6 How policymakers, lawmakers and regulators can help

279. Policymakers, lawmakers and regulators can facilitate cross-sector infrastructure sharing in two ways. The first is to foster conditions conducive to more voluntary, market-based sharing through removal of disincentives and the possible introduction of positive incentives. This is the *carrot approach*. The second way is to intervene where market-based activities fail or are considered very likely to fail to achieve desired levels of infrastructure sharing. This approach, which may involve mandated access or regulation of access terms, is the *stick approach*. The optimal policy and regulatory equilibrium likely require a combination of carrots and sticks in most countries.

280. As a general theme, in the view of the author of this toolkit, existing interventions in many countries put too much emphasis on the sticks and too little on the carrots. Even where the sticks are the appropriate tool, existing approaches often overregulate (use a bough when a twig will do) or focus on the wrong behavior to regulate (hitting the wrong person with the stick).

281. Starting with the carrot approach, some general themes are relevant. Fostering the voluntary collaboration necessary for cross-sector infrastructure sharing requires mutual understanding by stakeholders of internal institutional constraints, incentives and dynamics within their own organizations and those of other stakeholders. Similarly, based on such an understanding, policymakers and regulators can take proactive steps to facilitate infrastructure sharing by removing disincentives and impediments. Unless understood and properly addressed by policymakers and regulators, such constraints can impede the business and policy goals of increasing the incidence of cross-sector infrastructure sharing. Failure to properly understand such institutional differences and limitations can also lead to unintended negative consequences.

282. Turning to the stick approach, some other general themes are relevant. First, with respect to land use rights, individual landowners whose land lies under existing utility corridors typically have little strategic interest in approving the addition of telecommunications facilities to the existing infrastructure, and even where many voluntarily approve such a project, one holdout can stop an entire project or hold it hostage to an unreasonable demand. The stick of telecommunications operators having eminent domain rights is therefore an essential element of any cross-sector infrastructure sharing policy. Second, where infrastructure is owned by state organs, as opposed to fully corporatized state-owned enterprises, financial incentives are sometimes inadequate motivators for those state organs to support infrastructure sharing requests in a timely and cooperative manner. Some additional sticks are therefore also useful in this context. This is particularly the case with respect to municipal governments and state authorities with control over roadways. Third, corporatized state-owned utilities, on the other hand, are often motivated to act commercially if regulatory and financial barriers are removed and they are provided with sufficient leeway to invest some resources in an infrastructure sharing department. These actors therefore deserve some deference before the sticks are bought in, and in many cases this can be reserved for intervention when they are found dominant in a relevant market or otherwise to be engaging in anticompetitive behavior.

283. Above all else, it is crucial to develop a harmonized and holistic approach across all distinct government actors, including policymakers, regulators and those responsible for state-owned enterprises. This can be reflected as a component of a country’s broadband policy. This module examines some key options available to lawmakers, policymakers and regulators to improve the
incidence and outcomes of cross-sector infrastructure sharing through an optimal combination of carrots and sticks.

6.1 Remove financial disincentives via infrastructure owner’s sector regulator

284. Submodule 4.1 discussed the financial disincentives to infrastructure sharing created by applying traditional rate regulation principles. The incidence of infrastructure sharing can be increased by applying an approach to rate regulation of utility infrastructure owners which removes the financial disincentives for sharing, while still properly balancing the interests of their core business customers and shareholders. In some cases, regulators may have discretion to pursue these options within existing statutory frameworks, while in other cases lawmakers may first need to amend the statutory framework. Education and clear articulation of a policy are also very important elements.

285. One approach to such incentive regulation is for the regulated utility to share revenues from its infrastructure sharing business with the core business rather than share costs of the shared infrastructure. This approach aligns the interest of the utility (or its shareholders, if investor-owned) and its core business ratepayers, while achieving greater regulatory certainty and reducing accounting difficulty and discretion. This approach can be tailored to each individual situation by adjusting the percentage of the revenue share. Under this approach, the core business continues to bear the baseline fixed and variable costs of infrastructure which it would have incurred in any event (whether the infrastructure is shared or not) and the infrastructure sharing business only bears the incremental fixed and variable costs incurred due to the shared use.

286. Revenue sharing is an efficient and effective means of allocating risks and rewards between rate-regulated and non-rate-regulated business units. It achieves absolute regulatory certainty as to the financial and accounting impact of various related-party and third-party transactions. It is very straightforward to administer. In addition, it can be calibrated, by adjusting the percentages of revenue to be allocated to the relevant business units, to take account of such factors as the level of investment and risk assumed by the ancillary business (such as investment in equipment to provide telecommunications services), the minimum percentage of revenue needed to allocate to the ancillary business to properly incentivize management, and other market and institutional factors.

<table>
<thead>
<tr>
<th>Box 15: Revenue sharing between core and non-core businesses can improve the financial incentive for utilities to share infrastructure</th>
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<tbody>
<tr>
<td>The following are examples of revenue sharing arrangements approved by regulators which recognize the benefits of establishing equitable methods of sharing rewards between utilities and their ratepayers and which also achieve regulatory certainty and provide stronger incentives for utility management to pursue alternative revenue sources. Two cases are from the United States, one state and one federal, and one case is from India.</td>
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90 Revenue sharing as described in the main text has been expressly approved by utility regulators in some jurisdictions. In other jurisdictions, such as some European countries, where it has not yet been considered as an option, revenue sharing is consistent with the developing policy of incentive-based rate regulation. See Ernst & Young, Mapping power and utilities regulation in Europe supra at 7.
In 2014, Southern California Edison, a rate-regulated electric utility, obtained approval from the California Public Utilities Commission, of a proposed revenue sharing arrangement for dark fiber leases. The decision referenced prior approval of revenue sharing for conduit and pole leases. All these infrastructure sharing transactions were entered into by the electric utility with telecommunications operators. Under the approved arrangements, gross revenue from passive services would be allocated 70% to shareholders (i.e. as unrestricted income of the electric utility) and 30% to ratepayers (i.e. to reduce revenue requirements from electricity tariffs), while gross revenue from active services would be allocated 90% to shareholders and 10% to ratepayers. The decision indicated that revenue from dark fiber leasing was considered active service revenue.91

In 2007, Pacific Gas & Electric Company, also a rate-regulated electric utility, obtained approval from the US Federal Energy Regulatory Commission of a 50-50 sharing arrangement for net revenues (i.e. gross revenues less the incremental costs of the ancillary business activity) between shareholders and ratepayers for a variety of ancillary uses of the electric utility’s assets by telecommunications operators. These ancillary revenue sources included right-of-way use for telecommunications lines and facilities, attachment of fiber optic cable to transmission towers and distribution poles, and attachment of wireless antennas to transmission towers.92

