MODULE 4

OWNER DISINCENTIVE AND IMPEDIMENTS

CROSS-SECTOR INFRASTRUCTURE SHARING TOOLKIT
4 Owner disincentives and impediments

186. This submodule identifies and discusses some of the more common disincentives and impediments which deter or prevent infrastructure owners from actively pursuing or entering into sharing arrangements with telecommunications network operators. It is not necessarily exhaustive, but focuses on recurring themes which are capable of being addressed effectively.

4.1 Suppression of financial incentives by utility ratemaking

187. As discussed in Submodule 2.2, the prospect of bringing in alternative revenue sources should provide a strong incentive for most infrastructure owners to share their infrastructure with telecommunications operators. However, regulators of the owner’s core business may seek to offset these infrastructure sharing revenues by reducing the allowed revenue from core business activities. Most notably, where the infrastructure owner is a rate-regulated public utility\(^1\) with a monopoly franchise or dominant market position, rate regulation of the host utility’s core business can significantly suppress these financial incentives. In the worst case scenario, all revenue received from infrastructure sharing is deducted from the host utility’s revenue requirements for setting tariffs in its core business – resulting in a zero sum outcome which removes all financial incentive to share infrastructure.

188. Understanding these financial disincentives first requires a deeper dive into the ratemaking rules for regulated public utilities. A typical revenue requirement formula for cost-of-service regulation of a regulated public utility is similar to the formula applied to Hawaiian Electric Company in the Figure below.\(^2\)

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\(^1\) While not all infrastructure owners are rate-regulated public utilities, many are. These usually include electric utilities, railways, water and sewer companies, gas companies, some pipeline operators and private toll road operators. Typically, the only infrastructure owners which are not rate-regulated public utilities are public roads authorities and some pipeline operators.

189. Under this formula, which is used to calculate a rate-regulated utility’s revenue requirements for tariff-setting purposes, the utility is permitted to recover its investment in infrastructure through three components of the revenue requirement:

- infrastructure operations and maintenance expenses;
- infrastructure depreciation expenses based on historical cost; and
- return on investment (based on the “rate base,” which represents investment which has not yet been recovered through depreciation).

190. The allowed tariff is computed by forecasting the revenue yield curve across various rates, accounting for elasticity of demand, and selecting the rate which is expected to meet the utility’s revenue requirements for a given period. All such tariffs must be approved by the sector regulator based on approved revenue requirements. Future rate adjustments may take account of any revenue surplus or shortfall from the previously approved rate, although utilities are sometimes allowed to retain any such gains earned before the next rate case, when core business tariffs may be reduced. The regulatory goal is to ensure that the utility receives exactly the full amount of its approved revenue requirements, but no more and no less.

191. Although the approach to ratemaking applied in a specific sector and country varies, and has progressed beyond traditional cost-of-service regulation in many jurisdictions, particularly in Europe, virtually all rate regulation of monopoly service providers continues to base the allowed rates on the utility’s regulatory asset base. This continued focus on the regulatory asset base limits

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4 Although such rate regulation is manifested in a wide variety of forms, European rate regulation of power and gas utilities also generally follows a regulatory asset base model, which in most cases calibrates permissible rates to the utility’s regulatory asset base. See Ernst & Young, Mapping power and utilities regulation in Europe (2013) (surveying utility regulation in Belgium,
permissible rates to returns which bear some relationship to the utility’s investment in in-service assets used to provide regulated services.

192. When a rate-regulated utility allows joint use of its infrastructure by telecommunications network operators, these commercial activities generate revenue in addition to the utility’s approved tariffs through ancillary use of infrastructure which was also included in the rate base or regulated asset base in determining its revenue requirements or permissible tariffs. This would appear to provide the utility with a windfall at the expense of its core business customers. The utility’s regulator will therefore want to determine what impact, if any, these ancillary commercial activities should have on the utility’s revenue requirements and approved tariffs.

The most common approach is to treat the shared infrastructure as having been partially removed from the rate base (or regulatory asset base) and hence reducing the utility’s recoverable costs of service accordingly. Under this approach, revenue derived from infrastructure sharing is not applied toward meeting the utility’s revenue requirements, but expenses associated with the infrastructure removed from the rate base (or regulatory asset base) are excluded in calculating its revenue requirements or permissible rates. This approach therefore reduces the utility’s allowed revenue requirements for operations and maintenance, depreciation and return on investment.

193. The cost-allocation approach creates two inherent disincentives for the utility to share infrastructure. First, the reduction in regulated revenue allowed may offset all or a significant part of the revenue received from infrastructure sharing. This reduction of regulated revenue allowed has the potential to undermine the entire financial benefit of the alternative revenue sources from infrastructure sharing. The reduction in regulated revenue could even exceed the additional revenue from infrastructure sharing.

194. Second, the cost-based approach is a fundamentally flawed methodology in this context. Calculation of the operation and maintenance cost of shared infrastructure to be excluded and the capital cost of shared infrastructure to be removed from the rate base (or regulatory asset base) present great practical difficulty. This is because there are no accepted or discernible principles for allocating costs between two distinct uses of the same asset. The requirement to allocate costs of shared infrastructure between the regulated and unregulated businesses creates significant regulatory uncertainty (both for the utility and its sector regulator) as to (1) what costs should be removed from the utility’s revenue requirements for operations and maintenance, depreciation and return on investment and (2) the impact on its permissible rates however otherwise determined.

195. At first blush, the separate accounting requirement may appear deceivingly straightforward. All external revenue related to the utility’s core regulated business is for the account of that business and all external infrastructure sharing revenue is for the account of a separate business which is not regulated by the infrastructure owner’s sector regulator (but which may, as discussed

Czech Republic, Finland, France, Germany, Greece, Italy, the Netherlands, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey and the United Kingdom). Available at http://www.ey.com/Publication/vwLUAssets/Mapping_power_and_utilities_regulation_in_Europe/$FILE/Mapping_power_and_utilities_regulation_in_Europe_DX0181.pdf (last visited 10 Feb 2017).

