
Financing Sustainable Infrastructure

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PREFACE

The International Development Finance Club (IDFC) has brought together 22 national, bilateral and regional development banks from Africa, Asia, Europe, and Central and South America to pool their global expertise, best practices and in-depth local know-how on strategic topics of mutual interest. Members finance a wide range of projects, from poverty alleviation and habitat protection to education, health, and public transportation. The primary objective of the club is to address the major obstacles facing development finance today by joining forces on the issues currently defining the global agenda.

This paper, *Financing Sustainable Infrastructure*, was developed by the IDFC Sustainable Infrastructure Working Group. The project was initiated by the IDFC in 2012, as part of a multi-year plan to share experiences, explore new financing tools, and identify concrete measures to strengthen interbank financial cooperation in the club's four main strategic areas: renewable energy, energy efficiency, sustainable infrastructure, and social and economic inclusion.

In recent years, many studies have highlighted the importance of infrastructure optimization for growth and development. However, much of the developing world continues to be plagued by deteriorating and deficient infrastructure segments. Estimates for global infrastructure investment need reach as high as US\$3 trillion per year, and underinvestment represents a systemic and highly interconnected risk to global social and economic development.

This paper summarizes some of the key findings in recent studies on the importance of infrastructure development for long-term growth and poverty reduction, and underlines the enormous funding gap that many emerging economies face today. The various sources and instruments for financing infrastructure projects are also examined, with an emphasis on innovative mechanisms for leveraging public and private sector funds. In particular, this paper highlights the lessons learned and best practices from some of the IDFC's members on financing sustainable infrastructure projects.

We hope this publication will provide valuable insight and catalyze further dialogue among governments, investors, and other stakeholders regarding the role of development banks in infrastructure finance. Additionally, we hope that the paper's findings will contribute to a better understanding of infrastructure finance, and inspire greater investor interest in the sector.

EXECUTIVE SUMMARY

Quality infrastructure ensures the delivery of goods and services that promote economic growth and contribute to quality of life, including social well-being, health and safety, and the sustainable conservation of the environment. However, infrastructure stocks and service access are relatively low in the developing world. Rapid per capita income increases in many emerging countries will amplify the scale and pace of infrastructure demand. Countries like China, India and Brazil will need to allocate billions of dollars to infrastructure development to support their booming economies and populations. The OECD predicts that infrastructure investment needs across land transport, telecommunications, electricity and water and sanitation sectors could amount to an estimated USD 53 trillion through 2030. The annual investment requirement would equal more than 2.5% of world GDP (2006).

Current public spending on infrastructure remains well below even conservative demand estimates. Unless governments drastically shift their fiscal budget priorities or increase taxation a large infrastructure funding gap will continue to exist. Public budgetary limitations and tight bank lending conditions require greater recourse to foreign and private sector capital to support infrastructure investment at the scale necessary for sound development. Private sector participation can inject much-needed investment capital, provide the technological expertise and managerial competence to improve operational performance of publicly run utilities, and the end-user benefits of a more competitive market.

However, infrastructure has not yet been clearly recognized and defined as a full asset class, so intermediation of infrastructure transactions remain highly fragmented –private equity funds, project finance banks, merchant banks, multilaterals, government ministries, PPP centers and project promoters, among others, are all doing a small fraction of the work, resulting in disorganized, highly inefficient and costly intermediation for the industry. Infrastructure as a comprehensively defined asset class -- with enhanced visibility and a standardized return profile and risk allocation – would be far better positioned to attract greater private financing.

Having the ability to finance a larger portion of their infrastructure development needs from domestic sources would give developing countries more control over long-term sectoral planning and asset management. Unfortunately, financing infrastructure projects through domestic savings presents a serious challenge in many developing countries, where bank penetration remains low. At the same time, the 2007 global financial crisis will continue to restrain the amount of foreign capital available for infrastructure projects for the foreseeable future, further heightening competition for resources. Notwithstanding, in light of the financial uncertainty and relatively moderate growth potential of many developed countries, emerging countries have an opportunity to position themselves as attractive, higher-yielding investment destinations.

The Role of Development Banks

Following the 2007 global economic crisis, more traditional financing sources—such as public expenditure and private bank lending—have had even fewer resources available to devote to infrastructure development. The financial sector is facing a tighter regulatory framework at both the national and international levels, and the heightened focus on short-term liquidity and solvency in Basel III increases the cost of long-term financing. Even if domestic banks and other financial intermediation vehicles were able to fill the gap, development banks play a uniquely “additional” role as financial catalysts, drawing private capital into large, long-term projects in countries and sectors where

significant development results are likely, but the market perceives high risk. These institutions often offer below-market interest rates, longer terms and repayment schedules that can more easily be adjusted. They can also offer risk mitigation through political or partial risk insurance or guarantees that attract a wide variety of market players, and provide local funding partners with an improved level of creditor status. Development banks can also provide project selection and design additionality, offering a range of aid enhancement instruments, including technical assistance and other tools for capacity building that promote the transparent use of resources, accountability, cost-effective delivery and long-term project sustainability.

IDFC members support infrastructure development through a wide range of funding facilities and services. They finance projects ranging from trans-national expressways and sewage treatment networks, to transmission lines, geostationary satellites and submarine fiber-optic cables. Through their experience as financiers, advisors, partners and resource mobilizers, IDFC members have identified an array of investment barriers throughout the developing world, and are in a unique position to help address and manage them.

To begin with, public ministries in many developing countries do not provide high quality, long-term transport planning, investment programming or adequate maintenance. Where institutionalized norms and regulations exist, many exhibit weak compliance supervision. IDFC members stress the importance of decentralized transport management, local autonomy over financing, and the inclusion of end-users and customers in the decisions making process particularly in the case of urban transport. Unspecified end-user models, complex and costly legal and administrative requirements and burdensome tax regimes also dilute the transport sector's attractiveness in many emerging countries. Private investments in transport projects are typically constrained by high upfront capital costs, relatively low-returns and long investment timelines. Public subsidies are often required to make investments in public transportation profitable.

With the ever-increasing pressure on water quantity and quality, integrated water resource management and effective policy and regulatory frameworks are essential to ensuring the appropriate and efficient allocation of resources to domestic agriculture, energy and industry use, as well as the incorporation of proper conservation policies. Yet, the responsibilities between water and environmental ministries and other regulatory authorities in many developing countries are not well defined. Furthermore, these ministries and regulatory bodies often lack qualified staff and require lengthy and complex administrative procedures. Many developing countries also lack the technical competence of well-trained and experienced engineers and technicians to maintain water and sanitation infrastructure. Nevertheless, low financial return is one of the greatest impediments to private interest in the water sector in many developing countries. Tariff levels are often highly politicized and set insufficiently low to create incentives for private investors.

Decisions to commit capital to the energy sector in many developing countries are shaped by government policy measures and incentives. Unfortunately, strategies tend to focus on competitiveness issues, such as short-term costs and supply, rather than the long-term benefits of energy efficient cost savings, energy security and environmental performance. Technology inexperience, political instability, institutional weakness and less robust legal frameworks tend to heighten the risk perception and the cost of finance for energy projects. Pricing mechanisms represent a particularly pressing challenge for many developing countries, as market distorting subsidies often set fossil fuel prices and tariffs too low to cover project development and maintenance costs. Administrative costs of energy projects are also high, as there are often difficulties and delays in the approval process for concessions and other

procedures. Enhanced financial sector expertise and capacity to fund cleaner energy projects that require more advanced technology is also badly needed.

In the ICT sector, many developing countries have legislative restrictions or weak regulatory enforcement that shield public telecommunications providers from competition. Prices are high and diffusion levels are low in countries with limited market deregulation and liberalization. A combination of competitive market reforms and targeted incentives will be needed to promote affordability and greater inclusion. Many developing countries lack national ICT strategies, comprehensive sector management, coordination and regulatory compliance supervision to ensure that universal access initiatives are successful. Rural and remote communities in many developing countries lack the necessary skills to take full advantage of ICT, and appropriate local content remains unavailable.

A realistic infrastructure development strategy should include a clear financing distribution among tariffs, taxes and grant-based transfers. Moreover, as the infrastructure sector is highly interconnected to the health, energy and agriculture sectors, developing countries need to establish effective and integrated policy frameworks and regulatory environments, and a clearly defined division of responsibilities and resources among stakeholders. Particularly in the transport sector, many IDFC members noted the importance of allowing municipal governments to access credit and streamlining procedures and coordination among public authorities. The water sector would also benefit from improved commercial management, improvements to billing and collection and user awareness about non-payment and irrational water use. For energy projects, administrative burdens and market distorting subsidies that set fuel prices and tariffs too low to cover project development and maintenance costs must be reformed. And in the ICT sector, greater market deregulation and liberalization combined with efficiently modeled universal access strategies would significantly enhance development prospects.

IDFC can further support the infrastructure sector by mobilizing grant and technical assistance for policy development and national strategies, capacity training and the promotion of best-practices, market research and the design of appropriate payment and financing schemes. As they are aptly suited to absorb more risk than the private sector, IDFC members can also provide more competitive local currency debt financing and back more innovative development approaches and tools, such as public-private partnerships and frontier project finance models. IDFC members can also look to prioritize comprehensive programs, rather than project approaches, to help attract a wide spectrum of coordinated donors.

1. SUSTAINABLE INFRASTRUCTURE INVESTMENT: AN OVERVIEW

1.2 Infrastructure and Development

Efficient transport and telecommunications systems, safe drinking water and dependable energy are essential for attracting foreign investment, expanding international trade and achieving long-term growth and development. In fact, a National Bureau of Economic Research (NBER) study found that the inefficient utilization of infrastructure resources could explain more than 40 percent of the growth disparity between low- and high-growth countries (Hulten, 1996, p.2).

Conceptually, infrastructure affects productive output in two major ways, first, “infrastructure services enter production as an additional input, and second, they raise total factor productivity by reducing transaction and other costs thus allowing a more efficient use of conventional productive inputs”

(Serven, 2010). Infrastructure not only reduces production and transaction costs, but also helps poor individuals and underdeveloped regions connect to economic hubs, opening up more productive opportunities. Quality infrastructure also raises the value of assets; for example, improving the roads and communication lines between farm areas and agricultural markets can imply capital gains for poor farmers (Jacoby, 2000).

Infrastructure development can also have a critical impact on the human capital of the poor; quality transportation networks often determine the availability of health and educational services. Access to clean water has also shown to have a significant impact on child health outcomes; a WB study found that a quarter of the disparity in infant mortality and 37% of the disparity in child mortality between rich and poor countries can be explained by their respective access to clean water services (Leipzig, 2003, p.11).

Ultimately, infrastructure optimization both increases growth and lowers income inequality -a win-win ingredient for poverty reduction. Thus, expanding access and improving the quality of infrastructure should rank at the top of any development agenda.

1.3 The Funding Gap

Most future infrastructure demand is expected to derive from developing regions, where 85 percent of the world's population still lacks access to adequate infrastructure services. Demand for infrastructure services tends to rise with per capita income, and income growth is faster at lower income levels (WB, 2004, p.150).

For *Sub-Saharan Africa (SSA)*, the estimated funding needs for infrastructure development are estimated at USD 93 billion per annum during 2010-2020, representing 15% of regional GDP (10% for new investment and 5% for operation and maintenance). The spending needs of the poorest countries in SSA reach as high as 25% of their GDP, and even more is required in fragile states. Roughly 40% of the expenditure is needed in the power sector, 20% for water and sanitation, 20% for the transport sector, and 20% for irrigation and telecommunications (Estache & Garsous, 2012).

In *Asia*, infrastructure investment needs are projected to be around USD 750 billion p.a. for the decade leading up to 2020, representing about 6.5% of annual regional GDP. An estimated 68% of the expenditure is needed for new capacity investment. About 49% of the funding is needed in the energy sector, 35% for transport infrastructure, 13% for ITC, and 3% for the water and sanitation sectors (Bhattacharyay, 2010, p.11).

For *Europe and Central Asia (ECA)*, Estache (as cited in Estache, 2012) estimates the total infrastructure investments needs over 2010-2020 at around 6.6% of regional GDP. Road transport needs represent about 2.7% of GDP, followed by energy (2% of GDP) and ICT (0.9% of GDP).

