INTERNATIONAL ECONOMIC DEVELOPMENT INSTITUTIONS

CROSS-SECTOR INFRASTRUCTURE SHARING TOOLKIT
7 How international economic development institutions can help

350. Development banks and other donor organizations provide a significant portion of the funding for sharable infrastructure in developing countries. They stand in a key position to contribute toward an increased incidence of cross-sector infrastructure sharing. The following three submodules present key ways in which economic development institutions can improve the incidence of infrastructure sharing with relatively little incremental public expenditure while sustaining and encouraging facilities-based competition in the telecommunications sector.

7.1 Encourage neutral and decentralized passive infrastructure ownership

351. The rise of successful and competitive mobile operators in most developing countries over the past 20 years has demonstrated the benefits of investor-led growth in the telecommunications sector. It has also demonstrated the ability of emerging markets to support facilities-based competition. The rising need for fiber optic networks to support fixed and mobile broadband deployment need not portend a return to facilities bottlenecks. As they should be, international economic development institutions are wary of approaches to infrastructure development which lead to market concentration and monopoly. Investing development funding in the establishment of monolithic wholesale providers of intercity and metropolitan bandwidth services, whether wholly state-owned or public-private, creates a high risk of either creating significant market concentration (particularly if policymakers bow to pressure to require retail access network operators to subscribe to these wholesale services exclusively in order to ensure the financial success of the enterprise) or investing wastefully in failed projects (if retail access network operators bypass these wholesale services).

352. Fiber optic cable facilities, when coupled with a smart approach to cross-sector infrastructure sharing, present an historic opportunity to continue facilities-based competition for broadband network deployment in an economically viable manner. Fiber optic cables contain multiple dark fiber pairs which can be used by multiple competing retail access network operators and wholesale operators, each of which can install and operate its own active infrastructure. The IRU form of ownership developed for copper-based submarine cables in the early 1960s, when applied to dark fiber, provides a time-tested method of allocating shared long-term ownership of telecommunications facilities and infrastructure among multiple network operators, each assured of uninterrupted use and control of its own separate network at fixed prices.

353. At the same time, development and ownership of the underlying fiber optic cable by utilities in other sectors can offer competitively neutral landlords108 which can also benefit from core business uses of the fiber and the opportunity to monetize the excess capacity and reinvest the proceeds in their often cash-starved core businesses.

354. The potential for utilities to possess market dominance in wholesale dark fiber markets is often currently limited. Existing and easily erected microwave networks will continue to be viable substitutes for fiber on many routes in many developing countries for several years to come. The desire of infrastructure owners who enter the sharing market to monetize their excess infrastructure capacity quickly, while faced with continuing competition from microwave, restrains their ability

108 The neutrality of the infrastructure owner assumes the owner, and its affiliated enterprises, do not compete with its customers in the provision of downstream wholesale or retail services. In the case of state-owned enterprises, this determination must consider whether the boards and management of the infrastructure owner overlap with those of any other state-owned enterprises in the telecommunications sector.
to charge monopoly rents for IRUs. Many existing fiber owners, such as electric utilities and railways, also face competition from the ability of network operators to self-provision buried or aerial fiber along roadways. In addition, as more infrastructure owners enter the sharing market, they will increasingly compete with each other for the relatively small number of telecommunications network operators who require fiber.

355. Where such competition does fail, either a competition authority or an empowered telecommunications sector regulator can step in to regulate pricing and access terms. In short, the infrastructure sharing market presents significant checks and balances to ensure that market-based pricing is reasonable and to preserve the inherent neutrality of infrastructure owners vis-à-vis telecommunications operators which compete with each other.

356. With these matters in mind, development institutions can optimize continued private sector investment in upgrading telecommunications infrastructure for broadband, while sustaining the facilities-based competition model which has worked so well for wireless networks, by fostering the development and sharing of dark fiber by infrastructure owners whose core businesses or services are not telecommunications. The added benefit of this approach is that it reduces the need for development investment in standalone telecommunications networks. It frees up development resources for two key activities to foster the development of neutral passive infrastructure which can be funded and supported by development institutions at much lower incremental cost. These are (1) to provide technical assistance to public sector stakeholders and (2) to plan for cross-sector infrastructure sharing in all new infrastructure projects. These activities are discussed in the following two submodules.

