibid.
\textsuperscript{355} Ibid.
\textsuperscript{356} Ibid.
\textsuperscript{357} Ibid.
generation, transmission and distribution. It is entirely investor-owned and traded on the New
York Stock Exchange. Southern Company’s operating subsidiaries engaged in the electricity
business are also regulated at the federal level by the Federal Energy Regulatory Commission and
at the state level by the Public Service Commissions in Alabama, Florida, Georgia and Mississippi.

770. Southern Company conducts its electricity transmission business through Alabama Power
Company, Georgia Power Company and Gulf Power Company. These operating companies have
over 43,000 km of electric transmission lines and 3,700 substations with a service territory of over
310,000 km².

771. Beginning in the early 1990s, Southern Company’s chief information officer began pursuing
a strategy whereby Southern Company would seek to retrofit fiber optic cable on its entire electric
transmission grid by partnering with telecom operators under the hosting model described in
Module 1. Under these arrangements, the telecom operators would pay for the installation of fiber
optic cable on existing electric transmission lines in exchange for the rights of use of a specified
number of fiber pairs in the new fiber, provision of dark fiber to Southern Company for internal
use and payment of cash compensation. As a result of these transactions, Southern Company’s
operating subsidiaries gradually began amassing a large footprint of excess dark fiber capacity on
the electric transmission grid.

772. Under PUHCA, which had originally been enacted to curb excessive risk taking by public
utility holding companies which was perceived as contributing to the Great Depression, public
utility holding companies and their subsidiaries were generally prohibited from entering into new,
non-core lines of business without the express permission of the federal Securities and Exchange
Commission. As part of the Telecommunications Act of 1996, Congress partially repealed the
PUHCA prohibition on public utility holding companies, expressly authorizing (and encouraging)
them to enter the telecommunications sector through separately incorporated subsidiaries formed
especially for that purpose.

773. Exercising this new authority under the 1996 liberalization of the telecommunications sector,
Southern Company formed Southern Telecom, Inc in 1997 as a wholly owned subsidiary to
commercialize excess dark fiber on the transmission grid and to pursue related “partnerships” with
telecom operators. During the ensuing years, Southern Telecom and its electric utility affiliates
planned and executed multiple partnerships with major telecom network operators for joint build-
outs and shared use of fiber optic cables on the electric transmission lines of Southern Company’s
operating subsidiaries. These included aerial fiber installed in the transmission lines as OPGW
and fiber buried in the transmission rights of way. Southern Telecom’s counterparties included
AT&T, BellSouth, Level 3 and other regional and national telecom operators. Through this
process, Southern Company and its operating subsidiaries were able to develop an internal
backbone telecom network connecting all its major facilities in four states with a zero capital
budget. In addition, through Southern Telecom, the Southern Company group has been able to
generate significant upfront and recurring revenues from commercial exploitation of its excess
dark fiber and excess capacity in lit fiber.

774. Today, following the dark fiber model discussed in Module 3, Southern Telecom offers
wholesale dark fiber and co-location space to telecommunications operators throughout the
Southern Company service territory as well as in the service territory of other electric utilities in
southern Florida. Its fiber network has over 1,300 route miles of backbone between the larger
metropolitan areas in Alabama, Florida and Georgia, plus numerous spurs from the backbone to smaller cities.  

775. Like all electric utilities, the operating subsidiaries of Southern Company required a robust wireless network with coverage in all areas where the electric utilities had facilities. Until recently, Southern Company had used wireless mobile radios with wide area coverage and its facilities required upgrading or replacement to meet the growing needs of its line crews. The company studied its options and determined that it could not rely on existing and then-planned network coverage from one of the commercial mobile radio service providers. Instead, Southern decided to build its own cellular network with redundant and robust systems. The original technology deployed was Motorola iDEN, and included handset features such as push-to-talk and group call as well as integration with the PSTN. It procured the new network through a separate wholly owned subsidiary, Southern Communications Services, Inc., which applied for and received a wireless license from the FCC.

776. After completing its wireless network, Southern Company decided to have Southern Communications, trading under the name SouthernLINC® Wireless, commercialize excess capacity on the wireless network as a retail wireless network operator. SouthernLINC® launched service as a public telecommunications network operator in February 1996. The target customers have similar needs as utility line crews, the need to communicate while mobile, often in remote locations where coverage on other commercial wireless networks is poor, the need for extremely reliable service, and group coordination and speed features such as push to talk and group call. The customer base includes emergency fire and ambulance services operated by municipal governments and private operators, mobile businesses and trades, and others.