In *Latin America*, infrastructure investment needs are estimated at around 5.2% of regional GDP per annum over 2010-2020, or roughly USD 170 billion. Of this expenditure, 2.7% of GDP is needed for new capacity investments, and 2.5% for operation and maintenance. The telecommunication sector will represent about 2.2% of regional GDP, electricity 1.7%, transport about 1.1%, and water and sanitation about 0.2% (Perrotti & Sanchez, 2011, p.50).

For the *Middle East and North Africa (MENA)* region, about USD 106 billion per annum is needed for infrastructure over 2010-2020, representing 6.9% of regional GDP. Roughly 3% of GDP needs to be dedicated to capital expansion, and another 4% to operation and maintenance. Of the total

expenditure, about 40% is needed in the transport sector, 40% for electricity access and generation, 5% for water and sanitation, and 9% for ICT development (Estache, Ianchovichina, Bacon, & Salamon, 2013).

2. SOURCES OF INFRASTRUCTURE FUNDING: CHALLENGES AND OPPORTUNITIES

2.1 Public Sector Financing

Historically, the public sector has been the principal source of financing for infrastructure development. However, fiscal budget constraints prevent governments from completely satisfying the immense demand for infrastructure optimization. The use of public resources for infrastructure has a significant opportunity cost; any increase in infrastructure investment will require spending cuts to other important public programs or an increase in fiscal revenue. Consequently, attempting to meet infrastructure demand through public funding alone would likely cause long-term macroeconomic disturbances. In this context, attracting resources from both the private and external sectors to complement government spending efforts is absolutely essential to closing current financing gaps. Nevertheless, the public sector should continue to hold a central role in financing infrastructure projects, not in the least part due to the monopolistic nature of the sector. Infrastructure development also generates both positive and negative externalities that are unlikely to be captured by market prices.

Development Banks

Development banks play an important role reducing investment gaps by financing projects that the private sector is not normally able to undertake, either due to their risk profile or project size. They offer the benefits of country risk mitigation, below-market interest rates, longer terms and repayment schedules that can more easily be adjusted. Development bank loans are also often paired with technical assistance to ensure successful implementation and long-term sustainability of the project. Furthermore, development banks often pool their resources in coordinated efforts to support infrastructure projects. These syndication structures motivate other players to support governments and share the risks associated with investing in a sector in which assets are long-lived and thus slow to be amortized. It can also be an effective way to support domestic credit markets, by leveraging local commercial bank involvement in the infrastructure sector. The guarantees that development banks provide can also serve to incentivize private sector participation by reducing the intrinsic risk of infrastructure projects.

The mandate of development banks should be to provide the financial tools that the private sector lacks the incentive to offer; they should not compete with commercial banks. If development banks offer financing that could have been provided the private sector, they can mistakenly introduce distortions into the financial markets and divert financial resources from other projects that absolutely require public funding. Development banks should also avoid instances of cross subsidization and conflicts of interest when structuring financial operations in addition to providing the actual funds. Regardless, given the large amount of resources required, project scale and potential risks of infrastructure projects, public participation through development banks is often a necessary condition for their execution. Financing by development banks can also generate additional positive externalities, as they often provide technical assistance for training and corporate governance improvement, as well as conditional measures that incorporate environmental impact mitigation, among others.

Export Credit Agencies

Export credit agencies (ECAs) – quasi-governmental entities that support domestic businesses by guaranteeing or lending to overseas projects – have helped fill the financing breach vacated by banks following the 2008 global financial crisis. In 2012, Berne Union members supported some USD 1.9 trillion in cross-border trade and investment (Berne Union, 2013, p.6). Many ECAs are explicitly mandated to provide support for broader ‘national interest’ policy objectives that often extend beyond the promotion of export trade. In the case of FDI, for example, ECAs provide insurance that helps restore investor confidence and facilitate investment in high impact areas like infrastructure development. Asian ECAs such as the Export-Import Bank of China (CHEXIM), Japan Bank for International Cooperation (JBIC) and Korea Export-Import Bank (KEXIM) provide loans, equity participations and/or working capital to offshore subsidiaries to support resource security (energy production and industrial use) and infrastructure projects. According to a report by the Asian Development Bank (2009), the infrastructure development financing needs in Asia are expected to reach USD 8 trillion over the next decade; underinvestment continues to hamper regional economic growth (p.4). JBIC, for example, has responded to this need by providing significant finance to infrastructure projects in countries like Indonesia, Thailand and Australia. One example is JBIC’s commitment of US 50 million to the Challenger Emerging Market Financial Services Group. The fund directs its investments to infrastructure projects including power, gas supply, toll roads, ports and storage terminals primarily in Asian emerging economies (EFIC, 2012, p.10).

2.2 Domestic Financing

Developing countries’ ability to finance a larger portion of their infrastructure development needs from domestic sources would give them greater flexibility in the formulation and implementation of policies and more control over long-term planning and asset management. However, financing infrastructure projects through domestic savings presents a serious challenge in many emerging countries, where bank penetration remains low. While 89 percent of adults have an account at a formal financial institution in high-income countries, account penetration is only 41 percent in developing nations. Globally, roughly 2.5 billion adults do not have a formal bank account, most of them in developing countries (Demirguc-Kunt and Klapper, 2012, p.2). However, innovative financial tools like “mobile money” in Sub-Saharan Africa have succeeded in breaking down some of the fundamental barriers to wider financial inclusion. Many countries in developing regions will also achieve higher savings rates as they transition to middle-income countries.

Commercial Banks

In many emerging countries, low bank penetration has prevented the commercial banking sector from taking on a more central role in infrastructure finance. However, in countries like Brazil, Chile and Mexico, for example, the commercial banking sector actually serves as one of the principal agents for infrastructure funding. Commercial bank participation in these countries is often linked to structures backed by public resources, which allows the projects to be allocated credit ratings close or equal to sovereign investment grades. Projects that lack public sector guarantees rarely attract commercial bank interest, due to the prevailing challenge of accurately measuring infrastructure project risks. Commercial banks can also play an important role in infrastructure finance by offering performance guarantees and letters of credit. However, according to the World Bank PPP In Infrastructure Resource Center, “the complexity and duration of project financed projects often means that local banks in many developing countries lack the technical capacity or willingness to enter into these projects, and where they do they tend to be junior members of a syndication” (WB, 2011).

Furthermore, the recent global financial crisis has also increased risk aversion levels and regulatory restrictions that could deter greater private investment in infrastructure in the future. For example, it is possible that regulators may require higher capital requirements for infrastructure credit and stronger guarantees, increasing infrastructure financing costs relative to other sectors and thus dampening private sector interest.

Pension Funds

According to a study by Morgan Stanley-Liability (2007), infrastructure projects (volatility 7.9%, return 9.3%) rated second only to bonds in terms of expected (low) volatility and second only to private equity in terms of expected (high) annual return. Despite the diversification and return potential of infrastructure projects, institutional investment has been quite limited. An estimated 1% of pension funds are invested in infrastructure development globally (excluding indirect equity investments via listed infrastructure companies) (OECD, 2011a, p.16). Infrastructure -as an alternative asset class- tends to cover a wide spectrum of projects and involve new types of investment vehicles and risk- such as exposure to leverage, and legal, environmental and political challenges. Unfortunately, there is a lack of available data explaining the true size, risk, and return of infrastructure projects. In practice, unqualified risk administrators rely chiefly on guarantees to evaluate potential investments, divorcing the infrastructure project from the value of the asset. This distortion can be exacerbated when the pension fund industry is highly concentrated; the investment criteria of a dominant fund can quite possibly determine the rules of the entire market. However, in countries like Mexico and Brazil, for example, pension funds represent between 10 -20% of GDP (CAF, 2012, p.21) - a massive yet untapped potential source of infrastructure funding. Ultimately, the principal challenge will be to reach a healthy equilibrium between savings protection and the flexibility and administrative capacity to invest in assets that generate higher returns.

Private Capital

According to the 2010 Merrill Lynch World Wealth Report, the assets of high net worth individuals (HNWIs) topped USD 42.7 trillion, representing nearly 68% of world GDP (p.4). If just a small fraction of those assets could be channeled to the infrastructure sector, the infrastructure financing gap would be substantially reduced. Emerging countries attempting to attract private capital will need to increase their capitalization ratios through the use of more consolidated financial vehicles like exchange listed public investment funds and private equity funds. However, many emerging countries still lack the necessary institutional and regulatory framework.

2.3 External Financing

The global financial crisis will continue to have a significant impact on the amount of foreign capital available for infrastructure projects in developing countries for the foreseeable future. On one hand, fiscal budgetary pressures will increase demand and thus, competition, for multilateral funds and other external resources. On the other hand, in view of the financial uncertainty and moderate growth potential of many developed countries, emerging countries have an opportunity to position themselves as attractive, higher-yielding investment destinations. Ensuring political and macroeconomic stability, transparent institutions and an effective legal and regulatory framework, will be important factors for creating a more attractive investment environment for foreign capital in emerging countries.

Foreign Direct Investment

According to UNCTAD (2012), Foreign Direct Investment (FDI) inflows to developing countries in 2011 topped USD 684 billion, representing 2,3% of GDP in Africa (USD 42,7 billion), 3,9% of GDP in Latin America (USD 217 billion) and 2,6% of GDP in Asia (USD 423 billion) (p.72). In developing countries

with underdeveloped domestic financial markets and limited access to international debt markets, FDI could provide valuable financing alternatives for infrastructure optimization. FDI can also import administrative and operational best practices to receiving countries. However, the use of FDI as a source of infrastructure finance is a relatively new development in many emerging countries. Public-private partnerships (PPPs), such as concessions, leasing, and build-operate-(own)-transfer (BOOs and BOTs) have surfaced as a way to introduce competition and attract private and external interest to a sector with historic state dominance and natural monopoly characteristics. Currently, the benefits of FDI are not evenly distributed or fully exploited across countries and sectors. Most infrastructure projects involve large, up-front capital costs with uncertain, long-term prospects for cost recovery and profit. In this context, emerging countries looking to attract foreign investment will need to focus on building transparent and effective policy and regulatory procedures, as well as the human and institutional capacity to implement them.

Multilateral Development Banks

Multilateral Development Banks (MDBs) occupy a unique position in infrastructure finance; they not only provide funding for infrastructure projects, but their transnational ownership structure and pan-regional perspective mean that they can provide an important bridge across a variety of market players and stakeholders. Due to resource limitations and heightened competition among sectors and geographical areas, (MDBs) have a far more important presence in smaller countries. For example, the Panama Canal expansion project, aimed at doubling the canal's capacity and ensuring its long-term competitiveness in global maritime transportation, requires a total investment of USD 5.2 billion, representing almost 16% of Panama's GDP. Four multilateral development agencies, including the European Investment Bank (EIBC), the Inter-American Development Bank (IADB), the Development Bank of Latin America (CAF), and the International Finance Cooperation (IFC), along with the Japan Bank for International Cooperation (JBIC), contributed to the project with a USD 2.3 billion syndicated loan agreement in 2008. The rest of the financing is to be covered with resources generated by the operation of the canal, which serves around 5% of the annual global maritime freight (IADB, 2008).

Just like national development banks, MDBs also often provide technical assistance and other tools for capacity building that promote the transparent use of resources, accountability, cost-effective delivery and long-term project sustainability. They can also offer risk mitigation through political or partial risk insurance or guarantees that can attract a wider variety of market players. Unsurprisingly, following the global economic crisis that began in 2007, more traditional sources of funds—such as governments and private finance—have had even fewer resources available to devote to infrastructure development, further increasing the importance of multilateral and bilateral agency services and funding in many developing countries.

Bilateral Investment Mechanisms

In relation to bilateral development funds, many developed countries offer infrastructure financing to developing countries, particularly for climate change mitigation projects. Alternative bilateral funding mechanisms have also been employed by countries like China, who invests directly in Africa's infrastructure sector in exchange for favorable long-term supply contracts of raw materials. However, these types of funding structures should be analyzed with caution, as they tend to direct resources to projects that facilitate the development of extractive industries with strategic importance to the financing country.