In India, the Electricity Act 2003 codified the revenue sharing approach by requiring electric transmission utilities to share a proportion of ancillary revenue to reduce transmission and wheeling charges. In a 2007 decision applicable to all electric transmission utilities in Central India, the New Delhi Central Electricity Regulatory Commission interpreted how revenue should be shared in the case of right-of-way and/or tower use for buried fiber optic cable and aerial OPGW. The Commission’s decision applied a fixed monetary amount per kilometer, rather than a percentage of revenue received from the telecommunications operator, as the required revenue share. Thus, while the Electricity Act progressively embraced revenue sharing over cost sharing, the regulator appears to have reverted to a cost sharing approach and imposed its own view of the costs that should be apportioned. By mimicking a baseline cost sharing approach rather than a revenue sharing approach, the Indian regulator’s decision appears to have limited the usefulness of the approach intended by the legislature in calibrating the internal payments to the value of the external commercial transaction.93

287. An edge case variation of the revenue sharing approach is for the utility to retain all incremental revenue from infrastructure sharing while not reducing its core business revenue requirements. This would apply to infrastructure which has been prudently acquired and remains used or useful in the core business. Under this approach, the core business would continue to bear all baseline fixed and variable costs which it would have incurred in any event with or without use of that passive infrastructure to provide external telecommunications services. The infrastructure sharing business would only bear any incremental fixed or variable costs incurred to make the


excess capacity available for joint use in the telecommunications sector. In many jurisdictions, this is the approach followed between rate cases, while the utility’s allowed regulated core business revenues are reduced during the next rate case. Extending the zero-impact-on-tariffs approach indefinitely (or at least for an extended period) would increase the financial motivation for sharing, and may also be appropriate to enable undercapitalized state-owned enterprises to accumulate working capital which can be reinvested in the core business.

288. This approach would maximize regulatory financial incentives by allowing the utility to retain all net income from the infrastructure sharing business. In many cases, the incremental costs of joint use of passive infrastructure, such as rights of way, towers, poles, ducts and dark fiber, may be zero or relatively small with respect to both fixed costs and variable costs. The infrastructure sharing business would thus receive all revenue from the infrastructure leases and against that revenue would charge the costs of its personnel, office space and equipment and various other administrative and professional costs, but would realize a significant profit from the endeavor. This would provide the strongest financial motivation for infrastructure sharing.

289. Though this approach appears to disband with reducing the utility’s regulated tariffs to offset any of the gain from the infrastructure sharing business, it still benefits core business customers by providing the utility with an additional source of working capital and larger sums of capital for reinvestment in its core business. This is particularly the case for state-owned enterprise utilities where a state shareholder is unable or unwilling to fund capital investment and the utility does not otherwise have access to equity capital markets. Unfortunately, the incidence of infrastructure sharing in some developing countries is recent and clear embracement of these incentives by utility sector regulators is lacking in most developing countries. There is much opportunity for improvement.

6.2 Ensure open, equal and efficient telecommunications access to corridors

290. A key component of any public policy designed to facilitate cross-sector infrastructure sharing is to ensure that telecommunications operators have access to existing and planned land corridors established for other public or private purposes. Without the ability to acquire or perfect end-to-end land rights, a telecommunications operator will be unable to build a new network, extend an existing network or commercialize excess capacity on an existing internal utility network. From the standpoint of the motivations for infrastructure sharing, it is much more efficient and economical to ensure that telecommunications operators have access to corridors already established or planned for other purposes than to require them to assemble their own corridors. But they need well-defined legal rights to do this.

291. Effective laws providing for telecommunications operators to have access to land corridors are a fundamental component of ensuring optimal cross-sector infrastructure sharing. Such laws are sometimes found in lands acts, in provisions of laws of general applicability to public service utilities or sector-specific laws or a combination of these. To be effective, they should ensure that such access is open, non-discriminatory and efficiently administered. Thoughtful laws and regulations will seek to balance the competing interests of the telecommunications operator and landowner in accordance with constitutional principles of the relevant country regarding rights of private property owners. When so drafted and reasonably applied, such laws and regulations can play an important and helpful role in facilitating sharing of established corridors for use by telecommunications operators.
292. As noted in Submodule 5.2, the land in the relevant corridors may be under public, private or tribal (traditional) ownership and control or a combination thereof. The substantive and procedural requirements for access by a telecommunications operator will need to be different depending on whether public, private or tribal land is involved. Traditional and tribal land use rights may require another layer of procedures.

293. Access to the corridors established for public roads and highways is critical to the development of almost every broadband network, as the road reserves often offer the only viable option for the last mile to reach the customer premises (for wired networks) or the communications tower (for wireless networks). Most jurisdictions afford licensed telecommunications operators with rights of access to public roads and rights of way, but these rights of access are too often subject to a wide array of different required approvals and oversight by multiple government authorities. Encountering unexpected delays or hurdles during the planning and construction process is not uncommon. Policymakers, lawmakers and regulators can often do more than they have done to facilitate efficient and beneficial use of public roads and highways for telecommunications facilities. Relevant measures may include providing for one-stop shopping, streamlining and harmonizing permitting and approval processes, better planning and coordination of public works, managing of congestion, requiring coordination among competing users, and the anticipating and preparing for telecommunications (and other compatible) uses through the installation of ducts during construction or renewal.

294. To undertake works that require digging or disturbance of the roads and/or the road reserve, a telecommunications operator must typically obtain authorization from the relevant administrator of the roads. In many countries, these may be under different authorities depending on whether the roads are national, provincial or municipal. Existing procedures will typically exist, but may be slow and burdensome, may involve time limits, evaluation procedures and costly fees, and will often require restoration of the roads to their original condition. Some countries even require advance notice running into years. Legislation may assist in enabling sharing to occur more effectively and efficiently if it directs the relevant authorities responsible for such approvals to cooperate in requests for works by telecommunications operators that involve digging in or along the roads under their authority. Such legislation could also provide for greater advance notice of, and a right to coordinate works with, roadway improvement projects which may afford telecommunications operators more efficient and less costly alternatives for installing infrastructure in roadways and road reserves. For example, this would facilitate the installation of telecommunications ducts at the time of the construction or widening of a roadway. Regulatory initiatives within existing statutory frameworks are also possible.

295. Access to road infrastructure must of course be balanced with the importance of ensuring that road works are managed in an orderly fashion. For example, it may not be appropriate to allow telecommunications operators to dig up roads that have very recently been built or restored. Such restrictions on digging up roads are not unusual, and serve to preserve public property and resources and avoid the extensive nuisance that works and digging entail for the general public and for other users of the roadway reserve. Such objectives are common.