### 7.2 Provide technical assistance to public sector stakeholders

357. By underwriting targeted technical assistance, international economic development institutions can leverage their investments to serve as a catalyst for market-based development of broadband intercity, metropolitan and last-mile access networks. These limited interventions to address market and regulatory shortcomings or failures can have a significant positive impact by facilitating and promoting greater cross-sector infrastructure sharing.

358. All the elements to support this economic development model are already in place in many developing countries. Private sector inward investment money is already available and flowing. In most developing countries today, investor-owned mobile network operators have already made significant capital investments in national mobile voice coverage and are continuing to invest heavily in upgrading their networks for broadband. They often reinvest 15-25% of revenue in in-country capital expenditures. The private sector is also beginning to invest in fixed FTTP infrastructure in denser markets in some developing countries.

359. Much sharable infrastructure is also already in place, but it is often not being fully exploited for the reasons discussed in Modules 4 and 5. Emerging market infrastructure owners, which are often state-owned enterprises or state organs, seldom have a strategy for infrastructure sharing or a business unit to pursue such a strategy. Their sharable infrastructure is likely to remain dormant until they can and do develop and implement a sharing business.

360. Providing technical assistance to these public sector infrastructure owners, and to other relevant public sector stakeholders, in developing countries can have a huge positive impact on fostering the availability of shared infrastructure. The relevant stakeholders include state-owned enterprises and government organs which own or manage sharable infrastructure, the sector
regulators of these infrastructure owners (where they are regulated), telecommunications sector regulators, policymakers in relevant sectors, and lawmakers. In contrast, telecommunications operators who are investing in broadband retail access networks are usually investor-owned, quite sophisticated and do not require external financial resources for technical support.

361. In developing countries, state-owned infrastructure owners seldom have the discretionary financial resources to explore their options for infrastructure sharing or to develop a strategy and business plan. They also often do not have sufficient knowledge and experience to understand what opportunities they are missing, what steps to take to capitalize on these opportunities or even what advice to seek. Even when they are able to self-fund and undertake such planning exercises, their initial terms of reference often ask for advice on topics of little relevance, while overlooking much more fundamental matters. Development institutions, if attuned to the needs of such infrastructure owners, with whom they usually have established relationships in the core business sector, can therefore help by providing funding for technical assistance and by aiding the infrastructure owner in designing the terms of reference for procurement of advisers.

362. Key disciplines in which infrastructure owners may benefit from technical assistance include legal and regulatory, commercial, technical and financial. The mix will vary based on the identity of the client and its role in the potential infrastructure sharing eco-system.

363. Infrastructure owners typically need highly specialized legal and regulatory advice to address the regulatory and legal disincentives described in Modules 4 and 5. They also need legal advice to structure their infrastructure sharing business, including such topics as whether to conduct the business through a separately incorporated entity, how to structure the selected business model and how to structure relationships with customers. They also need regulatory advice to ensure that they understand and obtain required licenses and approvals and to ensure they establish and perform customer relationships within applicable regulatory constraints. There is often a need for advocacy in these roles as the law and regulatory environment in many emerging markets is relatively undeveloped on many aspects of infrastructure sharing, and is often an impediment to economically efficient sharing.

364. Because most infrastructure owners operate in a dominant market position in their core business, they need commercial advice and training to help them understand and prepare to operate in a competitive infrastructure sharing market. Commercial advice is also critical to help guide infrastructure owners in selecting a business model appropriate to their specific circumstances and appetite for risk. They will also require significant guidance in developing a market entry strategy and in establishing and negotiating pricing and other terms of service.

365. Technical support can help infrastructure owners understand the nature and usefulness of their sharable infrastructure, how it may meet telecommunications operator needs, and the required technology investment for each alternative business model discussed in Module 3.