Sovereign Wealth Funds and Foreign Pension Funds

As of 2010, there were 50 Sovereign Wealth Funds (SWFs) in 39 countries. The top 10 SWFs-in China (three), Singapore (two), UAE (Abu Dhabi), Norway, Saudi Arabia, Hong Kong (China), and Kuwait-account for nearly three-quarters of SWF assets (SWFI, 2013). The total assets of SWFs are expected to grow from an estimated \$4.3 trillion in 2010 to \$10 trillion by 2015 (Gijon, 2008). The majority of those resources are currently invested in US treasuries and in other developed countries. Recently, SWFs have starting looking to diversify and expand their asset portfolio into higher yielding alternative assets like infrastructure investments. Many SWFs and pension funds have already realized indirect investments in bonds and stocks issued by companies active in the infrastructure sector. However, direct investments, in which SWFs and pension funds have attained direct ownership of infrastructure assets, like airports, ports and highways, and subcontracted out the maintenance and administration of the asset, tends to generate greater incentive for long-term asset conservation. In 2012, the Canada Pension Plan, an independent pension manager with assets of around USD 166 billion, acquired 49% ownership (at USD 1.1 billion) of Grupo Costanera, the largest urban toll operator in Chile, with a portfolio of 5 toll roads. This transaction is a prime example of how a large scale investment fund can diversify its investments by directing just a small fraction of its assets to infrastructure projects. At the same time, this investment represents a significant flow of resources to Chile's infrastructure sector.

3. FEATURED INFRASTRUCTURE FINANCING TOOLS & MECHANISMS

Public-Private Partnerships

Public-Private Partnerships (PPPs) schemes introduce market mechanisms that appropriately assign resources and risks among investors, consumers, and the government. PPP agreements usually involve a government agency contracting with a private company to operate, maintain, finance, and/or manage a facility or system. In the case of traditional toll road privatization arrangement, for example, the franchise owner collects tolls until the contract term ends (usually 20 to 30 years), at which time the facility is transferred back to the government. These Build-Operate-and-Transfer (BOT) contacts are awarded either through direct negotiation with the transit authority or through a competitive bidding process. A traditional toll road PPP arrangement can appeal to the public because no new taxes are required to finance the project, the tolls are cost-based and those that directly benefit from the infrastructure pay for it. On the other hand, the UK pioneered an alternative road privatization technique in which the concessionaires do not charge tolls but rather, are rewarded by the government with the payment of a "shadow toll" based on traffic volume. This scheme does involve the collection of tolls but still transfers much of the risk from the public to the private sector.

Franchising is a technique historically applied to natural monopolies, like streetcar operation and electric distribution systems, where it was uneconomical or disruptive to allow for more than one private service provider. Franchising has become an increasingly important technique in the United States for financing transportation improvements. In the early 1990s, for example, cash-strapped Orange County, California, awarded a contract to a private consortium to finance, design, construct, and operate State Route 91 when it was unable to provide for needed expansion (Engel 2002). The states of Virginia and Maryland granted private access to public rights-of-way in return for deployment of an advanced traveler information system (the National Capital Region Traveler Information Showcase). Other types of franchise schemes have involved exchanging public rights-of-way for the provision of wireless communication infrastructure (Orski 1999).

These types of public-private partnerships allow governments to take advantage of the expertise and efficiency of the private sector, and concentrate on policy, planning and regulation by delegating day-to-day operations. Service and management contracts, for example, utilize the technical know-how and experience of the private sector and expose those activities to the benefits of market competition. Concession agreements also offer the benefit of transferring operating risks from the government to private sector companies, which are usually more efficient and better at managing assets than state-owned companies. Furthermore, having the same firm in charge of construction and maintenance provides more incentive to build high-quality and long-lasting roads.

More and more countries are adopting the PPP concept and using project finance models to develop infrastructure. For example, beginning in 2004, Brazil began enacting new legislation aimed at increasing private investment for PPP projects and created guarantee funds, Fundo Garantidor de Parcerias (FGP), which protect private parties against contracting authority default risk (government insolvency) for each PPP contract. The FGP was used for the Pontal Irrigation Project, in which, in addition to users service fees, the private partner's revenues are complemented by contributions from the public partner. The FGP guarantees 100% compensation in case The National Integration Ministry (Ministério da Integração Nacional) fails to pay. Furthermore, the funds used to pay the compensation are isolated from the remainder of the fund's assets and kept as liquid and risk-free market instruments (WB 2012).

Viability gap funding (VGF) is another useful tool to promote PPP development; it mobilizes resources for public projects, while ensuring that the private sector still shares in the risks of infrastructure delivery and operation. Through VGF, governments provide a one-time grant to support infrastructure projects that are socially desirable but not financially viable, often due to their long gestation periods and inability to increase user fees to commercial levels. The grant assistance can reduce up-front capital costs and therefore make projects bankable. In India, for example, VGF has been utilized for national highway development, and the central and state governments are allowed to provide a combined grant of up to 40 percent of BOT projects (Planning Commission 2005).

Securitization and Project Bonds

Securitization involves the transfer of a pool of illiquid assets to a Special Purpose Vehicle (SPV) that issues tiers of the repackaged instruments as tradable securities directly linked to the performance of the purchased assets. In the case of infrastructure asset securitization, the corresponding cash flows often refer to the fares, rights or tolls related to the use of the infrastructure asset. This methodology is primarily intended to redistribute credit risk from the original lender to a wide spectrum of investors who can bear the risk, thus fostering financial stability and market liquidity, as well as generating an additional source of funding.

In Latin America, countries like Mexico have been able to utilize securitization as a way to channel funds to the infrastructure sector. For example, in 2004, the company Carreteras de Cuotas Puebla (Puebla Toll Roads, CCP in Spanish) of the state of Puebla in Mexico issued a municipal bond backed by future cash flows from toll collections on state road Via Atlixcayotl. The revenues financed the construction of a new road in the same state. An SPV was used to issue the municipal bonds and to manage the collection of the toll revenue. The bonds issued by Via Atlixcáyotl were the first toll road securitization executed in Mexico, with a partial loan participation by a local agent. It was also the first occasion in which development banks participated in the issue of guaranteed bonds. The project was awarded a "AAA" local rating by both Fitch Ratings and Standard & Poor's.

Another noteworthy initiative in the sector is The Project Bond Initiative, created under an EIB and European Commission agreement signed in 2012 and currently in the pilot phase. The Initiative is designed to enable infrastructure projects promoters, usually public private partnerships (PPP), to attract additional private funding from institutional investors such as insurance companies and pension funds by improving the credit quality of the project bonds issued by private companies. The debt arrangement will be divided into two tranches: senior and subordinated. The subordinated debt, or Project Bond Credit Enhancement (PBCE), can take the form of an EIB loan provided to the project promoter at the outset or a contingent credit line which can be drawn upon if the revenues generated by the project are not sufficient to ensure senior debt service. The senior debt, in the form of project bonds, will be issued by the project promoters or the Member State. The PBCE essentially underlies the senior debt and thereby improves its credit quality.

In order to attract new lenders and further develop local capital markets in Brazil, a 2011 law granted tax incentives for infrastructure bond buyers investing in priority projects. Project bonds provide a complementary source of funding to BNDES loans, allowing greater leverage and mitigating investor risk. During the structuring process, once the loan repayment flow is defined, the possibility of a bond issue is considered to improve the project's debt service coverage ratio (usually not smaller than 1.2). Revenues received by the project over one year – after the payment of due taxes, contributions and operational or maintenance costs of the SPV established to manage the public service concession – must exceed the amount of amortization and interest paid by 20%. Then, within a project finance scheme, a loan operation by BNDES is jointly structured with an infrastructure project bond issue to take place on market for acquisition by investors. This model has the advantage of shielding the project, isolating costs and revenues of the enterprise in such a manner that invested resources are exclusively employed in the implementation, operation and maintenance of the project, as well as amortization and payment of interest services. BNDES may share collateral *pari passu* with investors, and contracts may include cross-default provisions. If an issuer defaults on its bonds, BNDES can declare early maturity on that issuer's debts, to the benefit of all bond investors. During structuring, an external rating agency is also employed to give the bonds a credit risk rating. Projects presented to BNDES are often supported by investors with a strong track record in the respective sector, such as national or multinational holding companies and construction groups; investors' technical and financial capacity are also evaluated so as to enable them to take part in concession auctions. In the energy sector, BNDES has approved some USD 1 billion in infrastructure project bonds for 4 power plants and 4 transmission lines. One such project included the implementation and operation of substations and transmission lines between Jauru and Vilhena (354 Km, 235 Kv) and Vilhena and Samuel (595 km, 230 Kv). BNDES provided R\$ 104 million and R\$266.8 million respectively for the two tranches, covering roughly 47% of the total investment need of the project. An additional R\$ 39 million was financed through project bonds.

Syndicated Lending Schemes

A syndicated loan consists of a structure in which a financial institution exercises leadership in a credit operation and brings together a group of banks and/or other institutions to respond to the needs of a client under the umbrella of a single loan. The participants of a co-financing arrangement can agree on common financial conditions (joint financing) or structure the loans independently (parallel financing).

Under A/B Loan structure a development bank may offer the A portion of the loan from its own resources, and another, or several other financial institutions provide the B loans. The development bank holding the A loan is the Lender of Record and acts as Administrative Agent for the entire facility. Development banks usually enjoy special privileges granted by their shareholder governments, such as

immunity from withholding taxes and de facto preferred creditor status, which helps mitigate transfer and convertibility risk. Financial institutions participating as B Lenders benefit from the same status; this reduced risk translates into lower borrowing costs for all participants. The A/B structure can help attract new financing partners, particularly commercial banks, to private sector infrastructure projects in non-investment grade countries and promote longer borrowing tenors.

In 2013, CAF began participating in the financing of a project to construct, operate and maintain a 50 MW capacity wind farm, Talas de Maciel II, in the Florida Department of southern-central Uruguay. The National Administration of Power Generation and Transmission (UTE) awarded a private company a 20-year contract for the project's operation and maintenance (O&M) as well as a power purchase agreement (PPA). The project commenced in August 2013 with funds from two bridge loans provided by CAF and the Bank of the Oriental Republic of Uruguay (BROU), for USD 35 million and USD 25 million respectively. In 2014, CAF structured a new credit facility to support the project, including a subordinated loan issued by CAF for 10.1 million, and an A/B Loan of 84.4 million total. CAF served as the Lender of Record (A lender) and Den Norske Bank (DNB) Group, Chile Branch, participated as the B lender; each bank contributed USD 42.2 million. This project forms an integral part of the Uruguayan Government's strategy in the wind power sector to achieve an installed capacity of 300 MW by 2015.

Multilateral Infrastructure Funds

Sizeable, global infrastructure investment platforms have the ability to combine public and private capital with knowledge, advisory services and credibility; the funds can play a catalytic role in promoting the definition of the emerging infrastructure asset class and help attract a wide range of investors. Multilateral funds, for example, can provide innovative risk instruments that can help bridge the phases of infrastructure project life cycles and allow lower risk investors to take out financing when higher risk periods have passed. Partner organizations and banks can use these platforms to more effectively amass financing and risk mitigation instruments to fund infrastructure projects which are not being implemented today due to size or complexity.

In an effort to increase infrastructure investment in the ASEAN region, the governments of 10 South East Asian countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Myanmar, Cambodia, Laos and Vietnam) recently collaborated with the Asian Development Bank (ADB) in order to establish the ASEAN Infrastructure Fund (AIF). Under the AIF, debt will be issued to leverage 1.5 times the fund's equity, using hybrid capital (perpetual bonds) to target high-investment grade credit ratings. It is expected that central banks and other institutions and private sector investors will purchase the debt after the AIF has established a clear track-record and sufficient lending volume. As ASEAN countries hold roughly \$700 billion in foreign exchange reserves, the Fund offers an avenue for recycling the region's resources for its growing infrastructure needs (ADB webpage). The Fund's has an estimated lending commitment of approximately \$4 billion through 2020. With some 70% in projected co-financing from the ADB, the Fund plans to leverage more than \$13 billion in infrastructure financing by 2020 ("Innovative Fund," 2011). The Fund is expected to promote greater private sector investment by mitigating some of the perceived risks of large scale, long-tenor infrastructure operations. Lending initially will occur only on sovereign-guaranteed projects and the public portion of PPP projects, but the Fund may make loans to private sponsors after formal determination by the AIF managers down the road. In December of 2013, AIF announced its first loan transaction, US 25 million to finance improvement in power transmission between Java and Bali, Indonesia. The ADB and Indonesian government will finance the remaining USD 410 million for the project ("Indonesia Power Project", 2013).