296. Most potential impediments that such restrictions may cause can be addressed through coordination among relevant public authorities, telecommunications operators and other corridor users. They could further be addressed by establishing clear guidelines, to be transparently administered, for acceptance or rejection of applications for works. Such guidelines can provide objective criteria to help road administrators balance the objective of preserving public property
and minimizing public nuisance (by avoiding repeated or unnecessary digging and damage to roads and risks to other corridor users) with the objective of facilitating the build-out of a modern telecommunications infrastructure (by allowing necessary digging in or along the roadways). Such criteria can specify the conditions under which a request to dig may be rejected and require the relevant administrator to articulate the reasons for rejection. One example of such coordination policies is the National Joint Utility Notification System adopted by utilities, roads authorities and telecommunications operators with 13,000 participating enterprises in 28 states in the United States.\footnote{See National Joint Utility Notification System (NJUNS) website at \url{http://web.njuns.com/} (last visited 11 Feb 2017).}

297. Legislation can also be directed to the relevant traffic management office, police or their equivalent and municipalities to ensure that each such administrator is officially instructed to cooperate in requests for approved works involving disruption of traffic on the roads and streets under its authority.

298. In addition to coordination and approval of temporary works, new telecommunications installations also frequently require permission for permanent occupancy and use of public or private property. Many cross-sector infrastructure sharing opportunities for telecommunications operators involve the installation of buried or aerial fiber optic cable under or above public land. Thus, where a telecommunications operator plans to install fiber optic cable in utility ducts or pipes or on utility distribution poles located in public rights of way, the operator must also obtain authorization from the relevant public administrator to use and occupy the public land.

299. In some cases, the roadway reserve may already comprise a dedicated easement in which all compatible public uses are permitted, provided that subsequent users do not jeopardize or compromise the earlier uses. Public easements may exist along most or all streets and roads. Subject to proper approval and carrying out of the public works by the telecommunications operator, these rights of use may be sufficient, subject only to the approval of the relevant ministry or utility to use its fixtures or improvements. In other cases, the telecommunications operator may require express approval to place permanent facilities in the roadway. This may be in the form of route-specific permits or blanket approval for all streets in a particular geographic area.

300. Pricing of access to public roads and highways varies widely from one jurisdiction to the next. In some countries, access to these public rights of way is considered a significant and reasonable revenue-generating opportunity for public authorities.

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**Box 16: Charging of recurring fees for telecommunications use of public streets**

In the United States, where use of public streets and rights of way for fixed-line access networks (as well as other utility installations) generally requires authorization from municipal authorities (city, town or county governments), it is common practice for many such authorities to grant a blanket authorization (commonly known as a *franchise*) to install, operate and maintain telecommunications facilities along or under public streets in consideration of the operator’s commitment to pay a *franchise fee* equal to a percentage of all revenue generated by the operator’s business in the municipality. The percentage varies, but typically does not exceed 5\% (which is the cap on franchise fees for cable television operators allowed under US federal law\footnote{47 U.S.C. §542.}). Similarly, in the United States, state and federal roads authorities often charge a per-mile per year fee for
telecommunications facilities installed along state and federal highways (which is typically higher in urban areas than in rural areas).\(^{96}\)

301. On the other hand, in many jurisdictions, access to public rights of way is provided at no charge (other than administrative charges for permitting and supervision of works). These jurisdictions consider use of public rights of way for the installation of facilities to provide public telecommunications services as a permitted public use which benefits public welfare and therefore should not require payment of any fee.

302. Access to private roads and other private land comprising part or all of an existing corridor is a subject which has been less adequately addressed in many jurisdictions than access to public roads. Access to private roads is often important to achieving last mile access network connectivity. The number and importance of private roads has grown significantly in recent decades, with such roads serving gated communities or office parks in suburban and rural settings and limited access areas in urban settings. Access by telecommunications operators to these private roads is essential as part of the last mile connection to reach customers in the communities, office parks and other areas served by the roads.

303. Not infrequently, the developer of a project which is served by a private road may have established utility easements in the road but only granted access to specified utilities and telecommunications operators at the time of developing the project. The developer may not have made provision for subsequent access by other telecommunications operators, particularly if the project was completed prior to the introduction of competition in fixed telecommunications markets, or may have delegated this power to the property manager or homeowners association. The subsequent owner(s) or association with authority over access to the road may attempt to exclude new entry by telecommunications operators, possibly even as part of an exclusive arrangement entered into with their competitors. Where a private road serving a community is not under the control of a single community association, but is instead owned by all the abutting landowners with some mutual rights of ingress and egress (a structure often employed in back alleyways in some cities), then a single landowner may prevent access by a telecommunications operator even if all other landowners have consented to use of the corridor.

304. Private lands, other than roads in private communities, are more likely to be important to intercity corridors, such as those followed by railways, electric transmission lines and pipelines. Private lands may also be an issue for limited access toll roads. In many cases, the corridor was established by the railway, electric utility, pipeline or toll road owner acquiring easements or similar legal rights that run across hundreds or even thousands of parcels of land, each with a separate owner or owners. Some of the traversed land may also be encumbered by mortgage or lien holders who may have approval rights over granting further easements.

305. It is important to emphasize, as discussed in Submodule 5.2, that a railroad, utility, pipeline company or toll road operator with an existing installation in an intercity corridor does not control the underlying land unless it has purchased full ownership of that land (which would be unusual). While the utility will necessarily have received rights to traverse and use the land for purposes of its own infrastructure (such as a railroad, electric transmission line, pipeline or roadway), these

rights will typically not encompass the right to install or operate commercial telecommunications facilities, even if they contemplate internal telecommunications, especially in the case of older rights of way. Moreover, where a state-owned utility is the existing user of a long-established corridor, there may be little or no documentation setting out the scope of its rights of use. Those rights may be presumed to be limited to its core utility business and to exclude commercial telecommunications services.

306. Indeed, to the extent a railroad, utility or pipeline company relied on rights of compulsory acquisition to assemble rights of way in a land corridor in the first instance, it would have been unable to acquire rights to construct and operate any improvements and fixtures other than those relating to the public service business which afforded it the right of compulsory acquisition. Such easements are also often not divisible or assignable so that any rights the utility may have received from the underlying landowner to install and operate commercial telecommunications facilities may not be capable of being divided from the utility’s rights to operate its core business infrastructure or of being assigned (in whole or in part) to a telecommunications operator which wants to share its improvements and fixtures in the corridor. Under these typical circumstances, the telecommunications operator will need to secure its own rights of use of the land in the corridor directly from the underlying owner.