5 In general, all income generated by a utility’s provision of regulated services is regulated income, and must be accounted for separately from all other income so that it can be compared to the revenue requirements on which the utility’s approved tariffs are based. Similarly, all costs included in the revenue requirement formula are regulated expenses and must also be accounted for separately from all other expenses so that revenue requirements for the provision of regulated services can be properly calculated. Thus, under applicable accounting separation rules, the utility’s sector regulator will typically require it to separate all revenues and costs associated with its infrastructure sharing business from its regulated core business.
in the next submodule, be regulated by the telecommunications sector regulator). Each of these separate businesses should also bear its own costs. Dealing with incremental costs incurred by the infrastructure sharing business is relatively easy. If the infrastructure sharing business needs equipment or personnel to provide services to external customers, then it bears those costs, whereas if the core utility business needs equipment or personnel to support its business, then it bears those costs.

196. However, one encounters great intellectual and practical difficulty in trying to apply the separate accounting rules to shared infrastructure which is used and useful in both the core utility business and by third-party telecommunications network operators. This infrastructure may include such fixed assets as land, rights of way, towers, poles, ducts, conduits, structures and fiber optic cable. If these assets were all acquired prudently by the utility for use in its core utility business and remain used and useful in that business, they should be fully included in its rate base (or regulatory asset base) prior to sharing them with third parties. However, if they prove also to be potentially sharable, there is no generally accepted criteria for apportioning their capital expenditure cost between the core business and the ancillary business. Similarly, there is not generally accepted criteria for apportioning operations and maintenance costs for shared infrastructure between the core business and the infrastructure sharing business. Nor is there any criteria for determining whether the allocation percentages should be the same for both capital expenditures and operating expenses in respect of shared infrastructure.

197. The difficulty of apportioning baseline capital and operating costs of shared infrastructure between the owner’s rate-regulated business and its infrastructure sharing business is easily demonstrated. Consider a non-telecommunications utility (such as an electric utility or railway operator) which has installed fiber optic cable to enhance its core business and later decides to lease excess capacity on the fiber to telecommunications operators. How should the utility apportion the costs of the fiber?

198. Apportioning fiber cost is conceptually difficult. One could say that the core business bears all the cost of the fiber optic cable except for the fiber leased to third parties, and that the infrastructure sharing business bears the cost of the leased fiber. It is possible to ascertain the depreciated cost of the fiber optic cable and apportion it among the total fiber count. However, does one apply this apportionment starting when the third party actually commences use of the fiber or when the infrastructure sharing business first starts offering the fiber in the market? What about the cost of spare fiber which is neither used in the core business nor leased to third parties? The core utility business has no use for spare fiber while the infrastructure sharing business is arguably holding all spare fiber in inventory to solicit additional third-party customers. On the other hand, the infrastructure sharing business has a very limited number of potential customers, and a significant portion of a utility’s excess dark fiber may never be used by anyone. The core business would have incurred the costs of the unused fiber in any event. Also, because third-party use is limited in duration and other respects, should there be some discount from the depreciated cost to reflect the fact that less than the full bundle of rights is being shared?

199. Apportioning the cost of shared towers, poles, conduits, rights of way, land and buildings presents even more difficult conceptual challenges than apportioning the cost of fiber. But such an allocation of cost must be made to comply with the accounting separation requirements because the shared fiber benefits from joint use of this other infrastructure. In most cases, if one were to apportion the cost of these host assets 50-50 between core business uses and infrastructure sharing uses, they would yield such high costs for the infrastructure sharing business that the utility would
not be able to charge telecommunications operators who share the fiber enough to recover the costs which have been excluded from its core business revenue requirements. The utility would lose more than it gains by sharing its infrastructure. Even if the third-party revenue, net of the incremental costs of the utility’s infrastructure sharing business, were viewed by the utility’s sector regulator as a cap on the reduction in the revenue requirements of its core business, this approach may still reduce the profits from the infrastructure sharing business to zero or near zero. These difficulties and uncertainties remove any financial incentive for the utility to enter the infrastructure sharing business, effectively returning all profits from that business to the utility’s core business customers through reduced tariffs. Management and shareholders of the utility would have little incentive to go to the trouble and incur the risks of entering the infrastructure sharing business under such circumstances.

200. If, instead, one were to propose apportioning the costs of shared infrastructure on some basis other than 50-50 between the two uses, then this begs the question of what other basis. There are no generally accepted or self-evident principles on which to develop such an allocation. Moreover, unless the utility is able to obtain its sector regulator’s prior confirmation of how these commercial activities will be accounted for, the utility will be unable to treat any proceeds as free and clear cash available to spend. From a prudent utility planning perspective, the revenues from infrastructure sharing are sufficiently encumbered as to provide little incentive to pursue such a business absent advance regulatory certainty that a reasonable portion of such revenues will benefit the utility by being available for discretionary spending.

201. While the foregoing problem arises in the regulation of the utility’s core business market, another problem with basing the allocation of commercial gain between the regulated core business and infrastructure sharing business on some fixed allocation of baseline costs arises in the telecommunications market. Any potential income from infrastructure sharing is typically earned in a competitive market, where potential customers have other options for telecommunications infrastructure, some of which may be more attractive than the utility’s infrastructure and therefore have higher market value. In conducting an infrastructure sharing business, the utility faces commercial challenges that lead to market prices for joint use of infrastructure which do not bear any direct relationship to its baseline costs (however they may be apportioned) or market prices for competing infrastructure. The portion of shared infrastructure costs a utility is effectively forced to bear by its core business regulator, through removal of those costs from its core business revenue requirements, may put the utility at a significant disadvantage in the telecommunications market.