Another example is the IFC's Asset Management Company (AMC), a wholly owned subsidiary of IFC, which focuses on fundraising from large institutional investors like sovereign funds, pension funds and development financing institutions looking to increase their exposure to emerging markets and seeking to benefit from IFC's transaction pipeline, investment approach and track record. One of the IFC AMC's funds is the Global Infrastructure Fund (GIF), a new multilateral investment platform aimed at mobilizing private sector and institutional funding to co-invest in IFC funded infrastructure projects. The GIF not only makes use of both public and private capital, but also has the ability to combine funding, knowledge, advisory services and credibility that can play a catalytic role for the emergence and refining of infrastructure as a new asset class. IFC AMC completed fundraising for the GIF in October 2013, with a total of \$1.2 billion raised from 11 investors, comprising of the IFC and a Singapore sovereign wealth fund, GIC, as anchor investors, and 9 sovereign and pension fund investors from Asia, the Middle East, Europe and North America ("IFC Global Infrastructure Fund," 2013). In August 2013, the IFC, IFC African, Latin American and Caribbean Fund and the GIF announced a joint USD 150 million equity investment in Pacific Infrastructure Ventures to support the growth of Colombia's oil and gas exports ("IFC, IFC Asset Management," 2013).

Revolving Funds and Trusts

Revolving funds act like a bank, in that they do not own the infrastructure asset, but act as a lender or guarantor to the project sponsor. Most revolving funds offer financing to private entities if they are building a public infrastructure project or working with a public sponsor. Although they are not traditional banking for-profit institutions, revolving funds rely on principal repayments, bonds, interest and fees to replenish the fund as a perpetual source of debt financing. Some revolving funds have leveraged their pool of capital to raise additional funds to finance more projects or those at a higher cost. Combining the private functions of a bank with a public agency helps attract private investment to development projects that may not normally draw interest, due to the smaller revenue streams and low returns. Additionally, revolving funds attract customers by providing competitive, low-interest rate financing.

In 2012, the Chicago Infrastructure Trust (CIT) was created to leverage public and private capital for infrastructure development, including transportation, telecommunications, alternative energy and social infrastructure across the city. Rather than simply receiving a low-interest rate as they would in a traditional revolving fund, the CIT allows private financiers to invest their money in a fund with low risk and stable returns. The CIT enables each project to customize a financing structure using taxable or tax-exempt debt, equity investments and other forms of support. The trust is backed by J.P. Morgan Asset Management's Infrastructure Investments Group, Citibank, Citi Infrastructure Investors, Macquarie Infrastructure and Real Assets, and the Union Labor Life Insurance Co. The Trust's first project was approved by the Chicago City Council in January 2014, for energy efficiency improvements to public buildings. Bank of America was the selected financier, and will earn 4.95 percent interest on its investment for 15 years. Any additional savings on electricity bills generated beyond the 4.95 percent interest rate go back to the trust (Ruthhart 2014).

ESCOs

Energy Service Companies (ESCOs) are commercial or non-profit businesses that develop, implement, and provide or arrange financing for energy efficiency investment. They can provide broad range of services, including design and implementation of projects, retrofitting, energy conservation, energy infrastructure outsourcing, and risk management, among others.

In countries like the UK, ESCOs are evolving to focus more on innovative financing methods, like off-balance sheet vehicles that own a range of applicable energy efficiency equipment. The building occupants benefit from the energy savings and in return, pay a fee to the ESCO. The energy savings is always guaranteed to exceed the fee; if the project does not provide returns on the investment, the ESCO is usually responsible for the difference.

The key concept of the ESCO business model is that the client does not have to come up with any upfront capital investment and is only responsible for repaying the investment arranged by the ESCO. The ESCO performs an analysis of the property, designs an energy efficient solution, installs the required elements, and maintains the system to ensure energy savings during the payback period. The savings in energy costs can be used to pay back the capital investment of the project over a five- to twenty-year period, or can be reinvested into the building for capital upgrades.

Value Capture

Large public investments in infrastructure such as new highways or railways can increase the value of adjacent private land and real estate; the public sector can “capture” the additional value or externalities generated from these investments.

Tools like rezoning and reselling, impact fees, special assessment districts and tax increment financing, among others, are gaining interest as innovative finance mechanisms for infrastructure development. Betterment taxes, or benefit assessments, for example, target those that benefit from the increased accessibility created by the transport infrastructure. They can range from direct land or property taxes, a tax on income generated from the sale of land and buildings that have increased in value after the introduction of the infrastructure, or taxes that are equivalent to the difference between the unimproved value of the land and the higher value after re-zoning. In a PPP scheme, the betterment tax can serve as the public sector’s contribution. Tax increment financing estimates the level of development that will occur as a result of the infrastructure improvements and the expected growth in property tax revenue is securitized, or used as the basis for securing a bond to help fund the infrastructure project.

Local governments or transport development authorities can also offer the right to develop land on a long-term lease basis or outright sale. According to the World Bank, many cities in China have funded their urban infrastructure projects directly from land leasing and borrowing against the value of the land on their balance sheets. For example, in order to fund the construction of a ring road in Changsha, China, the municipality transferred leasehold rights to a PPP agency for land on both sides of the road, of which more than half was unfinished, and had little market value. Of the total USD 740 million cost of the second stage of the ring road project, half was financed directly from the sale of leasehold rights on the finished land, while the other half was financed through borrowing against the future estimated value of the land that would be improved (Peterson 2006).

Asset Leasing

A lease is when a company makes an asset it owns available to another party to use for a certain period of time. At the end of a lease contract, the client may return the asset to the lessor, extend the contract duration or have the possibility of purchasing the asset. Leasing allows lessees to manage their working capital by spreading payments over the life of the asset. Because their ownership of the asset (which acts as a form of inbuilt security), lessors are often able to provide finance in situations where other lenders are not; it is often more affordable and quicker to obtain than other forms of finance. Leasing also provides greater operational flexibility in comparison to the outright purchase of an asset.

Furthermore, asset related risks and all other considerations linked to asset ownership are borne by the lessor.

Leasing can also enable clients to upgrade their assets to the latest technologies so that they remain competitive. In that way, leasing plays an important part in encouraging the uptake of energy efficient assets and a more sustainable use of resources. As the world tries to reduce its carbon footprint, the focus on producing and using energy efficient assets has increased. Leasing can help clients gain access to these assets. Furthermore, the fact that lessors are the owners of the assets, and bear the costs of maintenance and replacement, they are incentivized to ensure that production materials and the individual parts making up an asset can be re-leased, refurbished, reused or recycled.

Leasing can help address one of the general barriers that inhibits the development of sustainable energy production, i.e. a lack of access to capital. It is particularly effective in emerging economies where SMEs provide strong growth and employment opportunities, but lack access to financing due to underdeveloped financial markets. A dynamic leasing sector creates access to finance that, in turn, generates employment and investment opportunities. Also, developing alternative financial tools like leasing allows emerging countries to deepen their financial sectors by introducing new products and industry players ("Leasing," 2014).

4. FINANCING TRANSPORT PROJECTS: THE STRATEGIC ROLE OF DEVELOPMENT BANKS

4.1 The Funding Gap

International gateway infrastructures such as ports, airports and rail routes deliver services essential to national and regional trade and competitiveness, employment, quality of life and environmental sustainability. Their importance will only increase in the future as international passenger and trade demand are likely to see strong long-term growth, particularly in developing countries. According to the OECD (2011b), from 2010-2030, global airline traffic could increase by roughly 4.7% per annum; air freight could grow by around 5.9% p.a.; maritime container traffic could increase by about 6% p.a.; and rail passenger and freight traffic could grow by roughly 2-3% p.a. With global GDP likely to double by 2030, air passenger traffic will double in the next 15 years; air freight will triple in 20 years; and port handling of maritime containers will quadruple by 2030 (p.6). The strongest growth will likely be in the Asia region, particularly in the large emerging economies (China and India), as well as in Europe and North America.

Over the period 2009-2030, airport capital expenditure needs are projected to reach around USD 2.2 trillion; port infrastructure facilities capital expenditure needs will equal roughly USD 830 billion; new rail construction and maintenance will require USD 5 trillion; and oil and gas transport and distribution infrastructure will require USD 3.3 trillion in aggregate investments. The total transport infrastructure investment needs for the aforementioned infrastructure facilities is roughly USD 11.3 trillion over 2009- 2030 (OECD, 2011b, p.10).

Generally, the public sector has retained the primary responsibility for providing and regulating port, inland road and rail transport infrastructure. However, given the post-crisis financial situation, innovative funding arrangements will be needed in the future to ensure funding stability and financing levels consistent with escalating infrastructure needs. In many countries, private sector financing has helped deliver the equity and debt financing needed to make infrastructure projects operational. The

private sector can also facilitate the transition to user-pays/self-financing investments. PPPs and other mixed resource funding options can help balance long-term infrastructure development needs against short-term budget pressures and the construction-cost inflations associated with deferred investments.

4.2 IDFC Perspectives: Overcoming Investment Barriers

Governments have a key role to play in influencing private sector investment, by strengthening the conditions for investment in transport infrastructure and delivering investment grade policies. However, according to many IDFC members, the respective roles of the public and private sectors in financing, planning and operating transport services are difficult to define and implement in many developing countries. Public entities do not often provide comprehensive, long-term transport sector planning and maintenance or investment programming. Where norms and regulations exist, there also appears to be a widespread lack of compliance supervision and monitoring in many underdeveloped regions. Greater decentralization of transport management would foster more efficient, higher quality service, particularly in the case of urban and rural transport. At the same time, DBSA notes the importance of federal financing facilities to relieve some of the funding burden on local governments with limited access to credit markets. Many IDFC members, like AFD, also stress the importance of including end-users and costumers in the decision making process as well, to promote more service-oriented reform and widespread public support.

Private investments in transport projects have typically been constrained by high upfront capital costs, relatively low-returns and long investment timelines. The unspecified end-user model, difficulty in calculating and monetizing the indirect benefits of transport infrastructure projects, as well as burdensome tax regimes in many emerging countries also dilute the sector's attractiveness. Many non-motorized modes of transport, like public rail and tramways, often show negative economic viability. As noted by CDG, public subsidies are often required to make investments in public transportation profitable.

Roadways

Many IDFC members emphasize the importance of road construction for the socioeconomic development of poor rural areas in developing countries. Roads provide access to markets, jobs, health, education and other vital amenities necessary for quality of life. Unfortunately, weak macroeconomic conditions and financial turbulence tighten credit markets in many of these countries, making it difficult and costly to obtain large construction loans. Existing roadways are often left to deteriorate due to unstable and insufficient maintenance funding; the capital set aside for road maintenance –from taxes– is often diluted as government deficits increase. Despite these common fiscal budget constraints, there is not a great deal of institutional support to incentivize private investment in the roadway sector in most developing countries. Additionally, it is often difficult for private parties to forecast cost and revenue over the long-term, given the long asset life and unspecified end-user scheme of roadway projects.

The relatively high cost of construction in Latin America makes financing local transport projects – whether big or small–a serious challenge, according to CAF. Regrettably, many countries in the region lack any sort of tax stimulus that could strengthen market incentives. Many countries in Latin America also exhibit complex and costly administrative requirements for concession contracts and permits. However, Brazil has made major progress in this area, according to BNDES, having developed relatively mature regulatory frameworks for the roadway sector. Brazil has granted some 55 roadway concessions since 1995 and roughly 9 new road concessions are also in the works for the near future.

As reported by CABEL, frequent changes in public management policies and a lack of long-term planning slow progress in roadway development in Central America. However, in the nineties, the official political and economic organization of the Central American States –the Central American Integration System (SICA) – began promoting regional cooperation in the roadways sector through the Central American Committee of Transport Ministers (COMITRAN). COMITRAN has sponsored a number of comprehensive agreements, such as the Mesoamerica Project¹ –which outlines the development, financing, and implementation of regional infrastructure and social development projects. One of its primary goals is to enhance regional trade by improving market networks and reducing transport costs. As part of its framework, the project ensures that the five corridors that make up the International Network of Mesoamerica Roadways (RICAM) are in optimal condition, particularly the 3,244 km Pacific Corridor, which impacts service, roadway security, port integration and border-crossings. Participating countries have also proposed the creation of new laws and regulations for PPPs to incentivize private investment in public goods and offer higher quality service in the roadway sector in Central America.

Logistics

More developed, industrial and consuming countries are doing more and more business with the striving emerging market nations– and vice versa. More unforeseen collaborations between the East and West, North and South are developing due to rapid developments in emerging economies. New logistics passageways are appearing between Asia and Africa, between Asia and South America and within the Asian continent. The relative weight of the flow of goods between regions and continents is shifting considerably. Improving competitiveness of products and services, efficient and low-cost logistics services make a significant contribution to the economy and national prosperity. Unfortunately, many developing countries still lack basic logistics infrastructure and trade is inhibited by complex and expensive border procedures. However, national and international logistics systems in many emerging countries generate sizable profits and are commonly operated by private companies. State-owned service providers, on the other hand, often operate well below international standards and are generally considered very inefficient. Yet, in many countries, legal and political barriers deter international private service providers from entering local logistics markets.