366. Financial advice is of critical importance for any infrastructure owner considering and planning entry into the sharing business. At the outset, an infrastructure owner needs some financial analysis of the market opportunities and risks presented by each potential business model. This analysis should include consideration of the owner’s financial circumstances (such as available capital and access to additional capital), the revenue potential and risks for each potential business model, the required fixed costs (capital and operating) and variable costs for each business model, and other relevant factors, as well as the regulatory impact on core business tariffs and likely infrastructure sharing revenues. Once the infrastructure owner has selected a business model
based on a comparative analysis of options, it will require support in developing an investment plan and pro forma operating income statements and cash flow statement so it can fully understand the financial consequences of the new business. Finally, the modelling needs to consider the impact of the new business on the utility’s revenue requirements and tariffs in its core business. This will enable the utility to understand what portion, if any, of the net earnings from its ancillary business will be available for reinvestment or other purposes, and what portion will be offset by reduced tariffs.

367. Other potential beneficiaries of technical assistance include sector regulators of infrastructure owners, telecommunications regulators and relevant government policymakers. These public stakeholders can benefit from technical assistance in assessing the existing legal, policy and regulatory framework from the standpoint of its friendliness for cross-sector infrastructure sharing and benchmarking this assessment against best practices. This assessment and benchmarking exercise can lead to advice for legislative, policy and regulatory reforms consistent with the suggestions discussed in Modules 6.

368. Technical assistance can also be used to develop standards to govern joint use of infrastructure. As mentioned in Submodule 4.5, such standards are often deficient or absent in developing countries or in sectors that do not have a history of sharing infrastructure with telecommunications operators. These standards are necessary to address safety and other operational concerns, including allocating responsibility between the infrastructure owner and a third party installing telecommunications equipment. While exemplary standards abound in the wealthier developed countries, and even some developing countries such as South Africa, standards for infrastructure sharing must usually be localized in order to account for local variations and practices in sharable infrastructure. These efforts are typically carried out through collaboration by industry participants and regulators. Technical assistance funding by a development institution might be provided through a telecommunications or other sector regulator or a state-owned utility which can serve as a catalyst for setting up and leading such a standards development effort. Collaboration between similarly situated infrastructure owners in a region can also be a useful and efficient way to develop and share standards and best practices.

369. The key potential public sector stakeholders who could benefit as recipients of technical assistance, and key topics to target, could include those identified in the following table:
370. Technical assistance from development institutions also needs to be provided in the manner most suitable for the client. Technical assistance sometimes takes the form of an assignment executed by the development institution itself (either with its own personnel or outside advisers procured for the assignment). At other times, development institutions provide financial support and guidance for recipients to procure and engage their own advisers directly. In the case of advisory services to policymakers and regulators, both approaches have their pros and cons, but are potential options. By executing the technical assistance itself, the development institution has more control and influence over the recommended policy outcomes and is therefore able to ensure that the recommendations are consistent with best practices. On the other hand, some public institutions resist advice coming directly from development institutions, and may be more likely to follow and implement regulations if provided by independent advisers.

371. In the case of infrastructure owners, it is fundamentally important to provide for recipient-executed procurement of technical advisers to ensure that advice is client-focused, that the advisers do not have conflicts of interest (e.g., are clear that their mission is to support the infrastructure owner’s role and not a broader policy or regulatory agenda), and that the recipient will respect and trust the advice. Because the development institution’s objectives and agenda tend to be policy-based and look at macro impact, advice provided to infrastructure owners though such institutions is inherently likely to compromise the infrastructure owner’s own interests for the greater good sought. The infrastructure owner will be participating in the marketplace and regulatory environment. In a market-based approach to development, policy must rely on each individual actor pursuing its own best interest, within a framework of rules to ensure fair play, and therefore each market participant should have its own advisers who are independent, selected by the client and not a third party. Otherwise, the advice is likely not to promote the best interest of the individual client, and will likely not be trusted or followed by the client. Such reports end up in a drawer or waste bin and nothing changes.
7.3 Plan for cross-sector sharing in all new infrastructure projects

372. While a market-based approach, supplemented with technical assistance to stakeholders, may be all that is needed to optimize cross-sector sharing of existing infrastructure, the opportunities for sharing of new infrastructure can be enhanced by planning for sharing activities when it is developed. This requires proactive and inclusive planning by development institutions which finance the infrastructure and the implementing agencies of the recipient governments.