202. Requiring a utility to reduce its core business revenue requirements by a specified share of costs, without regard to the market value of the sharable assets, risks reducing its revenue requirements by more than the market value of the shared infrastructure. This cannot be good for the utility, its ratepayers or the telecommunications operators and their customers who are denied access to potentially sharable infrastructure as a result.

203. Such regulatory disincentives do not exist by design, but rather by the unintended consequences of the interaction between two different sectors which face different market structures and regulatory environments. When brought together, these produce a result that does not exploit the latent value of the infrastructure for optimal economic and social benefit.

204. The lack of regulatory certainty requires a prudent utility to assume and plan for the worst. This, of course, stymies incentives to enter the infrastructure sharing business. Even where the
law attempts to mandate or regulate sharing, the lack of regulatory certainty regarding the impact on core business rates and tariffs may create incentives to resist or undermine requests for access.

205. Progressive policymakers and regulators have developed ways to protect the interests of utility ratepayers, while providing stronger incentives for rate-regulated utilities to pursue cross-sector infrastructure sharing opportunities. As discussed in Submodules Error! Reference source not found. and Error! Reference source not found., it is not sufficient simply to allow or mandate infrastructure sharing. The approaches of the two sectors (utility core business and telecommunications) must be aligned so that the regulation of rates in the utility’s core business does not have this restraining effect beyond its own sector.

206. Notwithstanding the significant financial disincentives created by traditional regulated utility ratemaking principles, one can find examples where utilities have nonetheless shared infrastructure voluntarily under such circumstances. However, policymakers and regulators can increase the incidence of infrastructure sharing by reducing or removing these financial disincentives.

Box 9: A self-interested utility may voluntarily share infrastructure even if ancillary revenues are offset by reductions in regulated rates

For example, in the United States, without any legal or regulatory compulsion to do so, electric utilities and telephone companies historically shared poles used to support electricity distribution lines and telephone lines. From the early days of both businesses until 1996, 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). 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 reduced the capital required for each to extend its lines into new coverage areas.

This voluntary pole sharing in the United States continued through 1996, when the US Congress passed legislation opening up local telephone service to competition. At that time, the telephone companies ceased investing further in poles. Though the former monopoly telephone companies continued to maintain their existing poles, the electric utilities thereafter assumed responsibility for pole replacements and for the installation of poles on all new lines. The telephone companies previously could recover their investment in poles through regulated telephone tariffs. They ceased investing in poles because the sunk costs of investing in a new pole would now put them at a competitive disadvantage to new entrants, who received the benefit of pole attachment rights (both to electric and telephone poles) under a formula which allocated most costs to the pole owner. This is a clear signal from the market to regulators that the mandatory pole sharing laws were inequitable to pole owners and provided a strong disincentive to sharing as well as investing.

4.2 Suppression of financial incentives by infrastructure access regulation

207. Led by the developed countries, mandatory infrastructure sharing legislation and related rate regulation has proliferated around the world over the past two decades.⁶ For example, in the United

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⁶ See Wall Communications Inc., A Study of Wholesale Costing Methodologies in Selected Countries prepared for the Canadian Radio-Television and Telecommunications Commission (2 Oct 2012) (comparing, among other things, regulation of rates for mandated access to “support structures,” comprising primarily ducts and poles, in Australia, France, Germany, Sweden, the
States, Congress has since 1978 regulated the rates electric utilities and incumbent telephone companies may charge cable television companies for joint use of their utility poles. In 1996, the regulation of rates was extended, and mandatory access obligations imposed, to protect competitive new entrants in the telecommunications sector as part of the introduction of competition in local telephone services. In recent decisions, the United States Federal Communications Commission has extended the benefit of regulated access to electric utility poles to the former incumbent telephone companies. The development and practices and policies in the regulation of utility pole attachments in the United States are discussed in detail in the United States case study included in this toolkit.

208. Similarly, Ghana’s Electronic Communications Act of 2008 directs that “[w]here a network operator requests the use by its network of a utility installation owned by a public utility it shall have the right to use the installation in accordance with this section and where any public utility requests the use of facilities of a network operator, the public utility shall have the rights of the network operator under this section.”7 A “utility installation” is broadly defined as “any physical component of a system owned or operated by a public utility to provide water, gas or electricity.”8 Among other things, the Act empowers Ghana’s National Communications Authority to “regulate the rates, terms and conditions for access to a facility or utility installation, and ensure that the rates, terms and conditions are just and reasonable and to the greatest extent possible, based on a cost-sharing formula.”9

209. Accepted best practice for intra-sector infrastructure sharing within the telecommunications sector suggests that a regulator should define the relevant markets and assess competition in those markets before intervening in those market. Particular attention should be given to whether infrastructure owners or their affiliates have significant market power or dominance in the relevant markets for telecommunications infrastructure or are engaging in anticompetitive behavior. The results of this assessment should inform the nature and degree of any regulatory intervention and whether such intervention should be ex ante or ex post.

210. Unfortunately, the provisions empowering telecommunications sector regulators to regulate cross-sector infrastructure sharing often do not follow this best practice of limiting ex ante regulation to persons found to have been dominant in a relevant market. The approach to regulation presented in such provisions is sometimes arbitrary and excessive, from a competition policy perspective. As in the above examples from the United States and Ghana, it is not uncommon for mandatory cross-sector infrastructure sharing provisions of telecommunications sector laws to direct that the infrastructure owner use cost-based pricing and to empower the sector regulator to enforce this requirement. In contrast with the provisions of such laws limiting price regulation of telecommunications services to circumstances where a finding of dominance in a relevant market has been made, the infrastructure sharing provisions often direct or permit regulators to regulate prices and access terms without regard to dominance. Such legislation effectively deems all infrastructure owners to be dominant per se in the relevant infrastructure markets and provides no mechanism by which they can rebut that presumption. Such laws also

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8 Id. §101.
9 Id. §21(6).
seldom offer guidance for when a telecommunications regulator should exercise the discretion to forbear from regulating infrastructure sharing. These provisions are typically buried deep in telecommunications sector laws and received little attention during drafting, debates and passage of the law.