As reported by CAF, the logistics sector in Latin America, for example, suffers from poor coordination among actors and sectors as well as high levels of informality –an estimated 70% of current operators are informal. There are also low levels of training in cargo handling, and many aged vehicle fleets – some 60% are considered old and not suited to the products to be transported. According to CABEL, the logistics sector in Central America would greatly benefit from more multimodal transport planning that incorporates comprehensive strategies and concrete action plans. BNDES suspects that the growth potential of the Brazil’s logistics sector is constrained by the sector’s segmented nature; there is little debt capacity and poor corporate governance, as it made up mostly of family businesses.

Seaports and Airports

Ports drive economic development by connecting places to the global economy and increasing competition through the enlargement of the market areas, thereby reducing prices for consumers. Countries with seaport infrastructure systems are more likely to develop competitive manufacturing hubs, and airports greatly contribute to knowledge and service-based business, as well as the tourism market. Seaports and airports can also spur regional productivity, due to the positive externalities of the cluster economies that tend to develop around them. Although private companies operating

¹ Two IDFC members, BCIE and CAF, provide financial and knowledge support to the project.

seaports and airports are often quite profitable, KfW maintains that regulatory and legal barriers create an unwelcoming business environment for private investors in many developing countries. As with other transport sectors, difficulty in accessing credit due to poor macroeconomic conditions and the financial instability of many developing countries is also a major impediment to seaport and airport construction. Several IDFC members, like CABI and CAF, emphasize the importance of supporting concessions and other PPP models to promote seaport and airport infrastructure.

Urban Transportation

Without the capital to invest in housing at an accessible location, poor people in developing countries tend to spend more time commuting and a greater share of their disposable income on public transportation. Unfortunately, many developed countries lack integrated urban transport development strategies; urban transport services are carried out by unorganized and inefficient paratransit, such as shared taxis and minibuses. Governments are either unable or unwilling to enforce necessary regulations or build a framework for efficient and high capacity mass transit systems that could potentially operate on an economically viable basis. The CDB, for example, has pointed out that China does not currently have laws and regulations defining the responsibilities of the government in the operation and management of public transportation. This type of institutional failing was commonly noted among many IDFC members. Management tools, such as IT-based traffic control, have the potential to improve urban road capacity, quality and operational efficiency. However, ICT infrastructure is often complex and requires high levels of civil work capacity, as well as integrated transport planning and management –often lacking in many developing countries.

Another important constraint to urban transport development is the inability of cities to access credit. In Africa, for example, DBSA attributes the huge backlog of urban transport projects to a lack of funds in provincial governments' capital expenditures and maintenance programs. CABI has noted a similar situation in Central America, where municipal governments are unable to obtain financing independently. The situation is exacerbated by complex legal and administrative requirements, entrenched rights of existing operators, and a general lack of coordination among government branches in many countries in Latin America. On the other hand, reforms in Brazil's rail sector have brought about some positive changes according to BNDES. The Brazilian Federal Government has recently announced a series of changes in the regulatory framework for the sector, shifting it from a vertical regime –in which the same concessionaire is responsible for expanding and modernizing the infrastructure as well as day-to-day operational activities—to an open regime that separates infrastructure construction and maintenance from railway operation. State-owned enterprises will repurchase the transport capacity from the concessionaires and resell them to railway operators at market rates. This new model should create competition incentives and increase supply, positively impacting prices and service quality. New concessions are planned for 2014, in a total of over 11,000 new railways.

4.3 IDFC Strategies: Noteworthy Projects

IDFC members provide a wide range of instruments and services to support transport projects throughout the developing world. The following examples highlight some of the members' varied and notable funding facilities and innovative support mechanisms for projects ranging from roadways and railways to urban vehicular fleet modernization.

AFD: Recovery of the Kenya-Uganda Railway Concession

Rail transport on the Mombasa-Kampala line has fallen by almost 50% since 1970 as a result of the infrastructure's gradual deterioration due to the lack of adequate maintenance investment. In 2005, the

Kenyan and Ugandan governments awarded a 25-year concession for rail transport services to Rift Valley Railway (RVR). However, the track continued to deteriorate as RVR failed to raise the financing required for proper upgrades and maintenance. The volume of passengers and freight transported fell to an all-time low in 2009. In May 2010, Citadel Capital, Africa's largest private equity firm, took over RVR and set out to turn the company around. Citadel Capital raised USD 164m in debt and USD 110m in equity to finance the investment program required to improve rail service quality (fleet renewal and track upgrading) and for the future extension investments. AFD's Proparco – Investment and Promotions company for Economic Cooperation– supported this operation by making a USD 10.7m equity investment in the RVR holding company via the Investment and Support Fund for Businesses in Africa (FISEA).

CABEI: Guaranteed Funded Participation for Highway construction in Honduras

The 106km roadway, Villa San Antonio – Goascorán, connects Honduras' main highway, CA-5, with Goascorán, a border town with El Salvador. It is one of the principal logistical inter-oceanic corridors of the International Network of Mesoamerica Highways (RICAM) and a priority of the Mesoamerica Project. The completion of the 4 lane roadway should serve to reduce transportation costs, promoting commerce and the competitiveness of Honduran and Central American businesses, generate direct and indirect employment, encourage investment and tourism, and advance regional integration. The Honduran Commission for the Promotion of PPPs (COALIANZA) has also granted a 20 year concession of the roadway, ensuring more efficient and optimal operation and maintenance of the roadway in the long-term.

The total cost of sections II and III of the roadway project is USD 240 million, including CABEI's direct loan of USD 76.1 million, and BNDES and Citibank credit facilities to the Republic of Honduras for USD 145 million and USD 18.9 million respectively. CABEI also extended credit guarantees to Citibank and BNDES on behalf of the Honduran Government. This kind of guaranteed funded participation model provides a number of benefits, such as swift execution (similar to other ICC on-demand standby guarantees), reduction of lending costs, shared advantage of CABEI's international credit rating, and the increase in risk appetite for investment in Central America.

CAF: Comprehensive Urban Development in Guayaquil

The "Ciudades con Futuro" (*Cities of Promise*) Program, launched by CAF –Development Bank of Latin America– is a high social impact initiative aimed at improving the quality of life of urban populations through integrated multi-sectoral interventions. The program has four major components: 1) inclusive urban development, 2) productive transformation, 3) environmental sustainability, and 4) institutional strengthening and public safety. The first phase of the program will cover five major Latin American cities, including Guayaquil, Quito, Panamá, Fortaleza and Lima.

In the case of Guayaquil, from 1996 to 2012 CAF provided almost USD 515 million in funding for the completion of a variety of critical transport and water and sanitation projects that form part of the city's new urban development model. Another USD 297 million in financing originated from the municipal government and private sector entities, for a total of USD 813 million to date. One of the major transport projects included the modernization of the Metrovía rapid-transit system, a deal structured to transfer costs and operational risks to the private sector through a competitive concession process, and based on competitive user fares without government subsidization. CAF also provided 55% of the financing for a new sewage system covering several marginalized areas of the city, with the municipal government and a private water and sewage utility covering the remaining 45% of the necessary funding.

CAF's comprehensive urban regeneration program has not only represented a profound beautification of the city of Guayaquil, but has also provided employment for thousands of workers, accelerated the national and local economy, boosted tourism, and improved the quality of life and overall welfare of the city's habitants.

CDG: Tanger Med Port Expansion

The Tanger Med Special Agency (TMSA), a public limited company owned by the Moroccan State. TMSA is responsible for the development, maintenance and modernization of the Tanger Med port, as well as the development of logistics zones, industrial and commercial, which are at the cornerstone of the objectives assigned by the Moroccan authorities in terms of wealth creation and employment within the Special Economic Zone. In 2009, the Tanger Med Port Authority (TMPA) was created as a subsidiary of TMSA, and delegated all tasks and powers relating to the management and development of Tanger Med port complex. In order to support the expansion of the complex (Tanger Med II) and contribute to the development of the firm, in 2011, Fipar Holding (CDG Group) made an equity contribution to obtain 30% of capital and voting rights of the TMPA.

The Tanger Med is a world-class multi-purpose port platform serving the needs of global and regional trade. The port consists of the Tanger Med 1 terminal, which went into service in 2007, and the Tanger Med 2 port, which has been under construction since 2010. The port has a unique geostrategic location on the Mediterranean, bridging Europe and Africa, allowing easy access to a market of more than 600 million people. The Tanger Med will have an estimated full capacity of some 8 million containers, 7 million passengers, 700,000 trucks, 2 million vehicles and 10 million tonnes of hydrocarbons.

KoFC: Guri-Pocheon Expressway PPP Project

In 2011, KoFC structured -along with co-financial arrangers Korean Development Bank and Industrial Bank of Korea- one of the largest PPP road projects in Korea to date, both in terms of the volume of private capital raised and scale of the financial arrangement. The project aims to construct an expressway connecting Guri and Pocheon, located in the country's Gyeonggi Province. The new expressway should open in 2017, and is expected to bring significant improvements to the poor road network connecting Seoul and the northern Gyeonggi region.

Until 2009, the Korean government provided "Minimum Revenue Guarantees" (MRGs) to PPP projects in order to entice the private sector to participate in public infrastructure projects. With the program's abolition and the decline of Korea's real estate market, construction companies have had a hard time securing investors for infrastructure related projects. As the Guri-Pocheon Highway project was financed in 2011, it was not eligible for the MRG program. However, the government concession agreement provided a Termination Payment Guarantee in case the Special Purpose Company (SPC) could not make timely payments on its debts, a USD 270 million guarantee on senior loans through Korea Credit Guarantee Fund (KODIT), and provided a construction subsidy or grant of USD 40 million in order to heighten the return on the project.

KoFC not only arranged and helped fund the project, but also managed to recruit more than 16 financing partners, including Woori Bank, Nong Hyup Bank, Korea Exchange Bank, Busan Bank, Kyobo Life Insurance, Hanwha Life Insurance, and Mirae Asset Life Insurance, among others. The entire syndication amounted to roughly USD 1.5 billion, with 15% in the form of equity (including USD 100 million from KoFC), 9% in subordinated debt, and 76% in senior debt. KoFC's successful recruit of large-scale financial investors has marked the institution as a new alternative in fundraising for PPP projects in Korea, paving the way for renewed interest in infrastructure investment in the country.

NAFIN: Modernizing Mexico City's urban transport system

Mexico City's urban transport sector represents the 5th most profit generating activity in the city (MXN 40 million a day). However, more than 29,000 minibuses circulate the city, the majority obsolete vehicles that began operating in the 1990s. In order to renew and modernize the city's deteriorating transport fleet and create modern public transport corridors, NAFIN provided a MXN 600 million loan to the Mexico City Government (GDF). The project also aims to regulate and improve the professionalism of the city's concession model by establishing a trust, which administers system payments and awards first priority to financial intermediaries offering credit to transport service providers. These credits are also partially guaranteed by NAFIN, and GDF participates through a liquid counter-guarantee.

The long-term urban transport program will create 50 public transport corridors and replace some 3,500 minibuses with new, high capacity and low emission buses. To date, more than 1,000 minibuses have been replaced by 450 new units. NAFIN has also expanded the program to the states of Oaxaca and Querétaro.

5. FINANCING WATER AND SANITATION PROJECTS: THE STRATEGIC ROLE OF DEVELOPMENT BANKS

5.1 The Funding Gap

According to the WHO/UNICEF (2013) water and sanitation progress report, only some 55% of the world population enjoys piped water supply on their home premises; at least 11% of the world's population – 783 million people – are still without access to safe drinking water, including an estimated 185 million people that rely on surface water to meet their daily drinking-water needs (WHO/UNICEF, 2013, p.8). Additionally, there are some 2.5 billion people who lack access to improved sanitation facilities, including 693 million people that still use facilities that do not meet minimum standards of hygiene and another 1 billion (15% of the world population) that still practice open defecation (p.5). The OECD "Environmental Outlook to 2050" report warns of the looming dangers if the current haphazard use of environmental resources continues. Growing urbanization coupled with rapid population growth and shifting economic dynamics will cause acute competition for water, declining water quality, and an increasing need to further improve access to safe and affordable drinking water and sanitation.