373. Such cross-sector planning and implementation currently falls short of optimal, often far short. Historically, development institutions have organized their approach to infrastructure investments into sectors, such as roads, railways, power, water and sewer, and telecommunications. This has been a sensible and efficient approach for several reasons. It facilitated focus and specialization within the teams in these institutions. It enabled greater affinity and better relationship building between the development institutions and their counterparts in recipient countries.

374. However, the sector-based approach has also created silos which reduce cross-sector interaction for efficiency through joint pursuit of multi-sector infrastructure investments. Project managers are not tasked with considering opportunities for a project in one sector to be leveraged to support another sector. Procurement plans and procurement guidelines, and deliverable-specific funding grants and trusts from upstream donors, do not allow much flexibility to expand or change project scope to include outcomes for other sectors.

375. To some degree, the growing need for telecommunications technology to support the operation and maintenance of a wide variety of infrastructures has already begun the process of developing more sharable infrastructure. For example, electricity transmission lines, which require telecommunications facilities for network protection, SCADA and other internal uses, have for a number of years routinely been constructed or replaced with built-in fiber optic cables. As electric utilities, and their funders, have become more aware of the potential of excess fiber to generate alternative revenue streams from commercialization, they have tended to install cables with ever larger fiber counts.

376. There have already been some international development institution efforts to break down barriers between sectors once sharable infrastructure with fiber has been installed. For example, in 2009 through 2010, the World Bank commissioned a project to assess the feasibility of leveraging excess dark fiber installed on electric transmission lines of the West African Power Pool (WAPP) to support the development of regional fiber networks in West Africa. It was positioned as a feasibility project, so did not amount to full-scale technical assistance as discussed in the previous submodule, but the project did stimulate greater planning for cross-sector sharing. The project led to recommendations for WAPP to form a dark fiber leasing consortium and appoint a management company to lead the effort to commercialize the dark fiber. WAPP’s members endorsed this approach but the relatively slow moving process within this multi-county organization has left it still in the planning stages, having not yet gone to market. The World Bank renewed its efforts to stimulate cross-sector infrastructure sharing within West Africa in 2016 by commissioning another project along the lines of the original WAPP feasibility study. The results of that undertaking have not yet been published at the time of preparation of this toolkit.

377. On the other hand, the WAPP project has influenced various member countries to pursue dark fiber leasing and other infrastructure sharing activities within their own countries. These include Société de Gestion de l’Energie de Manantali (Society for the Management of the Energy ...
of Manatali) (SOGEM) in Mali, Mauritania and Senegal, also supported by the World Bank, and Ghana Grid Company, which has been self-funded by the state-owned enterprise. While these World Bank efforts to stimulate infrastructure sharing came after the transmission lines had been built, rather than during or before construction, they demonstrate the potential and commitment of such institutions to begin taking a multi-sector view to infrastructure investment.

378. More recently, the World Bank undertook a major internal reorganization which offers the potential for better cross-pollination during the planning and development stages of infrastructure projects. Other development institutions are also looking to break down the historical cross-sector barriers. These steps can facilitate greater advance coordination and planning. Projects can be designed and built with greater sharable capacity – for example, by installing OPGW on new or rebuilt transmission lines with high fiber counts rather than low fiber counts. Similarly, road projects can routinely include the installation of a duct bank along the roadway whether needed for the transportation system or not. Projects, and institutional rules, can also be evolved to allow more flexibility to embrace multi-sector needs within and around the same project.

379. These cross-sector planning efforts are currently only in a nascent stage and would benefit from continued and increased focus on the potential to leverage investment in one sector to benefit economic development in other sectors.

380. One approach is to plan, each time lateral infrastructure is being deployed or rehabilitated, to deploy fiber and/or ducts with ample excess capacity, whenever possible. This creates an alternative revenue source for the utility or other infrastructure owner, and also improves the options for telecommunications operators. Typically, the costs of doing so within the overall budget of the project are negligible, and the availability of communications infrastructure along these lateral corridors can provide continuing benefits to the operation and maintenance of the core activity of the infrastructure.