211. As a matter of good public policy, the decision to impose mandatory access, rate regulation and/or non-discrimination requirements on an infrastructure owner, and the manner in which such requirements are applied, should always consider (1) whether the activity, if unregulated, is likely to have a positive or negative impact on investment and competition in the telecommunications sector and (2) how and whether the market intervention would enhance investment and competition.

212. For example, where an infrastructure owner with existing dark fiber is a potential new entrant attempting to compete with wholesale dark fiber or bandwidth offerings of a dominant incumbent telecommunications operator, the regulator should encourage entry by the infrastructure owner, on an unregulated or lightly regulated basis, to foster competition in the wholesale dark fiber market. The infrastructure owner’s competitive entry in the dark fiber market should benefit competition and counterbalance the dominance of the incumbent. The regulator can therefore forbear from regulating the new entrant’s rates and access terms, and reserve its regulatory power for *ex post* intervention if necessary. Nurturing competition in wholesale infrastructure markets can increase sector-wide capacity, route diversity and geographic coverage while reducing downstream costs. This can benefit retail telecommunications consumers by improving access and speed and reducing prices. The non-dominant scenario thus presents a strong case for limiting regulatory interference in the relevant wholesale markets.

213. On the other hand, if a utility infrastructure owner is dominant in the relevant wholesale market, or is likely to be dominant on market entry, then some form of *ex ante* regulation of the utility may be appropriate. This may be the case, for example, where the utility controls non-replicated and economically non-replicable infrastructure which is essential for the deployment of broadband telecommunications facilities.

214. The existing cross-sector infrastructure sharing provisions in many jurisdictions (both developed and developing) have not yet adopted the competition-based approach to ex ante regulation as widely as in intra-sector regulation. For example, the Ghana Electronic Communications Act does not limit the National Communications Authority’s power to regulate rates for access to utility installations to circumstances where the utility has significant market power in a relevant market or is otherwise engaged in anticompetitive conduct. In contrast, the Act provides for tariffs for electronic communications services to be “determined by service providers in accordance with the principles of supply and demand” except where the Authority is expressly authorized to regulate tariffs, and in turn limits that power to situations where the network operator has a monopoly or significant market power or engages in anti-competitive pricing or unfair competition. This double-standard for rate regulation provides a significant disincentive for utilities to enter the infrastructure sharing market voluntarily.

215. The European Parliament and the Council of the European Union recently issued a Directive requiring Member States to require most utilities which own infrastructure to grant reasonable

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11 *Id* §25(2).
requests from public communication networks for access under “fair and reasonable terms.”\textsuperscript{12} Again, the Directive presumptively regulates terms of access, including rates, without any requirement of a showing of dominance or anti-competitive behavior.

216. Another aspect of these laws, as reflected in this EU Directive, is that the infrastructure owner is generally prohibited from declining to enter the market for infrastructure sharing. For example, Article 39 of Lithuania’s Law on Electronic Communications establishes procedures for providers of public communications to access “electronic communications infrastructure,” which is defined to include passive infrastructure such as pipes, ducts, towers, masts, buildings, structures and other facilities. Although Article 39 encourages the access seeker and infrastructure owner to negotiate terms of access directly without regulatory intervention, if the access seeker cannot obtain access or if the cost of access is disproportionately high, the Communication Regulatory Authority may eventually compel the infrastructure owner to share its infrastructure on reasonable and non-discriminatory terms.

217. The combined impact of utility ratemaking principles and cost-based price regulation of infrastructure sharing even in the absence of dominance can have a quite draconian impact on the financial incentives of utilities to share their infrastructure and to invest in making that infrastructure more attractive to telecommunications network operators.\textsuperscript{13} In principle, this dual price regulation limits the utility’s maximum price for sharing infrastructure to the same amount which must be removed from its core business revenue requirements. The only possible financial benefit from infrastructure sharing for a utility subject to these dual requirements is the potential to accelerate its cash flows by selling indefeasible rights of use (IRUs) in the shared infrastructure, which represents an upfront capital payment equal to the discounted present value of the cost-based rent. Such an arrangement may enable the utility to accelerate its cash flows from infrastructure investment, but would not increase its return on that investment, so the net present value to the utility of sharing its infrastructure would still be zero.

218. Cross-sector infrastructure sharing regulations also sometimes, in addition to mandating open access, require non-discriminatory pricing and terms and compliance with other similar regulatory mandates. Such provisions effectively treat the utility as an infrastructure common carrier.\textsuperscript{14} While this may seem laudable in principle, it is difficult if not impossible in practice for the market participants or the regulator to follow or administer. Often, the telecommunications operators which are large enough to use utility infrastructure are so differently situated that there are no two which could reasonably be considered to be in the same customer class. However, the existence and potential application of the common carrier principles creates legal and regulatory uncertainties for both utilities and telecommunications operators who participate in infrastructure


\textsuperscript{13} Cost-based price regulation of infrastructure sharing also begets the same lack of principles and regulatory uncertainty regarding cost allocations for shared assets as was discussed in Submodule 4.1. This engenders even further regulatory uncertainty as to the combined impact of both sets of regulations, and creates the risk of inconsistent cost allocations by the two sector regulators (core utility sector and telecommunications sector).

\textsuperscript{14} A common carrier, in a common law country, refers to a telecommunications operator that holds itself out to the general public to provide communications services, and is accordingly subject to heightened regulatory requirements such as an obligation to provide non-discriminatory service. A common carrier corresponds to a “public carrier” in civil law countries. A non-common carrier arrangement, also sometimes referred to as contract carriage or private carriage, is one in which the provider is not treated as a common carrier. Allowing contract carriage in the provision of wholesale infrastructure is generally considered to be economically more efficient than trying to standardize offerings by requiring common carriage.
sharing transactions. These legal and regulatory risks in turn suppress the level of infrastructure sharing commercial activity and investment (by both infrastructure owners and access seekers).