A WHO (2012) report examining the costs and benefits of completing the MDG water and sanitation targets indicated that the total global economic losses associated with inadequate water supply and sanitation are estimated at USD 260 billion annually, and relate primarily to health care costs, productivity losses pertaining to disease and the human capital losses associated with premature mortality (p.5). Meeting the 2015 MDGs for drinking-water and sanitation will require an estimated investment of US\$ 145 billion over the period 2010-2015. The global cost for operation and maintenance is estimated at US\$ 13 billion for sanitation and US\$ 3 billion for water (p.6). On the other hand, the estimated economic benefits of meeting the MDG water and sanitation targets are USD 60 billion per annum. The combined sanitation and water supply interventions have a benefit-cost ratio of 4.3 at the global level (p.4).

Nevertheless, the WHO (2012) estimated that external support agencies contributed roughly US\$ 8.9 billion to drinking water and sanitation projects in 2009 (p.27). Much of these funds were spent in middle-income countries that are already on-track to meet their MDG target. The cost of meeting the

MDG target and sustaining the served population – of USD 200 billion p.a. – is a more than 20 times the current external aid provided (p.49).

According to the OECD (2006), water and sanitation services require high rates of capital investment and maintenance spending and often generate low returns (around 5%) (p.251). Nevertheless, the returns for such projects are generally low-risk. Unfortunately, the private sector has not demonstrated a significant and durable interest in large-scale investments in water and sanitation services. Private participation is typically by way of offering specific services within the water supply and disposal chain such as the supply and distribution of bottled water (p.255). Ultimately, sustainable financing lies at the center of improved water and sanitation management. Aligning incentives through the use of tariffs and water prices will be vital, as is securing private sources of funding.

5.2 IDFC Perspectives: Overcoming Investment Barriers

As noted by many IDFC members, there are rising health and environmental threats posed by the inadequate water and sanitation systems that exist particularly in the rapidly growing urban centers of many emerging countries. Vast improvements are needed from wastewater and sludge collection and treatment to solid waste management and stormwater drainage.

Governance and Management

The water and sanitation sector involves a wide range of stakeholders working at different levels and has strong ties to the health, energy and agriculture sectors. This interconnectivity requires effective and integrated policy frameworks and regulatory environments, and a clearly defined division of responsibilities and resources among stakeholders. However, in many developing countries the responsibilities of water and environmental ministries and other regulatory authorities are not well defined. Water ministries and regulatory bodies often lack qualified staff and have protracted administrative procedures. China, for example, does not have an independent water supervisory organ; generally speaking, management and supervision of water quality and wastewater discharge in the country is sub-standard and inconsistent.

Acknowledging the need for improved management and supervision of the country's water and sanitation sector, the Brazilian Federal Government has established comprehensive framework of legislation, policies and guidelines to develop the sector. PAC Sanemento –part of the national growth acceleration program–has increased financial support allocated to the sanitation sector. At the same time, the private sector has shown increasing interest in investing in some of the PPP business models proposed by the new legislation. However, BNDES reiterates that despite these positive steps forward, roughly half of regional and municipal operators, controlled by the states, subsist without sustainable investments or long-term management capabilities. Additionally, federal policies set rigid restrictions on public sector borrowing, which reduces the financial resources available for water and sanitation investments. The water sector in Brazil is also highly concentrated, according to BNDES, with just a few holdings disputing the market and a number of the big players associated with major construction companies with significant market presence.

KfW also underscores the significant lack of technical competence in the water sector in many developing countries; more well-trained and experienced engineers and technicians are needed to maintain water and sanitation infrastructure. Industrial wastewater treatment, for example, involves high technical risks and costs. As industrial enterprises cover the fees for industrial waste treatment, there is also an added risk related to enterprises' intention and capacity to perform their obligations.

Sound supervisory organs are needed to ensure sustainable resource management and environmental conservation.

With the ever-increasing pressure on water quantity and quality, comprehensive water resource management is needed in many emerging countries to ensure an appropriate allocation of water to domestic agriculture, energy and industry use, as well as the incorporation of ecosystem requirements and climate change adaptation policies. AFD, for example, along with the French Global Environmental Facility (French GEF), participates and supports Transboundary Basin Organizations (TBOs) that promote the implementation of integrated water resources management in the basins of rivers, lakes and aquifers where hydrological, social, economic and environmental interdependences exist, and where integrated development and management of water resources have the potential to yield the greatest success.

Financial Performance

The potential for low or even negative economic return represents one of the greatest barriers to private sector investment in the water and sanitation sector in many developing countries. A typical water infrastructure project profile comprises a high upfront investment with an initially large negative cash flow, eventually yielding a modest positive cash flow as revenue increases over the long-term; these projects generally demonstrate extended investment horizons and delayed returns. Commercial risks are magnified by long contract periods that are susceptible to renegotiation, as with concessions contracts that can often be up to 30 years. According to DBSA, one of the key lessons learned in financing PPP water schemes in Africa is that the contracts require a reasonable predictability of the future operating environment. Packaging water projects require sufficient and accurate information on reliability of water resources, treatment technologies, sources of funding, water demand, and billing and revenue collection. Persistent non-payment by residential end-users and/or delayed commercial and government payments are commonplace in many developing countries. In Japan, poorly managed water utilities often demonstrate high non-revenue water ratios (NRW) that inflate operational costs and diminish revenue, as reported by JICA. Furthermore, prevailing water tariffs are often just sufficient to cover the cost of operation and maintenance of the existing water infrastructure in many developing countries. Water is usually viewed as a public good or even a human right by many users, and as such, tariff levels are often highly politicized and set insufficiently low to create incentives for private investors.

In China, CDB notes a lack of private sector interest in the agricultural and human water consumption sectors due to low rates of return (or even loss) and lack of effective user payment mechanisms; consequently, most water sector investment requires some form of government subsidies. According to CDB, the water market in China is also highly decentralized –the market share of the largest water group is a mere 5%. This decentralization seriously restricts technological advancement and the intensification of services in the sector, and makes it impossible for private investors to find sizeable investments.

KfW has also noted the problem of low tariff levels creating misaligned incentives in the industrial and agricultural sectors –which are often charged very little and sometimes not at all for water usage and disposal. This is often due to the influence of business and agricultural interests groups on the political process. Poorly set incentives increase pressure on an already strained resource which can further deteriorate the conditions for investment, when costs increase due to poorer water quality or lower ground water levels, for example.

The majority of IDFC members agree that a realistic development strategy should include a sustainable and clearly defined financing distribution among tariffs, taxes and grant-based transfers. There should also be a concerted effort to increase billing and collection in developing countries by improving commercial management and raising user awareness about non-payment and irrational water use.

5.3 IDFC Strategies: Noteworthy Projects

IDFC members support the water and sanitation sector through a wide range of facilities and services. The following examples underscore some of the members' noteworthy financing and assistance approaches for projects ranging from water kiosks and supply facilities to sewage treatment networks.

BNDES: Investing in mixed capital water utilities

Companhia de Saneamento de Minas Gerais (COPASA MG), established in 1974, is a publicly traded company listed on Brazilian stock exchange with the state of Minas Gerais acting as controlling shareholder. The company's main activities comprise planning, developing, implementing and remodeling basic sanitation services, such as water and sewage treatment.

In 2010, BNDES and BNDESPAR –the bank's variable income subsidiary- subscribed to R\$ 741 million (USD 330 million) secured, non-convertible corporate bonds in a private issue. The funds are intended to support COPASA's investment plan – which covers the implementation, enlargement and optimization of water treatment and distribution systems, and sewage collection and treatment in Minas Gerais – as well as corporate governance and operational development. The financing should also foster company action to reduce energy and chemical consumption and minimize the disposal of effluents in the environment, as well as promote energy cogeneration and reforestation of water preservation areas. It should also be noted that COPASA owns 14 water stream preservation areas across the state –more than 250 square meters inhabited by native flora and fauna species – and sponsors environmental education programs.

BSTB: Rehabilitation of communal water supply infrastructure in Batumi

BSTDB provided an unfunded risk participation (URP) of EUR 16 million for a loan facility extended by KfW to the Finance Ministry of Georgia for phase three of the rehabilitation of the municipal infrastructure in Batumi, Georgia, and the surrounding villages. It is worth noting that the URP is similar to a guarantee, but structured in such a way as to allow for more legal flexibility to accommodate the requirements/mandates of financiers and recipients of financing. The total cost of the project is estimated to be around EUR 44 million: KfW provided EUR 20 million in loans and EUR 9 million in grant financing, the European Commission provided a EUR 4 million grant, and a EUR 11 million contribution was made by the Georgian government.

BSTDB's project looks to rehabilitate the water distribution network and the wastewater system as well as install a wastewater treatment plant. The project will ensure a 24-hour supply of hygienically sound water and wastewater treatment. This project is a prime example of BSTDB's development objectives in the region and underscores a successful cooperative effort between BSTDB, KfW, the European Commission and the Georgia Government to improve living standards for the people of Batumi.

CDB: Supporting domestic environmental protection enterprises in going global

Beijing Enterprises Water Group Limited (BEWG) –ranking first among “top 10 influential water enterprises in China” – owns and operates a number of water supply and sewage treatment projects in the country. The treatment sewage facilities owned and/or operated by BEWG account for roughly

3.8% of the total treatment capacity of China. The company has been gradually expanding into the global market; in late 2009, BEWG entered into a Memorandum of Water Cooperation with the Malaysian Government, by which it would invest RMB 12 billion for the construction of 19 sewage treatment plants, supporting pipe networks and auxiliary facilities in Malaysia. According to the characteristics of the EPC project, CDB designed a model of corporate loans for overseas projects, structured the provision of a BEWG guarantee and pledge of interests and income for the construction of the Pantai No.2 Sewage Treatment Plant located in Kuala Lumpur and provided USD 175 million in loan financing.

JICA: Supporting the Phnom Penh Water Supply Authority

After decades of problems, such as poor coverage and high non-revenue water (NRW), the Phnom Penh water supply system has been completely revitalized through the strong leadership of Mr. Ek Sonn Chan –appointed General Director of the city’s water supply authority (PPWSA) in 1993- and the coordinated financial and technical support effort led by JICA. Based on JICA’s Phnom Penh Water Supply Master Plan (1993), ADB, WB, AFD and JICA provided funds in the form of grants and soft loans for overhauling and expanding the city’s water supply facilities including construction of three water treatment plants (WTPs) and replacement/ expansion of more than 300km of distribution pipes.

As head of PPWSA, Mr. Chan initiated a wide range of reforms, investing in staff, providing performance-based incentives (such as higher salaries and bonuses) and imposing penalties for poor performers, promoting transparency, involving civil society, and investing in modern management procedures and technology. As a result of these reforms, and with the help of JICA’s technical assistance, there have been noted improvements in operations and management of PPWSA’s water treatment plants and water quality control. PPWSA has also widened its distribution network from serving 40% in Phnom Penh in 1993 to over 90% in 2009 with clean, affordable water. Other improvements include introducing 24 hours water supply (from an only 10 hours/ day supply in 1993), reducing NRW from 72% in 1993 to less than 6% in 2009, establishing a complete customer database, improving collections, and metering all of the utility’s water supply coverage. Due to the drastic improvement of performance, PPWSA has not only operated with full cost recovery but become highly profitable. PPWSA has received awards and high performance ratings from a wide range of agencies, such as ADB’s Water Prize in 2004 and the Stockholm Industry Water Award in 2010.

KfW: Funding Water Kiosks in Zambia

The water kiosk concept is one of the key elements of a new program approach running in Zambia since 2006. Thanks to the simple, low-cost technology the kiosks supply water precisely to those people previously considered too unappealing as customers because they could not afford expensive connections to the water supply system. Construction of the kiosks is financed by the Zambian “Devolution Trust Fund,” – a water and sanitation fund that municipal water companies can apply to for financial and advisory services. KfW made crucial contributions to developing the concept and provides the largest financial contribution of EUR 9 million on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). The trust fund’s concept has also been adopted in other countries, like Kenya, and Zambia is now looking to expand this model to urban water supply systems across the entire country. Nowadays, the water kiosks in Zambia’s poor neighborhoods also serve as small shops selling items of daily use, and the clean water available actually costs less than the dirty water from the tanks of illegal water vendors.