777. During the ensuing years, SouthernLINC® has continued to modernize its network to include state-of-the-art technology. In an unprecedented move by an electric utility, however, the company in mid-2015 announced plans to upgrade its network to 4G/LTE over its entire coverage area in three stages, with completion expected by mid-2018. As was the original construction of the network, the upgrade is being driven by core electric utility business needs. According to Southern Company, its operating subsidiaries have thousands of devices in use across the existing iDEN network, utilizing either wireless voice or data communications. As a result, data needs continue to grow, specifically in the areas of network monitoring and control. In addition, because most homes and businesses throughout Southern’s service territory have smart meters, an encrypted LTE network can provide security when accessing data. Similarly, because a significant portion of Southern’s power distribution is managed digitally, other important benefits of constructing an LTE wireless network are the capability to guarantee a data priority level for utility data and the ability to keep that data secure.

778. At the same time, the network upgrade will continue the attractiveness of SouthernLINC®,s commercial services offered to the public. The new 4G/LTE Advanced network will increase company’s already strong history of reliability. Businesses and local government in Southern’s service area will have the opportunity to transmit vital data across our new high-speed, highly reliable and encrypted LTE network. The new 4G/LTE Advanced network will offer end-to-end

network encryption over the air and from SouthernLINC®’s towers to the network’s core data centers, a level of security which Southern says is not currently provided by its competitors. In addition, the company is beefing up emergency backup power capabilities with hydrogen fuel cell technology at key locations and is adding main power and core data center redundancy to increase the reliability of the new network. Southern is positioning its network as a strong option for companies and local governments looking for ways to transmit data as securely as possible. As of January 2016, SouthernLINC® had extremely good coverage in its service territory and, when the new 4G/LTE network is complete, will offer the same level of wireless broadband coverage.

Figure 55: SouthernLINC® Wireless coverage map (circa February 2017)

779. In the early 2000s, numerous electric utilities in the United States carried out broadband over power line (BPL) technology trials and some implemented small-scale commercial networks. To succeed commercially, this new technology required a concerted effort of stakeholders from the electric utility and telecom sectors, as well as from the nascent equipment vendor industry. Several electric utilities surveyed existing industry associations and coalitions and concluded that none was inclined or suitably organized to lead this effort. They therefore began an informal discussion group with representatives of five major US electric utilities and representatives of telecom operators, equipment vendors and other stakeholders. These discussions led to the formation of

the Power Line Communications Association, which later changed its name to the Broadband over Power Line Industry Association (BPLIA). The BPLIA’s mission was to promote a dialogue leading to mutually acceptable terms of engagement between electric utilities and telecom network operators, as well as to serve as a focal point for the nascent industry in advocating for a favorable regulatory environment, developing standards, and serving as a knowledge resource for stakeholders.

780. BPL was introduced to provide competition with DSL and cable modem service as a last-mile access network solution to support delivery of broadband Internet to residences and small businesses. BPL used existing shielded and unshielded electric power distribution lines as wave guides for high frequency radio transmission which could be used to carry packet-switched data using Internet protocol. The core technology was similar to both DSL and cable modem in using an electrical conductor as a wave guide. Due to the configuration of electricity distribution networks, BPL was more like cable modem in that it was a broadcast using signal routers to extract data rather than routing directly to the customer premises. The advantages of BPL over DSL and cable modem was the ubiquity of power distribution lines, connecting to virtually every premises in the United States, and the ability to use the premises electrical wiring to deliver Internet access at every electrical outlet in a connected building. The disadvantages of the technology were the high noise levels in electrical wiring (compared to telephone and cable), which caused interference and required expensive technology fixes. Because aerial power distribution lines are unshielded and uninsulated, there was also considerable concern about the possibility of leakage of BPL signals causing interference with radio communications. Amateur radio operators were particularly vocal in opposition to BPL.

781. From its inception in 2002 until the board decided to wind it up in 2007 because the new technology had been overtaken by other technology developments and changes in market conditions, the BPLIA provided vital leadership for the BPL industry in the United States. Among other things, the BPLIA undertook regulatory advocacy efforts which were quite successful. In October 2004, the FCC proposed rules to facilitate the deployment of BPL, and allowed experimental deployments pending adoption of its final rules. Notwithstanding vocal objections from amateur radio operators during the rulemaking proceedings, the FCC viewed the introduction of BPL as vital to attracting investment in competing broadband technologies and networks. The FCC’s proposed rules did require BPL providers to investigate and correct any interference they cause. In August 2006, the FCC adopted a final memorandum and order bringing its BPL rules into effect. When the final rules were announced, FCC Commissioner Kevin Martin said BPL “holds great promise as a ubiquitous broadband solution that would offer a viable alternative to cable, digital subscriber line, fiber, and wireless broadband solutions.”