219. A public utility typically has very few potential infrastructure sharing customers, all of whom are differently situated, and the infrastructure itself is often tremendously complex and not purpose-built for sharing. The infrastructure package desired by each telecommunications operator depends on a variety of factors. These include, for example, the operator’s specific needs for infrastructure, where the infrastructure is needed, the operator’s avoided costs of self-provisioning its own infrastructure, the availability of other existing or planned infrastructure that may be substitutable, the costs of adapting the utility’s infrastructure to the operator’s existing and planned networks, and the overall financial health of the telecommunications sector. The operator may also wish to barter certain telecommunications services to the utility in full or partial consideration for access to and use of the utility’s infrastructure. In general, the utility’s baseline costs, and the arrangements it has made with other operators, have little bearing on the commercial arrangements which may be mutually most attractive to the operator or the utility.

220. Permitting non-common-carrier arrangements whereby a telecommunications operator and a utility can jointly fashion an individually tailored commercial arrangement under such circumstances is generally the regulatory approach most conducive to optimizing infrastructure sharing. The regulator’s authority to intervene should be *ex post*, where the parties are unable to conclude an agreement, and the aggrieved party is able to demonstrate some form of anticompetitive conduct. Where an agreement has been voluntarily concluded by the parties, any *ex post* intervention should be limited to circumstances where a third party complains that the agreement was anticompetitive. Subject to this exception, the parties to a commercially negotiated infrastructure sharing arrangement ought to be allowed to select a dispute resolution forum which they believe will be fair and impartial, which may be the sector regulator, if they so choose, or may be an arbitral tribunal selected in accordance with procedures agreed by the parties.

221. For example, in the case of dark fiber, which is frequently a relatively competitive market, it is impractical for a utility which owns fiber to offer a general tariff or reference offer (at least insofar as price is concerned). Dark fiber transactions between utilities and telecommunications operators are nearly always concluded on highly customized terms which fit the unique circumstances of the utility and the telecommunication operator and the interplay between those circumstances.

### 4.3 Institutional silos for infrastructure investment in developing countries

222. In addition to the financial disincentives to sharing infrastructure, utilities in many developing countries also face additional institutional barriers to engaging in cross-sector planning and construction activities with telecommunications operators (which was discussed as one of the common business models in Submodule Error! Reference source not found.). Utility infrastructure investment in developing countries has extremely long planning cycles with many actors and rules which constrain the ability of the utility to plan and coordinate with potential infrastructure sharing partners.

223. First, much new infrastructure in developing countries is funded by development banks and other donor organizations. The funding units of these institutions are typically organized into sector silos, such as electricity, water and sewer, roadways, railways and pipelines. There has historically been little cross-sector planning within these institutions. Potential infrastructure
sharing opportunities which require joint planning and construction are therefore often missed. Even when infrastructure projects include fiber, as many power and railway projects now do, telecommunications operators build their own fiber instead of waiting for the utility fiber. They do this because they are not made aware that the new fiber is being constructed, the timetable for completion, whether it will be available for their use, and the terms and conditions on which it will be made available. By missing out on this planning stage dialogue, the infrastructure owner also often loses the opportunity to plan additional drop-off points and co-location space for its new fiber, which may improve the fiber’s commercial value to telecommunications operators.

224. Second, the disbursement conditions and procurement rules applicable to infrastructure owners which receive donor funding currently leave little room for cross-sector planning. The construction of a major infrastructure project typically involves long planning cycles with the input of various technical consultants and ultimately a competitive tender for the supply of materials and construction. By the time this phase of a major infrastructure project is reached, it is difficult to vary the specifications to accommodate a joint planning exercise with a telecommunications operator without setting back the underlying procurement process (and potentially requiring repetition of steps for which the fixed-price technical consultants have already completed their scope of work and no further advisory funding is available).

225. In addition, competitive bidding requirements often make it difficult for the infrastructure owner to engage in direct contracting with a telecommunications operator during the procurement stage of the infrastructure project. Thus, for example, while it may seem obvious that planning for conduit and duct systems or even fiber should be coordinated with the construction or refurbishment of a roadway, these disbursement conditions and procurement rules applicable to the roadway project present serious and seemingly insurmountable obstacles to such joint planning and construction.

226. Third, because the infrastructure owner for a developing country project is almost always a state organ or state-owned enterprise, it will be subject to a variety of constraints (discussed more fully in the next submodule). In addition, ministerial portfolios and board appointments for state-owned enterprises generally follow the same silo approach as that followed by development institutions. The shareholder representatives and board therefore often have no experience with telecommunications or joint use of utility infrastructure. While helpful in achieving subject matter expertise for the infrastructure owner’s core business, this silo approach to governance tends to suppress interest and experience in cross-sector planning.

227. Fourth, infrastructure owners often do not have a ready means to engage telecommunications operators as potential collaborators in co-deployment of new infrastructure. They do not typically have personnel who are trained or experienced in facilities sharing and do not have the budgets to hire such personnel within the scope of their regulated revenues and earnings.

4.4 Restrictions on activities of state actors and state-owned enterprises

228. State ownership of host infrastructure significantly impacts the potential for cross-sector infrastructure sharing with potential joint users of the infrastructure.

229. In most countries, at least some sharable infrastructure is held by government organs or state-owned enterprises. In many developing countries, virtually all sharable cross-sector infrastructure is under state ownership and control. This infrastructure is sometimes held directly by a state organ. For example, roadways and water/sewer infrastructure are typically under direct control of
transport ministries or agencies. Other infrastructure, particularly electricity and railway infrastructure, is sometimes also held through a corporatized state-owned enterprise.