6. FINANCING CONVENTIONAL ENERGY PROJECTS: THE STRATEGIC ROLE OF DEVELOPMENT BANKS

6.1 The Funding Gap

Safe, dependable, affordable, clean and equitable energy supply is fundamental to global economic growth and human development; it improves family health, broadens the reach of education, allows households to cook and heat their homes, and enhances agricultural development and food security.

In 2010, some 1.2 billion people did not have access to electricity, and roughly 87 percent of that population was concentrated in Sub-Saharan Africa and Southern Asia. With regards to cooking, about 2.8 billion people primarily relied on solid fuels like wood, charcoal, animal and crop waste, of which roughly 96 percent were geographically concentrated in Sub-Saharan Africa, Eastern and Southern Asia. The indoor air pollution that results from solid fuel use causes about four million premature deaths a year, most of them women and children (Banerjee et al., 2013).

The IEA estimates that under current and planned policies, global energy demand will increase by about 1.3% annually over the period 2010- 2030 (Banerjee et al., 2013). China, India and Middle East alone are driving about one-third of global energy demand growth (IEA, 2013). Although renewables will account for nearly half of the increase in power generation over the next two decades, fossil fuels continue to meet a dominant share of global energy demand. Wide-open deserts (in the western United States, China, and northern Africa) hold promise for solar and wind power generation, but nuclear power and natural gas may offer more tenable energy solutions for many developing countries—at least in the short term.

Achieving universal access to electricity by 2030 will require a fivefold annual investment increase, from USD 9 billion in 2009 to USD 45 billion in 2030. Universal access to modern cooking solutions by 2030 will require average annual investment of around \$4.4 billion, up from a meager USD 0.1 billion in 2009 (Banerjee et al., 2013). Non-OECD countries will account for the majority of total energy supply infrastructure financing needs between now and 2030.

6.2 IDFC Perspectives: Overcoming Investment Barriers

Energy investment worldwide is primarily impacted by the uncertainties surrounding market reforms, environmental constraints and access to capital. Similar to other sectors, access to capital for energy initiatives is particularly uncertain in developing countries, due to underdeveloped financial markets and unfavorable regulatory and investment climates. Policy makers in many countries are addressing concerns for greater system reliability and quality by establishing a market framework that sends efficient market signals to investors.

Costs and Financial Risk

Many IDFC members emphasize the high up-front costs for energy projects as a major investment barrier, particularly for natural gas and coal-fired plant construction and other energy projects that require new technology. Whereas in developed markets capital expenditure is often self-financed through companies' retained earnings, most emerging and developing energy markets depend in large part on external financing. Unfortunately, access to long-term debt capital for large energy supply infrastructure is limited in many developing countries due to immature local financial sectors and limited access to global capital markets. This is less of a concern for more export-oriented projects, like upstream gas projects, but presents a serious constraint for projects to supply electricity and natural

gas to domestic markets. Furthermore, the high cost of debt financing requires returns commensurate with the perceived level of risk of investing in energy projects in developing countries. IDFC members have noted, that like other types of infrastructure projects, risk perception and the cost of finance for energy project developers are high in developing countries particularly due to technology inexperience, political instability, institutional weakness and less robust legal frameworks.

Many IDFC members have also noted widespread incompetence of public officials in the public procurement process. Administrative costs of energy projects are high, as there are often difficulties and delays in the approval process for concessions and other procedures in many developing countries. Obtaining approvals and licenses are cited by developers as being a big hurdle and a costly and time-consuming project activity. These costs and delays also add to the cost of finance if the cost of capital increases due to inflation. Burdensome tax restrictions also inhibit growth in the sector in many countries; CAF and other IDFC members suggest improving tax stimulus programs to attract more private investors.

Many cleaner energy projects, like natural gas and nuclear energy, present uncertain financial returns that constrain private financing. In Mexico, for example, NAFIN has noted the difficulty in securing long-term funding, particularly in dollars. This is particularly problematic because the country's rapidly growing power generation sector depends on natural gas imports from the US by pipeline and liquefied natural gas from terminals located at its pacific and Atlantic coastlines. Development banks can help improve the risk landscape for co-investors by adjusting investment capital structures; providing capital that is subordinate to private investors' debt or equity will help leverage additional investment from private lenders and improve the risk/return attractiveness of the sector.

A particularly pressing challenge for the energy sector in many developing countries will be tariff reform, to improve revenue collection and ensure that prices cover costs. Many developing countries exhibit weak institutional frameworks and complex regulatory regimes; market distorting subsidies in the energy sector set fossil fuel prices and tariffs too low to cover project development and maintenance costs. In China, for example, there are major deficiencies in the country's power pricing system. According to CDB, the costs of gas power generation are generally high and unstable. There is no existing natural gas market pricing mechanism. The factory price, pipeline transport fee and end user price of natural gas is assessed and determined by the government. As a result, there is uncertainty about the financial returns of gas power generation projects, which stifles private sector interest in the sector.

In the Brazilian Power Sector, BNDES is the main source for long-term credit. The bank has been working with the Brazilian federal government to foster the infrastructure project bond market. This market allows utility companies to issue long-term bonds for greenfield projects in order to complement BNDES credit facilities with private market resources. The federal government has provided the added incentive of exempting infrastructure project bonds from income taxes. Bond holders have equal access to all collaterals pledged to BNDES, and cross-default clauses exist between BNDES long-term loan agreements and bonds. This financial structure has succeeded in reducing risk perception and increased infrastructure investment demand.

According to AFD, many governments are no longer providing sovereign guarantees for energy projects, not only due to increasing public debt constraints but also because the sector is largely deemed profitable. As a result, non-sovereign loans with financially viable counterparts are becoming increasingly important to support bankable projects with controlled risks. Like many IDFC members, AFD also provides private sector loans at market conditions, and equity and quasi-equity financing

tools to support developers and promoters for private generation projects. Many development banks also participate and help design project finance arrangements, whereby project sponsors setup a company specifically for the purpose of constructing, owning and operating a facility, such as a power plant or pipeline. The company is financed through a mixture of equity and debt, and returns are derived solely from the project's revenue stream. This structure gives energy companies access to additional capital without limiting their creditworthiness or burdening their balance sheets; it is a common financial tool in the oil, gas and power sectors. Development banks can also provide longer term debt maturities that facilitate the participation of other private lenders and equity investors in the sector.

Many IDFC members also provide technical assistance products in order to support cleaner energy policies and operators, like assistance programs for power upgrading. There also needs to be further support to enhance financial sector expertise and capacity to fund the clean energy sector, particularly considering that cleaner and more efficient energy projects normally lack an extensive performance history. Technical assistance will continue to be important in the context of loan/grant blending to finance projects with uncertain profitability levels.

Technology and Know-How

Markets function best when everyone has low-cost access to good information and the necessary skills. However, human capital that can install, operate and maintain sustainable energy technologies can be limited in developing countries. Project developers, managers, lenders, and consumers can sometimes lack information related to financial costs and benefits, resources and externalities, operating and technical experience and other vital information that may increase perceived uncertainties and block decisions in the energy sector. Building local expertise and capacities can help strengthen market development and efficiency, thereby reducing costs. Many IDFC members provide technical assistance and grant funding for capacity training and are helping spread best-practices in energy project development. Spreading expertise will also create spillover effects; subsequent projects can improve their viability by capturing some of the positive externalities related to improvements in technology design, construction and operating skills, and new financing structures.

Financing cleaner and more efficient energy projects requires providers to invest resources in developing the necessary knowledge and experience to undertake it. Project lenders will not accept the risk that the technology will be unable to perform consistently in a commercial setting or that a state-of-the-art technology will become prematurely obsolete. One key challenge with more cleaner-energy technologies is that there is often no experience base or track record in the marketplace, which is needed for due diligence and risk assessment by project financiers. As a result, technology risk is of particular concern for plants employing new technology that carry high costs because of their innovative and less-mature nature. Development banks can support capacity building and knowledge formation in the finance sector, to help ensure improved risk assessment of projects.

Many IDFC members note the lack of advanced power plant technologies and know-how in the field of efficient coal- and gas-fired power and heat generation, for instance. To support further progress in the sector, many members devote substantial resources to projects aimed at improving demand- and supply-side energy efficiency projects. KfW, for example, is financing the construction of the first coal-fired power plant in India based on supercritical steam power technology. The project aims to reduce GHG emission by 1.8 Mio. tonnes per year.

Like other IDFC members, CAF emphasizes the importance of supporting pre-feasibility and feasibility studies for energy projects. The lack of adequate ex ante project evaluation has become a barrier to the

timely execution of loans and energy projects in some countries in Latin America. A lack of basic and widely disbursed technical studies on energy projects has meant that each project developer must dedicate time and resources to carrying out their own individual studies. Moreover, these studies are vital to ensuring that all technical details are taken into account when designing risk mitigation measures to be incorporated during project execution.

Policies and Regulations

Domestic policy and regulatory challenges are commonly cited barriers to investment in the energy sector. In many countries, governments have retained direct influence over energy sector investment, through retained ownership of oil and gas reserves, for example. As a result, decisions to commit capital to the energy sector are increasingly shaped by government policy measures and incentives. Furthermore, energy investments are often subject to lengthy approval processes and delays are likely where projects involve socially and environmentally sensitive areas. Many IDFC members have noted the importance of reducing political and regulatory uncertainty for mobilizing private capital to the sector. However, policymakers are often faced with conflicting pressures, like calls for stronger action on climate change but opposition to the cost of renewable energy subsidies. Under these circumstances, policymakers may fail to provide clear and consistent signals to investors.

In countries like Mexico, for example, NAFIN has noted the slow development of the natural gas sector due to weak legal and economic frameworks. Policies and regulations in many developing countries tend to focus on short-term costs and supply rather than the long-term benefits of energy efficient cost savings, energy security and environmental performance. Energy sector management is often driven by concerns over country competitiveness; conventional electricity prices often do not reflect the true costs of fossil-fuel technologies to public health, the local environment and global climate. To encourage private sector investment in energy projects, IDFC member point to the need to develop more transparent and independent regulation schemes, political commitments to meet energy targets, as well as effective and long-term incentive programs. The availability of viable energy projects in the pipeline for private investors is limited in some developing countries due to regulatory uncertainty around policy changes that may reduce or eliminate publicly provided incentives. Political risk of expropriation or nationalization is a major barrier to capital intensive fixed investment in some developing countries; private investors require transparency, longevity and certainty. Public ministers will need to work to ensure that the investment and regulatory environment is supportive and that institutional investors are offered appropriately structured financing vehicles.

Financial market access is particularly problematic for the state-owned utilities that dominate energy sectors in many developing countries. Regulations prohibiting or constraining private investment in sectors like nuclear power, for example, exacerbate the problem. The Chinese regulatory system, for instance, requires State approval for banks to extend credit for nuclear power projects. This can be problematic because nuclear power projects require a great deal of up-front work and investment. CDB has provided support to the sector by financing a number of nuclear power projects, like the Ling'ao and Qinshan Nuclear Power Stations. CAF also has experience in the sector, having supported the refurbishment of a nuclear plant in Argentina. According to CAF, knowledge enhancement was a key factor of the project, due to the complexity of the technology involved and to ensure that the highest standards of environmental security are met.

CABEI notes that there has been limited progress in the implementation of projects that use natural gas as fuel for power generation in Central America. By its nature, the supply chain of natural gas is much more complex than that of petroleum. Due to the specific nature of natural gas transport, only a large electricity generator in the region could ensure a minimum level of consumption to justify the large

investments in pipelines and infrastructure to receive liquid natural gas (LNG). However, the Central American Electrification Council (CEAC) has announced plans to make natural gas the largest fossil fuel component of its energy matrix. In addition to requiring large investments for plants, as well as ports, pipelines and storage facilities to import LNG, the plan will require the development of new regulatory frameworks throughout the region.

Ultimately, developing countries will need to examine the value of attracting more institutional investors and investment funds to energy projects versus the cost of modifying their other policy objectives. For example, the regulation of pension funds or insurance companies can constrain investment in infrastructure projects but also insures the financial solvency and security of the funds. Many IDFC members are actively working with developing countries to help put in place new, more effective pricing mechanisms, investment incentive programs, and improved transparency and oversight to help attract more private and institutional investment to sustainable energy projects.