307. While a telecommunications operator will generally not be prohibited from acquiring easements or other rights of use in private roads or other private lands, its ability to do so, and its ability to obtain such rights on fair and reasonable terms, can be very tenuous unless it has a right of compulsory acquisition of easements over private land. Moreover, where a corridor traverses multiple parcels with different owners, a single holdout can block an entire project or extort an unreasonable price for easement rights. Many countries afford such compulsory acquisition rights to telecommunications operators. Some also provide for intervention of the sector regulator to aid the operator in reaching agreement with landowners without recourse to legal proceedings. For example, Samoa’s Telecommunications Act 2005 provides that where a service provider requires access to private land to install facilities but cannot reach agreement with the owner, the Office of the Regulator will mediate between the parties. If no agreement is reached, the service provider may then proceed to the Courts for consideration.

308. In most countries, land ownership and other private property rights typically have constitutional protections against expropriation or involuntary taking. Where telecommunications operators have been provided with compulsory taking rights, these are usually relatively narrow and limited in scope. As a prerequisite, the telecommunications operator will need to demonstrate that the taking is for a proper public purpose, which should expressly include the establishment of a public telecommunications network or facility. The operator will also be required to pay the owner fair and reasonable compensation. In this respect, fair and reasonable compensation generally means recovery of market value, not cost, and, if the owner and operator cannot reach agreement voluntarily, would typically be determined by a court or administrative tribunal in a hearing in which both parties are entitled to present evidence.

309. Usually, the additional compensation payable by a telecommunications operator to perfect rights of way in an existing corridor over private lands is relatively nominal in comparison with the compensation which would be payable by the utility which originally acquired the easement from the landowner if it were to acquire the rights of way at the same time. For example, where electric transmission lines have been installed over private lands, the value of the landowner’s residual rights may have been reduced to only 5% of the value before installation of the facilities.
This is because the remaining compatible uses have been severely limited. This means the utility will already have compensated the landowner for 95% of the land’s original value when acquiring its easement. Therefore, any compensation required from a telecommunications operator proposing to acquire an overlapping easement would primarily go to the utility rather than the underlying landowner. The latter point is often overlooked in existing mandatory sharing laws directed at utilities which specify a cost-based rather than value-based formula. In some jurisdictions, these laws may conflict with constitutional protections of private property.

310. In many countries, in addition to public and private ownership, a telecommunications operator must consider whether and how traditional and tribal land use rights may be implicated as part of cross-sector infrastructure sharing, which is more likely in intercity transit networks. The particular nature of these rights varies substantially from jurisdiction to jurisdiction and a detailed examination is beyond the scope of this toolkit.

6.3 **Tread carefully in regulating cross-sector joint use of facilities**

311. Access to improvements and fixtures, such as poles, ducts, conduits, towers and fiber, generally merits separate treatment from access to land corridors. Any successful infrastructure sharing partnership must be designed to result in a win-win for both the telecommunications operator and infrastructure owner. It cannot just be a win for the telecommunications operator, although this is the approach taken by many infrastructure sharing laws. It should be clear that what the telecommunications operator’s business case does not offer to the infrastructure owner cannot easily be overcome by enacting a legal mandate. If the infrastructure owner’s refusal to allow shared use is due to inadequacy of the compensation offered or available, or other valid operational or commercial considerations, then a legal mandate to share will not improve the value to the owner or solve the owner’s other objections. The mandate will be met with resistance.

312. The circumstances attending joint use scenarios are usually much more complex than those relating to access to land. In many cases, access by a telecommunications operator to third-party improvements and fixtures creates significant burdens for the infrastructure owner and creates additional operational risks to the safety, reliability and efficiency of the infrastructure owner’s facilities and hence its ability to meet service level commitments to its core business customers (which, if it is a monopoly provider, often have no alternative). Joint use of facilities also requires significantly greater ongoing cooperation and interaction between the telecommunications operator and infrastructure owner, such as in respect of operations, maintenance and restoration, than does the use of a land corridor.

313. Moreover, in contrast with land corridors, access to improvements and fixtures, while beneficial to a telecommunications operator in terms of cost savings and accelerating deployment time, are less likely to be essential to the technical feasibility of network buildout or to achieving financial viability. On the other hand, due to the growing need of most infrastructure owners to have their own telecommunications networks, joint use of facilities offers infrastructure owners strategic as well as monetary value. In other words, in contrast with access to land, in the case of facilities, the owner has more interest in attracting the telecommunications joint user and the telecommunications joint user has less interest in the owner’s facilities (because it may have other options). This is much more likely to establish relatively equal bargaining power between owner and user and therefore is more conducive to voluntary market arrangements.

314. Providing for regulatory intervention for cross-sector joint use also presents significant risk of inherent regulatory bias. Unless the infrastructure owner and telecommunications operator are
both regulated by the same multi-sector regulator, enforcement of mandatory sharing legislation must be entrusted to the regulator either of the infrastructure owner’s sector (such as electricity, water or railways) or the telecommunications sector. In either case, the enforcing regulator will have expertise in only one of the two sectors involved and will typically also have a statutory mandate to promote the development and performance of the sector over which it has regulatory authority. Under these circumstances, the regulator is prone to be less sensitive to the needs of the party in the other sector and to favor the party of the sector it regulates in reaching a decision. In many countries, enforcement of mandatory cross-sector facilities sharing is endowed upon the telecommunications regulator and there is evidence of regulatory bias in favor of telecommunications operators over infrastructure owners. A better model would consider the best interests and policy objectives relating to both impacted sectors. For example, while this toolkit extols the benefits for broadband of infrastructure sharing (and how best to achieve those benefits), an equally compelling narrative could extol the benefits to other sectors and how best to achieve those benefits. Policymakers should take a holistic view of all those narratives and sector regulators need to be directed to focus on the common good by harmonizing and coordinating their interventions.

For these reasons, it is therefore usually better policy to approach cross-sector joint use of facilities carefully, relying to the greatest extent possible on voluntary commercial arrangements, rather than mandatory access.

Legislative and administrative practices in respect of cross-sector sharing of improvements and fixtures vary considerably across jurisdictions. Although the differing approaches form a range from no regulation to heavy regulation, for simplicity, they can be considered as falling into four major categories.