782. Unfortunately, success of BPL required more than regulatory certainty and approval. It required sufficient commercial opportunity for the new technology to be viable against competing access technologies. In particular, as a nascent technology, it required sufficient scale of orders for the small number of equipment manufacturers who were producing early generation equipment to bring down their unit costs and to receive a sufficient return on investment to continue their research and development efforts. For a time in the early 2000s, BPL looked as if it was poised to obtain the necessary critical mass of take-up. However, despite its initial promise, BPL did not achieve sufficient commercial traction as a technology before its potential was overtaken by FTTP and 4G broadband. While DSL and cable modem continue to be viable, albeit gradually being replaced, the time window for BPL passed. By 2008, only two years after the FCC issued its final
rule, most of the serious vendors and would-be operators were closing down or turning to other technologies. BPL survived only as a form of in-building communications where networks use electrical wiring for broadband. Multiple vendors still provide equipment for this purpose and the standards have been developed and maintained under the Home Plug Alliance.\(^{362}\)

783. During the period while BPL had promise, multiple electric utilities in the United States conducted trials and pilots of the technology with equipment vendors and telecom operators. Several electric utilities also moved ahead with full-scale commercial deployments, based on several variations of the alternative business models discussed in Module 2.

784. In 2004, Cinergy, an investor-owned electric utility which operated a distribution business in Kentucky, Indiana and Ohio, entered into two ventures with Current Communications Group, a supplier of BPL equipment and BPL network operator. Under one venture, Cinergy and Current were to install and operate a BPL network over Cinergy’s electric distribution facilities. Under the other venture, Cinergy and Current would jointly install and operate a BPL network over the electric distribution facilities of the smaller municipal utilities and electric membership cooperatives in the same three states in which Cinergy had operations. The ventures would initially offer high-speed Internet access, and later add a VOIP offering. Cinergy also expected to use capacity on the BPL network for core business applications, such as network monitoring or internal communications. Cinergy and Current began deploying BPL network equipment on Cinergy’s distribution facilities and offering commercial BPL services in a limited geographic area. However, competitive pressure and shrinking potential for BPL kept the coverage area from being expanded. No BPL facilities were ever installed on municipal and cooperative electric distribution facilities. Current exited the business in 2008.

785. In 2002, Indianapolis Power & Light Company (IP&L) signed what was perhaps the only hybrid hosting/dark wire model agreement for BPL with Franklin Park Communications, a start-up broadband operator. Under the arrangement, which was exclusive, Franklin Park would be permitted to install BPL equipment on IP&L’s electric distribution facilities, interconnect the network with other networks, and transmit and receive communications over IP&L’s electric distribution lines. In consideration of the access to and use of IP&L’s facilities, Franklin Park would pay IP&L a revenue share and reimburse all incremental costs incurred by IP&L in supporting the installation and operation of the BPL network. The agreement had a 20-year term, subject to early termination by IP&L if Franklin Park did not commence operations within 12 months after signing. Franklin Park was in fact unable to secure funding and IP&L terminated the agreement on its first anniversary after signing.

786. Perhaps the most innovative and ambitious deployment of BPL was undertaken in Manassas, Virginia. In the early 2000s, the Electric Department of the City of Manassas, which operated a municipal electric distribution system in the City limits, entered into an arrangement with COMTek to deploy a BPL network to every home and business in the City. In 2008, the City took over the network’s operations, purchasing it for US$ 150,000 from COMTek, which was exiting the BPL business due to low returns. The City continued to operate the network for a few more years. However, in April 2011, facing high fixed operating costs, heavy competition from fiber, DSL and cable modem, and low penetration levels, the City of Manassas announced that it was

---

At the time, the City was spending US$ 170,000 annually to keep the network running and had revenues of only US$ 156,000 annually from 520 subscribers at US$ 25 per month. The City was expecting revenues to continue to decline in view of Verizon’s plans to complete FTTP for the entire City by the end of 2011.

9.3.4 Lessons learned

The United States offers multiple examples and insights into voluntary cross-sector infrastructure sharing driven by the commercial needs of telecommunications operators and host infrastructure owners. The United States also offers insights into government intervention in the form of financial and other incentives, mandated sharing and regulation of sharing. Some of the country’s major telecommunications network operators have their roots in early cross-sector infrastructure sharing, while virtually every owner of infrastructure, whether voluntarily or involuntarily, has participated in the vast expansion of intercity and access networks over the past century and a half.

---