230. Establishing infrastructure sharing arrangements with state actors and state-owned enterprises requires the parties to deal with a variety of contracting restrictions, including regulation of public procurement, disposition of public assets, public-private partnerships and public concessions. These legal requirements can be quite cumbersome and clumsy when trying to establish infrastructure sharing arrangements. They typically were not adopted with projects of the nature and scale of infrastructure sharing in mind. Their potential application to such projects uncovers ambiguities and anomalies, may involve a third-party agency tasked with regulating such transactions, and can raise costly delays or insurmountable hurdles. The prospect of public enterprise regulation can often deter telecommunications operators from investing the time, money and effort to attempt infrastructure sharing arrangements. It can also frustrate infrastructure owners and policymakers.

231. For example, where the number of telecommunications operators in a country is small, and one is dominant, the best commercial option, and coincidentally the best policy option, for infrastructure sharing may be for the state-owned host to partner with a non-dominant telecommunications operator, if the host were to adopt the joint venture business model. This would introduce competition with the dominant operator. Yet, the strict rigors of public enterprise transactions may dictate a contrary outcome. They may require a form of open and equal access by all telecommunications operators to the opportunity through a competitive selection process, which may allow the dominant telecommunications operator to interfere with entry or expansion by its competitors. These laws may thus force the state to invite the dominant operator to bid for the right to partner with the host infrastructure owner.

**Box 10: Correcting for unintended consequences**

With funding from the World Bank under the Regional Connectivty Infrastructure Program (RCIP), the Malawi Public-Private Partnership Commission sought to introduce greater competition in international fiber routes. At the time, Malawi, which is a landlocked country, was served by a single terrestrial fiber route from its border with Mozambique through to submarine cables along the east coast of Africa. The Mozambique segments were owned and operated by TDM, the state-owned Mozambique incumbent fixed-line operator, which had a monopoly and was beyond the reach of Malawi’s telecommunications regulator. In addition, the Malawi segments from the border to the two major cities, Blantyre and Lilongwe, were controlled by MTL, the recently privatized former state-owned Malawi incumbent fixed-line operator.

The Public-Private Partnership Commission sought to encourage the construction of a competing route with geographic diversity to existing routes which would pass through Tanzania to the coast, thereby breaking the monopoly of TDM over the terrestrial segments outside Malawi. It also hoped to attract a new wholesale backbone operator to enter the market in Malawi. These goals would be accomplished by tendering the procurement by the Government of a block of international capacity for Government use, to be made available in Lilongwe and at certain other drop-off points. By having the Government serve as an anchor tenant in this way, the Commission hoped to improve the financial viability of the investment in the new route, thereby creating an alternative supply of international capacity as well as making the domestic portion of the cable available for transit and backhaul purposes.
The Commission also sought to improve the financial viability of the new fiber route by ensuring the availability of two separate options for infrastructure sharing, one involving the installation of buried or aerial fiber along existing roadway reserves and the other involving the retrofitting of fiber on existing electric transmission lines owned and operated by state-owned ESCOM.

The Government’s investment as an anchor tenant in the new infrastructure was governed by the World Bank’s Procurement Guidelines (and otherwise would have been governed by similar requirements under Malawi’s recently enacted Public-Private Partnership Act). The worthy principles of open and competitive bidding in these Guidelines (and the Act), which were not designed with the circumstances at hand in mind, seemingly clashed with the Government’s objective (fully supported by the World Bank) of introducing greater competition in international routes. The Procurement Guidelines did not permit the Government to exclude either TDM or MTL, the two dominant operators on different segments of providing international connectivity to Malawi, and with whom the Government sought to introduce competition, from the bidding process. Yet, if they were to participate and win, then no competition would be introduced.

Precluded from ensuring the introduction of competition, the Commission instead addressed the issue by requiring each bidder not only to bid a price for the Government’s capacity purchase but also to commit to offering various new international capacity products commercially and to bid price caps for these international capacity sales. In this way, the Commission was able to achieve a second-best solution in the project design through the use of competition for the market as a substitute for competition in the market. The World Bank was also able to support this approach by allowing a weighted price evaluation which considered both the price offered for the services being procured by the Government and for the services required to be offered by the winning bidder to the market. Thus, the Commission arranged to secure the benefits of competition over pricing in the tender itself rather than relying on achieving it through operation of the market once the infrastructure was installed.

As it turned out, neither TDM nor MTL submitted bids, and the Commission was able to secure competitive entry as well as ensure competitive wholesale pricing. Absent the creative solution to overcoming the unintended consequences of the Procurement Guidelines, however, the Commission may have been unable to achieve the objective of diversifying the ownership of infrastructure and hence reducing market concentration.

232. Political interference, as well as the mere possibility of political interference, further complicates the ability of infrastructure owners and telecommunications operators to enter into long-term, mutually beneficial sharing relationships. Political decisions can stem from a variety of motivations, some more worthy of intervention than others, but all leading to interference with commercial arrangements between infrastructure owners and telecommunications operators.

233. One form of political interference is an inclination to favor the incumbent state-owned telecommunications operator for backbone infrastructure projects even when other state-owned utilities or investor-owned operators are better positioned to develop these facilities. Driven by nostalgia for a state-owned operator which is a flagship of successful state enterprise or by a political mandate to shore up state enterprises slated for privatization, favoritism for the state-owned telecommunications operator is more common than it would be if selection of partners were based on commercial objectives.

234. An alternative manifestation of the same genre of political interference is an inclination to disfavor the existing state-owned telecommunications operator. This may result in the
establishment of a separate state-owned enterprise to undertake new backbone infrastructure projects, to disqualify the existing state-owned operator from participating or to overregulate the incumbent such that it is unable to secure financing or discouraged from making new investments.

235. A third alternative is to favor and impose centrally planned decisions for collaboration rather than to foster conditions conducive to voluntary collaboration and allow market forces to work. This form of interference is now fashionable under the mantra of public-private partnerships. Where centrally planned public-private partnerships are favored, state-owned public utilities may be overtly prohibited or more subtly dissuaded from pursuing their own activities or may have these projects taken away from them.