The first category is those jurisdictions which make no provision in their laws for joint use of infrastructure across sectors. This is the case in a surprisingly large number of many developing countries otherwise known for have a progressive and proactive legal and regulatory climate, such as Kenya and the Bahamas.97

The second category is those jurisdictions whose laws state that a telecommunications operator has a right to use existing improvements and fixtures with the permission of the owner. In these jurisdictions, the telecommunications operator’s remedies, if it cannot reach agreement with the owner, may be limited to seeking intervention by the sector regulator as a mediator or to no remedy at all. In these jurisdictions, neither the access seeking operator nor the regulator has actual legal authority to force the infrastructure owner to allow shared use. While they may appear weak, such infrastructure sharing laws establish the principle of sharing, and therefore may provide impetus and foundation for infrastructure owners to anticipate and prepare for sharing. They also afford telecommunications operators and regulators with some leverage in their discussions and negotiations with infrastructure owners, while still leaving the making of deals to situations where both participants find mutual benefit.98


319. In the third category of approaches, the telecommunications operator may have a right of compulsory access, within defined parameters based on administrative or judicial intervention, but only after the telecommunications operator first exhausts reasonable efforts to negotiate a voluntary commercial arrangement with the infrastructure owner. These laws will typically not empower the regulator to impose ex ante regulation on the infrastructure owner, but rather only to impose ex post remedies in the case of failed negotiations at the request of the telecommunication operator seeking access.

**Box 17: Ex post remedy approach to mandated infrastructure sharing**

One example of mandated infrastructure sharing legislation that limits regulatory intervention to ex post remedies is Article 39 of Lithuania’s Law on Electronic Communications. Article 39 grants providers of public communications a means of accessing “electronic communications infrastructure,” which includes passive infrastructure such as pipes, ducts, towers, masts, buildings, structures and other facilities. The Law encourages telecommunications operators and infrastructure owners to negotiate the terms of access without intervention. However, under Article 39, the Communication Regulatory Authority may ultimately compel an infrastructure owner to share its infrastructure on non-discriminatory terms, so long as the sharing is cost efficient and does not require significant additional work.

Another example of infrastructure sharing legislation that limits regulatory intervention to ex post remedies, although exhibiting some scope creep into ex ante regulation, is the 2014 EU Directive requiring Member States to ensure that owners of most non-telecommunication physical infrastructure grant reasonable requests from public communication networks for access under fair and reasonable terms, which specifically includes “price.” Refusal of access must be based on objective, transparent and proportionate criteria as outlined in the Directive. By outlining criteria, the Directive itself imposes some ex ante regulation of infrastructure sharing.

320. The fourth category of mandatory access legislation empowers a regulator, often the telecommunications sector regulator, to promulgate ex ante regulation of infrastructure sharing as well as to impose ex post remedies. This is the heaviest form of intervention, and often involves ex ante price regulation (without any requirement to determine whether the infrastructure owner is dominant or has significant market power in the relevant market) as well as comprehensive regulation of the procedures for assessing and responding to access requests. Ghana and the United States both fall within this category of regulation of utility installations.

321. The authors of this toolkit are not aware of any comprehensive comparative economic study of the impact of these four different approaches to joint use of facilities. Such a study may be useful in providing an economic impact assessment of alternative approaches to the topic. Absent such analyses, the authors suggest that the optimal approach is the following hybrid of the second, third and fourth categories:

- The second category (voluntary-only sharing with regulatory mediation where agreement cannot be reached) would be applied where a particular type of joint use is experimental or

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not well-developed and/or poses significant operational risk to the infrastructure owner. One example would be broadband over power lines technology, where a telecommunications operator uses the electrical conductors of an electricity transmission or distribution lines as wave guides for high frequency communications carrier frequencies (in a similar manner to how DSL uses phone lines and cable modem uses coaxial cable television cables).

- The third category (mandatory sharing but with regulatory intervention limited to \textit{ex post} remedies after voluntary efforts have been exhausted) would be applied in situations where the type of joint use of a particular type of facility is well-developed and poses relatively little operational risk to the infrastructure owner.

- The fourth category (mandatory sharing with both \textit{ex ante} and \textit{ex post} regulatory intervention) would be applied where an infrastructure owner has been determined by a regulator based on a market assessment to be dominant or has been found by the regulator to have engaged in anti-competitive conduct.

322. The breakdown of infrastructure owners, infrastructure types and types of joint use among these three categories of regulatory intervention will necessarily be context-specific and so will inherently vary from one jurisdiction to the next.

323. Regulators should closely monitor and police infrastructure owner conflicts of interest, which are particularly likely to occur where the infrastructure owner, or its affiliate or commercial partner, is itself a licensed telecommunications operator which competes with potential infrastructure sharing customers. Host infrastructure owners have increasingly established commercial telecommunications divisions, subsidiaries or partnerships. When the infrastructure owner is affiliated or in partnership with a telecommunications operator, then this may form the commercial basis for excluding other telecommunications operators from gaining access to the same infrastructure. That may not be a bad policy result if the infrastructure owner’s resources are used to counterbalance another dominant telecommunications operator in the market. But it may suppress competition where the host’s affiliate is dominant in the relevant market, such as intercity and backbone fiber networks. Some regulatory scrutiny is therefore merited in these circumstances before deciding whether regulatory intervention is or is not warranted. This requires a market assessment in which the infrastructure owner may be considered as operating in some of the same relevant telecommunications markets as its customers and therefore subject to operator-to-operator scrutiny for sharing.

324. Even where stronger telecommunications operators seek access to shared utility infrastructure, the decision whether to regulate the infrastructure owner should be based on its market power, not the market power of its customers, as long as it does not enter into exclusivity or non-compete agreements which restrain it from offering similar infrastructure sharing arrangements to the competitors of its earlier customers. For example, in the case of \textit{Société de Gestion de l’Energie de Manantali} (SOGEM), the three member-country incumbent telecommunications operators sought sharing of dark fiber with SOGEM. This had the positive impact of significantly increasing the national backbones in Senegal, Mauritania and Mali, and increasing the international connectivity of the Western African region as a whole. As long as the infrastructure owner is not restrained from offering its remaining available capacity to competitors of these incumbents, it has every financial motivation to do so in order to maximize its revenue from infrastructure sharing.
325. Even where strong enforcement capacity is present, excessively intrusive sharing laws may result in inefficiencies and frustrate voluntary arrangements. They may also lead to disinterest or reluctance by infrastructure owners to promote their infrastructure for sharing. Where one-sided legislation is present, even when telecommunications operators call on host utilities to share their infrastructure, the utilities can be recalcitrant and difficult partners, believing they are receiving the short end of the arrangement.

326. When it can function competitively, a market where the potential for profit serves as the primary incentive for entry and competition serves as the primary regulator of behavior is preferable to a market governed by legal mandates. Most utilities in developing countries are starving for revenue and investment capital. They often have to cut their budgets because the sector regulator will not approve recovery of all the investments proposed when establishing revenue requirements in their rate cases. Moreover, due to capital constraints, they do often not have access to the capital to invest even if they could include the investment in their rate base. They rely almost entirely on donor grants and loans, or government appropriations, and to a much lesser extent on their limited ability to accumulate capital from earnings. The infusion of cash from an infrastructure sharing deal provides much-needed oxygen.

6.4 Apply competition law principles to assess need for ex ante regulation

327. Treating a utility entering the telecommunications infrastructure sharing market with the level of regulation appropriate to its degree of market power in such infrastructure market is generally the most pro-competitive and pro-investment policy approach. This is generally the case whether the utility provides passive infrastructure such as towers or dark fiber or offers telecommunications services. In particular, the incentive for the utility to enter the market at all may depend on not imposing heavy ex ante regulation on its offer. It is much easier for a conservative utility, which already faces significant regulation of its core business, to avoid the regulatory uncertainty and adversity of entering a new market with questionable financial upside than to do so and then find itself unable to exit.

328. Leaving aside experimental infrastructure sharing,100 which the authors believe should be encouraged rather than regulated, the key question for policymakers and regulators is when to apply ex ante remedies and when to limit regulation to ex post remedies. For purposes of this discussion, this distinction should be considered both in respect of remedies imposed by the legislature and those imposed by sector regulators or competition authorities (i.e. those which flow from their statutory authority). The first step in selecting between ex post and ex ante regulation should be based on a market assessment to define the relevant markets and assess the market power of infrastructure owners in the relevant markets.

329. Submodule 4.2 discussed the financial disincentive to infrastructure sharing created by price regulation in mandatory infrastructure sharing laws. Economically unjustified regulation of infrastructure sharing prices is usually counterproductive if the aim is to increase the incidence of

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100 One example of experimental infrastructure sharing is broadband over power lines. Originally introduced through a series of technology trials in the late 1990s (and even deployed commercially in a limited number of areas), broadband over power lines employed electric power line conductors as wave guides for high frequency radio transmissions, which could be used as carrier waves for telecommunications, much in the same way as copper lines and coaxial cables are used as wave guides for DSL and cable modem services. More recently, AT&T has announced technology trials to use the electric field around power lines as a wave guide. See Aaron Pressman, “AT&T Says It Has a New Take on Fast Internet over Power Lines,” Fortune (20 Sep 2016). Available at http://fortune.com/2016/09/20/att-internet-over-powerlines/ (last visited 14 Feb 2017).
infrastructure sharing. Generally, infrastructure sharing price regulation is appropriate only when the infrastructure owner has been found to be dominant and its pricing is an abuse of such dominance or where there is evidence of collusion between the infrastructure owner and others with similar infrastructure.

330. Dominance should be determined by sector regulators based on general competition law principles in accordance with traditional economic tests of market power. Most telecommunications laws which have been updated to reflect best practices have established standards and procedures for assessing market power in the context of telecommunications services. These same standards and procedures can and should be applied to the wholesale markets for passive infrastructure.

331. Regulators should consider available substitutes for the infrastructure being considered in defining the relevant market and determining the market power of the infrastructure owner. For example, where an electric utility has available dark fiber running between two cities, the available substitutes would typically be considered by telecommunications operators as including all other existing fiber connecting the same two cities directly or indirectly, whether following the same or different routes and regardless of differences in distance traversed. Available substitutes would also typically be considered as including the possibility of constructing new fiber between the same two cities along an existing roadway, railway or other right of way. As long as there is reasonable possibility of self-provisioning by an operator between the same two points, which is typically the case in respect of buried fiber along a roadway, this should be considered a reasonable substitute for the utility’s fiber which limits its ability to exercise market power.

332. Where price regulation of cross-sector infrastructure sharing is necessary, regulators or courts must take care in setting regulated price levels. As discussed in Submodule 4.1, there is no principled basis for allocating costs between core business and telecommunications uses of shared infrastructure. This requires some level of arbitrary allocation based on policy considerations, which should respect the public policy in both sectors, as well as the interest of each party’s shareholders and customers. In making this determination, policymakers, regulators and courts should endeavor not to establish prices by which the customers of a utility’s core business are forced to cross-subsidize the telecommunications operator’s customers. Price regulation which is heavily skewed in favor of telecommunications operators can cause significant market distortions, forcing the customers and shareholders of the infrastructure owner to subsidize the telecommunications operator, shifting economic value to its customers and shareholders. Such laws sometimes take unfair advantage of the first mover status of infrastructure owner, rather than following traditional economic principles for determining market definition, assessing dominance and regulating prices.

333. Where an infrastructure sharing law is currently overbroad in allowing price regulation absent dominance, the regulator should consider exercising its prosecutorial discretion to forbear from promulgating and/or enforcing price regulations against infrastructure owners absent evidence of dominance or collusion.

334. From a public policy perspective, providing proper financial incentives and introducing competition in passive infrastructure sharing can obviate the need to impose price regulations and other heavy regulatory burdens on infrastructure owners that strain the capacity of a country’s telecommunications sector regulator and do not properly motivate, and sometimes demotivate, utility infrastructure owners – which is often a major concern in developing countries.
6.5 Address regulatory restrictions that impede sharing by state utilities

335. As noted in Submodules 4.3 and 4.4, many utilities that might share infrastructure are state organs or state-owned enterprises, and the silo structure of government and development agencies often hinders infrastructure sharing opportunities that might otherwise arise. In such situations, the infrastructure in question is considered public property in many legal systems.

336. As previously discussed, infrastructure sharing is often hampered by the institutional structure of such state-owned utilities. State organs are rarely run like businesses and state-owned enterprises only sometimes are. They may lack formal corporate governance structures and processes. They also generally have no experience operating in competitive markets, and may not have the institutional culture to thrive. Where strong corporate governance mechanisms are lacking, state ownership may lead to commercial decisions being driven by government policy goals, rather than the requirements of the market, or may be subject to other political interference. In addition, state organs and state-owned enterprises are often subject to public enterprise regulation, which governs public procurement, disposition of public assets and partnerships and concessions with the private sector. Thus, mitigating these adverse consequences of state ownership can play a significant role in increasing the incidence of cross-sector infrastructure sharing.