236. None of these forms of political interference achieves policy goals of encouraging investment and fostering diversity and competition in the provision and use of shared infrastructure.

237. Examples of the challenges presented by the realities of politics can be seen where state-owned utilities were originally proactive in pursuing infrastructure sharing in Ghana, South Africa and Zambia. In each of these countries, utility management had taken the initiative to establish an infrastructure sharing business. Subsequently, in each country, government transferred the business to another state-owned enterprise. In Ghana and Zambia, a significant part of the electric utility’s dark fiber was transferred to the incumbent fixed-line telecommunications operator immediately prior to its privatization. In both cases, the dark fiber fell under control of a vertically integrated telecommunications operator whose new owners were less motivated to continue sharing with the operator’s competitors than the electric utility had been. In South Africa (see Box 11 below), the fiber assets of electric utility Eskom and Transnet Freight Rail were transferred to a new national broadband backbone company, under separate political control.

238. Each of these three countries, in hindsight, appears to have suppressed the level of infrastructure sharing from what was originally promised by the efforts of the four utilities involved. Centralized government planning and unnecessary political interference is seldom a good substitute for market forces (including the market activities of corporatized state-owned enterprises with entrepreneurial management).

**Box 11: If it isn’t broken, don’t fix it.**

In South Africa, both the state-owned railway, Transnet Freight Rail, and electric utility, Eskom, had been very entrepreneurial and active in developing cross-sector infrastructure sharing opportunities. They had achieved significant success in collaboration with investor-owned telecommunications operators for sharing infrastructure. In about 2009, the Government of South Africa decided to transfer these assets to the newly formed Broadband Infraco SOC Ltd (BBI), an umbrella state-owned infrastructure company established to share the fiber optic infrastructure of the state-owned electric and railway utilities. BBI was 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. BBI was established to provide wholesale long-distance high-capacity connectivity to other licensed fixed and mobile network operators and ISPs under a legislative mandate.

The Government caused all excess capacity in the telecommunications assets of Eskom and Transnet Freight Rail to be transferred to BBS. As a result, BBI acquired over 12,000 km of fiber routes hosted on rail and electric transmission infrastructure to commercialize. BBI decided to offer bandwidth services rather than dark fiber. Although BBI owns a number of fiber pairs on
For the first three years of its operation, BBI was required to lease most of its network to Neotel to facilitate Neotel’s expansion as a second national fixed-line operator. In 2010, BBI’s management wanted to expand its commercial services to other telecommunications operators. However, during a significant period of delay while this proposition was debated by BBI’s government shareholders, the Department of Public Enterprises and the Department of Communications, other wholesale providers developed their own fiber networks and captured potential BBI customers.

BBI has struggled to build a reliable and effective network meeting the requirements of commercial customers. Much of the company’s network has reached end-of-life status on its fiber optic equipment as well as the fiber itself and is in need of replacement. BBI has encountered financial difficulties and in late 2015 requested a cash injection of R243 million (approximately USD 16.6 million) to remain afloat.

BBI has been criticized as generating 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. Rather than having increased the incidence of infrastructure sharing following the transfer of assets from Eskom and Transnet, the BBI initiative appears to have foreclosed much sharing that might otherwise have happened.

239. The potential for sharing to be impeded by political decisions is a reality of any effort to increase the incidence of infrastructure sharing. Political motivations must be understood and, where they lead to suboptimal results, countered with strong policy and commercial arguments. Where the political interference is from the executive branch, some checks and balances from legislative or judicial intervention may also be helpful. However, in a parliamentary system where the distinction between executive and legislative branches is relatively weak, legislation is more likely to be used as a tool to implement political interference rather than prevent it.

240. An additional problem faced by state-owned enterprises stems from limitations on their permitted scope of business activities. The charters15 of state-owned enterprises are often much more narrowly drawn than those of investor-owned utilities. The permitted objects of state-owned enterprises usually limit their permitted business pursuits to the core business for which they have been established. These limitations add further barriers for infrastructure sharing pursuits, sometimes requiring the utility to amend its charter before it may enter an infrastructure sharing business. This in turn would typically require prior political approval by one or more ministers, who may question why the utility is venturing into a new business and who, in any event, are likely to slow down the decision to proceed. If such approvals are requested for a pending infrastructure sharing transaction, then the utility risks seeing the telecommunications operator make alternative plans during the delay.

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15 The term charter is used broadly to refer to any legal instrument forming the constitution of state-owned enterprise which sets out its permitted objects, including memorandum of association, articles of incorporation, statutory authorization or executive order.
In 1999, the Water & Electric Board of the City of Eugene, Oregon, USA completed construction of a 70-mile fiber optic cable network connecting 25 metro-area power substations and three bulk power stations, at a cost of USD 15 million, which was funded through the issuance of municipal bonds. Although the network was primarily constructed for internal use in operating the Board’s electricity and water systems, the Board envisioned from the outset that it would commercialize excess capacity in the network. But this was not as simple as securing a license and entering the business. The City’s voters first had to approve an amendment to the City Charter to authorize the Board to provide telecommunications-related services. A year elapsed following completion of the fiber network before the City Charter amendment was approved in May 2000. Nearly another year elapsed before the Board obtained authorization from the Oregon Public Utility Commission to provide telecommunications-related services in February 2001. Yet another year passed while the Board considered various business models and ultimately decided on a dark fiber model due to highly competitive market conditions. During this time, the Board also evaluated various pricing methods for its dark fiber and settled on a methodology which provided three different rates, one for schools, one for other public agencies and one for commercial telecommunications operators. These initial rates were approved in 2002 – some three years after the fiber network was originally completed. As of March 2013, the Board had granted dark fiber IRUs to PeaceHealth, Oregon Medical Group, School District 4J, Springfield Utility Board, Zayo Group, Verizon, and Light Speed Networks.16