337. Many countries have improved the business performance of state-owned enterprises through corporatization. In these countries, state-owned enterprises which were once chartered by special statute have been reincorporated under the commercial company law or business corporation law. This is a positive first step in corporatizing state-owned enterprises so that they operate under the same principles as private enterprises. This includes moving the management of their business under the stewardship of an independent board of directors with statutory fiduciary duties of care and loyalty rather than having the management being under a government department or ministry. Nonetheless, one or more government ministries or departments will usually still retain some level of oversight over the enterprise through the role of representing the government as a shareholder. If these ministries and departments limit their involvement to the annual appointment of board members and if they appoint directors with the proper skillsets and experience, then the corporatization can limit political interference and provide more business-like management to the state-owned enterprise. However, where ministerial or departmental involvement in day-to-day management continues, then these reforms may have a more limited impact.

338. Another positive step taken in some countries is to provide full-scale or limited exemption from public enterprise laws (such as those governing public procurement, disposition of state assets and public-private partnerships) for qualifying state-owned enterprises. Where this has been done, the utility or its infrastructure sharing subsidiary (if structural separation is desired or required) is freed from the shackles of laws meant to restrain government when acting as government and not government when acting as a market participant. The financial discipline of separate accounting can also ensure that the utility operates like a business rather than a government department.

Box 18: Freeing state-owned enterprises from the shackles of public enterprise laws

Colombia-based ISA S.A. E.S.P. (ISA), a majority-state-owned enterprise, operates one of the largest cross-sector infrastructure sharing groups of businesses in South America. ISA’s group owns and operates electricity transmission lines, roads and fiber optic networks, and makes great use of cross-sector infrastructure sharing across all three lines of business. As of 2017, ISA’s,
telecommunications subsidiary Internexa S.A. boasts 29,000 km of fiber optic telecommunications facilities in Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Venezuela.\textsuperscript{101} The group’s slogan is “linear infrastructure systems that boost continental development.”

Parent company ISA is fully corporatized (hence the S.A. suffix in its company name) but remains subject to public enterprise regulation (hence the E.S.P. suffix in its company name) of its electricity transmission business, which generally has a monopoly in the markets served.\textsuperscript{102} In contrast, subsidiary company Internexa S.A., which operates the fiber optic telecommunications business, is also fully corporatized and has further obtained exemption from public enterprise regulation (and hence the absence of the E.S.P. suffix in its company name). Exemption from public enterprise regulation affords Internexa flexibility and efficiency in entering into partnership and other contractual arrangements with infrastructure owners, suppliers and customers, and thereby has enabled it to grow successfully in the highly competitive markets in which it operates.

In Ghana, the Public Procurement Act, 2003 governs procurement by government, ministries, departments, agencies and institutions. The Act only applies to state-owned enterprises to the extent they utilize public funds.\textsuperscript{103} In addition, the Act allows the Minister for Finance the ability to deviate from the requirements of the Act if it is in the national interest.\textsuperscript{104} However, there is no existing interpretation of the extent to which infrastructure sharing activities of a state-owned public utility in Ghana would involve public funds, such as where the shared assets were purchased with a mix of public funding and private finance, nor has the Minister of Finance issued any ruling allowing deviation from these principles. Thus, the planned activities of Ghana Grid Company in sharing its infrastructure with telecommunications operators (see case study on Ghana’s Electricity Transmission Line Fiber) would currently be subject to the full scope of Ghana’s Public Procurement Act.

6.6 Facilitate information exchange and dialogue

Telecommunications operators are proactive in designing and constructing their networks and will often make unsolicited approaches to owners of existing infrastructure about possible sharing opportunities. These overtures can and do lead to completed infrastructure sharing transactions. Likewise, some infrastructure owners have proactively entered the sharing business, hung out their shingles and call on prospective customers in the telecommunications sector. However, some infrastructure owners have not entered the sharing market and telecommunications operators also sometimes face a daunting array of public institutions without clearly identified points of entry to begin a conversation about infrastructure sharing.

Policymakers and other stakeholders can help address these impediments by facilitating greater information exchange and dialogue to raise awareness and understanding of cross-sector infrastructure sharing opportunities (and obligations) and points of entry into state-owned infrastructure owners. This can be accomplished by fostering meaningful dialogue between


\textsuperscript{104} \textit{Id.} §14(1)(a).
telecommunications operators and infrastructure owners. In addition, infrastructure mapping resources can be utilized to create an accessible database of opportunities for passive infrastructure sharing.

341. In many countries, public utilities do not publish information about their infrastructure and are not accustomed to handling requests for information. Government and state-owned enterprises may help by collecting, compiling and supplying this information to telecommunications operators and establishing a process for requests for information about existing and planned public infrastructure. The procedures can ensure that requests relate to genuine telecommunications network planning.

342. Telecommunications regulators may also facilitate requests for information and sharing by compiling, publishing, updating and maintaining for public inspection a list of government departments and utilities that administer infrastructure that might be attractive for sharing and such other information as the regulator considers necessary or useful. This would be done in coordination with such government departments and utilities.

343. In many countries, reliable maps of infrastructure either do not exist or are not publicly available. Even though much of the infrastructure is in plain view, the lack of data including geographic coordinates and corresponding data about the infrastructure adds significant cost and uncertainty to desk-top planning exercises by telecommunications operators who may otherwise want to share infrastructure. The operators frequently must conduct their own surveys of underground and above-ground infrastructure on public properties. They also have to take the initiative to identify ownership and, once the owner is identified, the proper person with whom to communicate. Until a utility formally enters the infrastructure sharing business, the chances are slim that the utility will have assigned responsibility for infrastructure sharing to anyone inside its organization. Telecommunications operators face an uphill battle in trying to start and advance discussions of infrastructure sharing in these circumstances.

344. The telecommunications regulator or ministry can support stakeholders in establishing such an information exchange and dialogue. A growing trend among telecommunications regulators has been to require or facilitate chambers of commerce or other trade groups among telecommunications operators. These groups have in some cases become valuable sources of information exchange and dialogue within the industry. Where they exist, these industry groups can and should be encouraged to expand their constituency to include infrastructure owners. This would prompt each participating owner to designate a representative, create greater awareness of infrastructure sharing opportunities through this representative, and provide a conduit for telecommunications operators to make contact with infrastructure owners.

345. Another contribution which can be supported by such an industry group is to coordinate infrastructure owners and telecommunications operators in preparing and periodically updating infrastructure maps or databases. These can include route and location maps, with geographic coordinates, and related records showing access points, infrastructure type, size and age, the identity of owners and users and any other pertinent information. Government ministries or regulators may serve as a catalyst for such a project by suggesting or directing that it be undertaken, providing meeting space and perhaps with seed funding from Government or an economic development institution.

346. Telecommunications regulators can also assist by collecting, compiling, maintaining and publishing the identity and contact information for all relevant public infrastructure owners, as
well as any applicable legal or regulatory procedures, guidelines and instructions for accessing and using such infrastructure. Where infrastructure owners are uncooperative, the regulator may use its statutory powers to compel compliance.

**Box 19: Coordination efforts can be led by regulators or industry coalitions**

In 2009, after a substantial amount of preparation time, the Lebanon Telecommunications Regulatory Authority published a Study on Use of Public Properties, which was followed by a draft Rights of Way Decree intended to address shortcomings in the existing access rights and availability of access to these public properties.\(^{105}\) The Study aimed to help accelerate the deployment of broadband networks and services by facilitating telecommunications operator access to Lebanon’s extensive public property portfolio, which included telecommunications ducts, poles, towers, rooftops and rights of way along highways, streets, roads, power lines and pipelines.

An equally proactive approach has been taken by a national coalition of utilities in the United States to reduce the complexity and uncertainty of joint use notifications. As is with most change in the utility industry, electronic pole transfer notification came about as the result of a tragic accident involving a pole transfer. During the course of the litigation, in 1989, it was decided that Georgia Power and BellSouth needed a better means to notify each other of pending pole replacements. The Claims Departments of both companies initiated the effort to improve communication.

Discussions between the two companies led the team to decide that certified letters and phone calls were not the way to continue the operation and the companies decided to use new technology to provide the transmission medium for notices. They implemented a system using batch modem entry with automated fax delivery. This was the same technology that was being used by many one-call centers around the United States. It was named The Electronic Notification Pole Transfer Program (ENPT). Ticket number 1 was created May 28, 1990 in Savannah, Georgia.

The Georgia Utilities Protection Center (UPC) hosted the software and database. Utility pole owners in Georgia entered “tickets” in the system, which in turn broadcast faxed them to all affected parties. Each company or distribution area was represented by a 5-6 character member code associated with a fax modem. As work was completed, each member updated the ticket via modem entry. The process was a great improvement over the manual method, and soon word began to spread to other states about the program.

A utility contract company employee was given the task of maintaining the system for both BellSouth and Georgia Power. In 1991 she was hired as a full-time employee of the Georgia UPC with responsibility for maintaining the ENPT system. In 1995, the participants decide to upgrade the system to use the Internet for ticket delivery. At that time, most member companies had to seek special permission from their top management and IT departments to allow employees to have Internet access at their desk.

With the new technology, the system was given a new name, to reflect the spread of membership across the country. The name **National Joint Utilities Notification System** (NJUNS) was formally adopted in 1997. NJUNS has subsequently continued to improve its communication system and

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participation, and today has been adopted by 13,000 infrastructure owners and telecommunications operators in 28 states.

Figure 21: NJUNS participating states

Source: NJUNS website

347. Publication of information about infrastructure may give rise to concerns about national security or public safety, particularly given the potential vulnerability of critical infrastructure to attacks. Some information may appropriately be kept confidential, and only divulged to telecommunications operators who demonstrate they are properly licensed and undertake to respect confidentiality requirements. However, much infrastructure is already in plain view so maps and databases reveal little that is not already known. Rather, they provide additional information which is primarily of use to potential lawful users of the infrastructure, and, importantly, they reduce the cost of information acquisition and processing by potential user of shared infrastructure.

348. Some jurisdictions have established infrastructure mapping initiatives. These resources allow stakeholders to access a comprehensive database of existing passive infrastructure in a particular geographic area. These databases can provide a shared resource through which infrastructure owners can supply information about their infrastructure and telecommunications network operators can identify potential host infrastructure for construction or expansion of their networks. These resources can also be particularly useful in congested areas in helping to avoid unnecessary duplication of infrastructure or conflicts between different infrastructure installations. The can also be useful in providing more precise data on the location and nature of infrastructure.

Box 20: Developing an infrastructure database in Lithuania

In Lithuania, the Communication Regulatory Authority (Lietuvos Respublikos ryšiųreguliavimo tarnyba) (RRT), has led the creation of a web-based GIS resource (http://e-infrastruktura.lt/lt) which serves as a single information point for mapping systems covering telecommunications and other utility infrastructure.107 The project was initiated in 2010 after RRT’s analysis concluded that infrastructure mapping in Lithuania needed improvement. Although RRT leads the project,

municipalities are responsible for their own data collection and sharing. RRT developed the dedicated website, which centralizes access to the information managed by local municipalities. The GIS resource has been implemented in Lithuania’s four largest cities. The maps are available online to registered users. While plans exist to expand the resource to cover additional municipalities, costs and unreliable data present barriers for more rural municipalities. In 2014, the Ministry of Agriculture established a working group to set out mandatory obligations for all municipalities regarding mapping, including collection, access, exchange and validation of data.

In Poland, the Ministry of Infrastructure and other agencies have developed the Information Broadband Infrastructure System (SIIS), an electronic GIS mapping system implemented in late 2012. SIIS gathers and presents information on infrastructure deployment in the county with the objective of accelerating deployment of broadband infrastructure. SIIS allows local governments to obtain geo-referenced information to support public investment in broadband infrastructure. This information provides government institutions with a common understanding of the current level of broadband deployment in a given area and identify locations that lack access to broadband and would benefit from public intervention. SIIS also enables telecommunications operators to identify network access points and passive telecommunications infrastructure for sharing to optimize broadband deployment. SIIS provides operators with detailed information to make business decisions on new investment projects, modification of existing infrastructure and market competitiveness.

SIIS has also been used by businesses and investors to evaluate potential business locations by providing information on access to existing telecommunications technologies. As of early 2016, SIIS did not yet gather information regarding non-telecommunications infrastructure, such as electric distribution and transmission facilities or railways, but this was expected to be added within two years.

6.7 Tailor intervention to local conditions

349. The likelihood and benefits of, and approach to, market interventions to facilitate cross-sector infrastructure sharing remain highly contextual and must be adjusted to each country and the other variables that prevail in a given geographic market. One size will not fit all. Some of the more significant relevant variables include:

- existing telecommunications infrastructure, gaps and market conditions;
- existing host infrastructure (electric, roads, rails, pipes);
- the relevant country’s geography, topology, population distribution, GDP, demand and similar metrics;
- ownership and market structure of telecommunications operators and infrastructure owners;
- full state ownership of sharable infrastructure and its permutations (ministry, corporatized parastatal or management concession);
- partial state ownership of sharable infrastructure and the degree of autonomy of the enterprise;
- private sector ownership of sharable infrastructure;
- regulatory framework, enabling legislation and regulatory capacity in utility and other infrastructure owner sectors and the telecommunications sector;
- nature of land use rights and existing legal system for land law;
• country history in all relevant sectors; and
• the financial condition of telecommunications operators and infrastructure owners.