241. State-owned monopolies often develop a culture that lacks an appreciation of market dynamics. They may also behave as organizations of civil servants with politically appointed boards and senior management. Their focus is on the core business as understood in terms of the underlying cost of their assets and of providing core business services rather than on market values and alternative revenue streams that can be extracted from those assets. This mindset can only be changed by exposure to greater commercial and entrepreneurial experiences, and may require greater corporatization of the state-owned host or a partnership with an experienced telecommunications operator. This is one of the reasons why separate incorporation of an entity to manage the assets to be shared can be important to success. For example, this need was recognized for management of the fiber of the Tunisian railway system. Nonetheless, keeping the separate business entity under the dominion of the infrastructure owner, typically as a wholly owned subsidiary, is preferable to establishing it as a sister state-owned enterprise. The former approach maintains the financial incentives of the infrastructure owner to support the new business, while the latter approach removes them entirely (which was likely an additional problem encountered by BBI in South Africa).

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telecommunications service provider, as a consultant to advise it on commercialization of its fiber. However, in part due to institutional limitations and regulatory restrictions, very little materialized over the next two years with only two telecommunications operators leasing dark fiber on ESCOM’s network.

According to Globe’s senior management, ESCOM’s lack of experience and credibility as a telecommunications operator required a partnership with an experienced player in order to offer bandwidth services. Aware of its muted success, ESCOM entered into a 10-year revenue sharing partnership with Globe to sell wholesale capacity. Under the terms of their partnership, Globe is responsible for ESCOM’s network expansion and for the provision of bandwidth services using that network. Globe expanded ESCOM’s fiber network, and, as of 2014, the Globe/ESCOM partnership had the largest share of the carrier’s carrier market in Malawi, with all major ISPs and operators Airtel, TNM and Access as customers.

4.5 Lack of resources to pursue infrastructure sharing

242. The tight financial constraints and inflexible governance structures of rate-regulated public utilities, particularly state-owned enterprises, often deprive management of sufficient financial and human resources to pursue infrastructure sharing opportunities. Rate-regulated utilities must account for every item of revenue and expense and often do not have any discretionary budget to devote significant internal or external resources toward developing a new, non-core business opportunity such as infrastructure sharing. In addition, when they are state-owned enterprises, rate-regulated public utilities rarely have the internal financial resources to engage external advisers for a non-core business activity.

243. State-owned enterprises are typically controlled and governed by sector ministers and politically appointed boards chosen for their perceived expertise in the core business sector, and not telecommunications experience or expertise. Senior management is often groomed up through the infrastructure owner’s business and therefore also has no telecommunications experience or expertise. Internal communications personnel, if employed by the infrastructure owner, are often not part of senior management. These personnel are sometimes inclined to provide senior management and the board with ambitious plans for a standalone telecommunications services business requiring capital which is unavailable and involving operating risk to which the infrastructure owner is institutionally averse. This may result in a vacuum of advice which is properly gauged to the utility’s resources and appetitive for risk.

244. Senior management’s lack of relevant experience and capital, coupled with the sometimes unrealistic or disconnected recommendations of internal communications personnel, often creates a paralysis of indecision. The utility is afraid to move ahead with any of the common business models discussed in Module 3 for fear it may adopt a suboptimal model. Sometimes, if it is able to accumulate or receive a grant or appropriation of necessary funds, the utility may seek guidance from experienced outside advisers. This decision alone can be years in the making and then take another lengthy period to execute. Each step in the process requires another cycle through the utility’s management team, board of directors and responsible minister(s). A special appropriation to procure outside advisers may need to be approved. The selection and contracting of the advisers must be carried out through competitive bidding under public procurement rules applicable to the state-owned enterprise. This is further complicated by the utility not even having sufficient experience and expertise to properly prepare the terms of reference for procurement of outside experts. Meanwhile, any infrastructure sharing opportunities which may have initially prompted
this exercise evaporate as the potential telecommunications operator customers make alternative plans to source their fiber networks.

245. Some infrastructure owners have successfully overcome these barriers and established successful telecommunications commercialization activities. One excellent example is Internexa in Colombia, which is highlighted in Box 18.

246. Another impediment to cross-sector infrastructure sharing is a lack of standards for joint use of infrastructure. Installation of telecommunications equipment on some host infrastructure can cause operational issues for the infrastructure owner and potential conflicts between the owner’s use and the telecommunications operator’s use of the infrastructure. For example, in the electricity sector, the attachment of cables to transmission towers carrying high voltage lines is potentially dangerous and requires skilled workers. In the network sector, installation of cables in ducts along high-speed highways similarly raises safety issues for workers. In both cases, beyond safety issues, decisions need to be made about whether and how to disrupt the primary use of the infrastructure to accommodate the installation process (as well as later maintenance and repairs).

247. In the case of electricity transmission infrastructure, if there is a power outage, the presence of the telecommunications attachments may impede the restoration of power and also present utility crews with conflicting priorities of whether to delay power restoration while repairing damage to telecommunications facilities or to restore power without repairing the telecommunications facilities. Countries with less experience with such joint use (and sectors that have less experience hosting telecommunications equipment) tend to have fewer resources to guide parties in determining allocation of responsibility and proper procedures.

248. For example, when Lesotho Electricity Company and Vodacom Lesotho entered into a pole attachment agreement, they looked to South Africa and the ITU for safety standards. Lacking any personnel skilled and experienced in the installation of fiber on electric distribution lines with the power on (a common practice in many countries), they had to design the construction project to proceed with the power turned off during installation. This raised issues about mitigating the adverse impact with the electricity regulator and electricity customers of the planned power outages. It also resulted in a loss of electricity revenues for the electric utility. While these issues did not stop the project, they added unnecessary financial cost, political and public relations issues, and project complexity, and they slowed down the construction timetable.