6.3 IDFC Strategies: Noteworthy Projects

AFD: Innovative financing tools for electricity and water providers in Cambodia

In Cambodia, access to electricity and water services is largely inadequate. In secondary towns in rural areas, in the absence of public operators, small-scale service providers have emerged to finance and manage electricity and water networks. In order to support this efficient local response and help extend and improve service provision, over 2013-2014, AFD set up a comprehensive financing package: 1) a USD 15 million credit line under soft conditions to a local bank, Foreign Trade Bank (FTB), which will be on-lent to small scale operators, 2) a EUR 3 million grant from the Asian Investment Facility of the European Union, allocated to capacity building programs and the partial financing of the least financially profitable (yet economically viable) investments, and 3) a portfolio guarantee of USD 5 million to reduce the level of securities requested by local banks to operators.

The complementarity of the public and private stakeholders involved, as well as that of the financing tools mobilized, makes this program both unifying and innovative; it contributes to removing some of the financial barriers that have been hampering the development of electricity and water service provision in rural areas in Cambodia.

BNDES: Secure and Affordable Electricity in Northern Brazil

In 2012, BNDES approved R\$ 1.05 billion in financing for Norte Brasil Transmissora de Energia S.A to implement the approximately 2,300 km long collector transmission line in Porto Velho (state of Rondônia) - Araraquara 2 (state of São Paulo), which integrates the Rio Madeira transmission system. The total project cost was R\$ 1.98 billion, of which 52.9% was financed by BNDES. Roughly R\$ 5.25 million of the funding was directed towards social investments, covering improvements in urban and rural infrastructure, health, education, security, recreation and workforce capacity-building in the regions affected by the project. An additional R\$ 200 million (or 10.1% of the total investment) was provided through infrastructure project bonds. The bonds will also contribute to the development of Brazil's long-term corporate debt market for project financing.

The project is part of Brazil's Growth Acceleration Program (PAC) and a priority for the country, as it will increase security in the electricity supply to the Brazilian Interconnected System and help lower tariffs. Approximately 5,000 transmission towers are being constructed along the line, which cross over 80 cities in five states, including Rondônia, Mato Grosso, Goiás, Minas Gerais and São Paulo.

CABEI: Central American Electrical Interconnection System

The Central American Electrical Interconnection System (SIEPAC) project entailed the construction of 1,796 km of 230 kV transmission lines, and expansion and revamp of 25 substations. More than 35 million electricity users will eventually be connected across Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. The line is operated by the Empresa Propietaria de la Red (EPR), a company created and owned equally by the state transmission companies of each of the Central American countries involved, as well as ISA of Colombia, CFE of Mexico and Endesa of Spain.

The total cost of the project was USD 494 million in credit financing and USD 6.5 million in non-refundable technical assistance. The main funding partners of the project include the Central American Bank for Economic Integration (CABEI), the Inter-American Development Bank (IDB), The Development Bank of Latin America (CAF), and Bancomext (CFE).

In addition to building the infrastructure for the interconnected power grid, the project also supported the creation of the Regional Electricity Market (MER), which acts complementary to national markets. Technical assistance was directed towards establishing legal, institutional and technical mechanisms to facilitate the participation of the private sector in the development of power generation and transmission. Different entities have also been established to regulate, operate and provide technical guidance to MER, such as the Regulatory Commission on Electrical Interconnection (CRIE) based in Guatemala.

The SIEPAC and MER initiatives are optimizing national electricity markets in Central America and facilitating generation projects at a regional and more efficient scale, reducing production costs. The promotion of a larger and more diversified set of actors in the electricity sector also incites competition and leads to improved prices. The line also permits the import of production if necessary, increasing energy security for users in the region.

KoFC: Improving the bankability of the Ansan Power Plant

The 835 MW Ansan LNG CCGT plant is currently being built in Ansan, Gyonggi Province in South Korea. Initially, a special purpose company was established by Samchully Co., Korea South East Power Co. and Posco E&C for the KRW 887.1 billion investment needed to cover the cost of the project. Although each investor had a strong credit rating and extensive experience in their respective fields, the project was delayed for four years due to a combination of factors that eroded the project's bankability, including the high cost of the project, real estate market risks, and unfavorable financing conditions.

KoFC was eventually asked to provide "one-stop" advisory and arranging services and succeeded in substantially improving both the feasibility and bankability of the project. In fact, KoFC arranged a syndication that was overbooked twice the intended size. In the end, a total of 17 private financial institutions took part in the syndication, contributing KRF 617.1 billion, or 70% of the total cost of the project.

The electricity produced by the plant will be sold through the Korea Power Exchange and the heat will be provided on a wholesale basis to the Ansan Urban Development Inc. The project will serve to reinforce the South Korean government's energy policy by stabilizing the power supply of the metropolitan area and bringing down national energy costs by providing relatively cheap heat.

JICA: Rural Electrification

In 2007, JICA launched a concessional ODA loan project, "Improvement of Efficiency for Rural Power Supply" in Bhutan, in cooperation with other donors like the ADB and Austrian government. The

project was based on a previous development study conducted by JICA in 2005, “The Integrated Master Plan Study for Dzongkhag-wise Electrification in Bhutan,” which laid out a plan to electrify communities by both grid and off-grid power plants and improve counterpart capacity to manage and revise the plans. The loan was accompanied by technical assistance to enhance the capacity of the implementing agency, the Bhutan Power Co. Ltd. (BPC). The program developed operation and maintenance manuals, and upgraded BPC’s training capacity in order to improve efficiency and customer service.

In 2011, JICA signed another concessional ODA loan agreement with the Government of the Kingdom of Bhutan to provide a loan of up to 2.187 billion yen to support the expansion of electric distribution lines for the Rural Electrification Project. Phase 2 provided the construction of a distribution network that would serve approximately 3,700 households. This project, combined with other assistance programs from the ADB and others, helped Bhutan achieve 95% electrification as of June 2013. Roughly 22% (18,700 households) of this newly serviced population directly benefited from Japanese participation.

NAFIN: Mobilizing resources for Gas Pipeline Development

NAFIN participated in the financing of a gas pipeline in the northern border of Mexico that successfully started operating in 2013. A Mexican company served as the sponsor (debtor), and was actually the first Mexican company to have a contract of this type awarded by the Federal Electricity Commission (CFE). The pipeline has a planned capacity, without compression, of 850 million cubic feet per day, and will account for a big proportion of Mexico’s five billion cubic feet per day national consumption. It is important to note that the CFE will eventually require all of the pipeline’s capacity to meet the needs of both its own fleet and other independent power projects.

The gas pipeline project was financed through a syndicated-loan, using a mini perm structure, with a tenor of 7 years. Seven commercial and development banks participated in a pro-rata share of the financing in US dollars, with a total project cost of USD 475 million (including debt and equity). In addition, an independent engineer was in charge of providing the banks with assurances of the development, construction and completion of the project, including the fulfillment of local and international environmental principles (e.g. Equator Principles), with a full report under the sponsor’s expense.

7. FINANCING ICT PROJECTS: THE STRATEGIC ROLE OF DEVELOPMENT BANKS

7.1 The Funding Gap

ICT affects how individuals live, work and interact. It facilitates social and economic inclusion, makes markets more efficient and has a significant impact on shaping geopolitics and spreading culture. In key development sectors, like education and health, for example, the creative and cost-efficient use of ICT tools has been able to enhance service quality, outreach and training. ICT is also essential to economic growth, trade and competitiveness and is considered a driving force in poverty reduction. In fact, according to a 2009 World Bank report, for every 10 percent increase in broadband service penetration there is a 1.38 percent increase in economic growth. Internet and mobile phone penetration were associated with a 1.12 and 0.81 percent increase in economic growth respectively (WB 2009). ICT has been a motor of outsourced job-migration and offshoring that has helped create new employment opportunities in many developing countries. In China, for example, the ICT sector provided

employment for some 23 million internal migrant workers in 2011, with evidence that a large portion of their earnings was remitted to poor rural and remote areas (UNCTAD 2011).

According to the International Telecommunications Union (ITU), at the end of 2010, fixed (wired) broadband subscriptions reached an estimated 555 million globally (or 8% penetration), but penetration remains particularly low in developing countries, with only 4.4 subscriptions per 100 people, compared to 24.6 in developed countries. In developed countries, roughly 71% of the population was online in 2010, compared to just 21% in developing countries. Internet penetration is particularly low in Africa, where only 9.6% of the population was online in 2010. Mobile cellular penetration rates were also much lower in Africa, at 41%, compared to 76% globally and 68% amongst developing countries at the end of 2010 (2010).

ICT infrastructure demand will be shaped by the needs for accessibility for the large mass of currently underserved populations in developing countries. As the service sector takes on an increasing share of developing countries' economies, so too will the demand for ICT development. Demographic shifts towards an aged population will also seed the need for more extensive ICT infrastructure and services to support the elderly, particularly for health care. Climate change effects, including increased flooding, tidal waves and hurricanes will also increase demand for alert networks and telecom infrastructure that can resist extreme weather and alleviate disasters as much as possible. Furthermore, as countries take a more active role in combating pollution, telecommuting will become an increasingly important way to reduce fuel consumption.

McKinsey Group estimates that the world will need to spend roughly USD 9.5 trillion on telecommunications infrastructure between 2013 and 2030 (2013). The main growth in deployment and technology is expected to take place in developing countries, particularly China and India, and will be driven by competition in the private sector. In many countries, the government is no longer the prime ICT investor. Privatization and deregulation of the industry has increased the importance of financial market development for the growth of the ICT sector. Governments also have a prominent role to play in investing in research that can feed back into the commercial sector, in areas like new radio technologies and propagation, spectrum sharing and digital signal processing implementation, among others.

7.2 IDFC Perspectives: Overcoming Investment Barriers

With the growing importance of the knowledge-based economy, the demand for ICT infrastructure will continue well beyond 2030, particularly in developing countries. As a result, middle-income and low-income countries are increasingly preoccupied with accelerating the rollout of networks and improving affordability. Thankfully, tomorrow's ICT infrastructure will leapfrog developed countries' current advances. As ICT infrastructure competition progresses, increasingly lower prices and costs of entry will continue to fuel innovation and enhanced service provision from new market players. Whether the potential for universal access and services is realized in developing countries will depend on the removal of investment disincentives and barriers to entry, such as price controls and subsidies that discourage competition.

ICT also has significant spillover effects; teleworking, teleshopping, distance learning and e-commerce will reduce dependencies on vehicle transport and fuel, and lessen their environmental impact. At the same time, there will be fallout effects on other services, such as electrical distribution, gas for heating and sewage and water supplies as ICT increasingly provides a substitute for travel. However, ICT usage will pass on savings in overall infrastructure costs due to these substitution effects, as well as stimulate

education, commerce and health care. Infrastructure planning must take into account the potential impacts of ICT substitution impacts; more research and feasibility studies are needed in this area.

Market Development

Private sector-led growth in infrastructure investment has expanded access to ICT services throughout the world. Market liberalization and deregulation has opened the door for new pricing regimes and new market players. However, in many countries, former state monopoly suppliers continue to control the main domestic trunk elements of ICT networks, and are often the primary providers of local access to services. Anti-competitive activities, such as charging excessive rates for inter-connections, can flourish under such circumstances. Furthermore, protecting public monopolies with far-reaching ICT infrastructure networks already in place create extremely high market entry costs. Regulators should ensure fair competition and a level playing field in services and technology, so that the more dominant players are not able to act against the common good in protection of sunk infrastructure costs. However, in many countries legislative restrictions and/or weak regulatory enforcement can shield public telecommunications providers from competition. In the case of the television sector in China, for example, no fee collection is allowed on any frequency point (limited to public services) so the sector does not attract private investment. Special attention should also be paid to the regulation of ICT-related trade. According to CAF, technology services and goods are subject to high trade tariffs in some countries in Latin America, slowing growth of the sector.

Weak-institutional frameworks to design national ICT strategies are also prevalent in developing countries. CAF notes the importance of providing technical assistance to support national broadband plans, internet backbone deployment and regulatory and institutional enhancement to support ICT growth and enhancement. Public leadership needs to focus on cross-sector management and collaboration, rather than on individual agencies and turf protection. Development strategies for the sector must be able to respond to evolving national goals and increasingly dynamic economies, and ensure adequate institutional coordination and continuity. CAF, for example, has assisted with the design of national digital inclusion plans in several countries in Latin America, providing policy and strategy recommendations for both the public and private sectors on how to promote affordability and greater inclusion. It will be important for developing countries to adapt the national ICT policies from a model previously dominated by bilateral relations to one of oligopolistic competition among large scale global service providers. These global service companies often have wide-ranging expertise in equipment procurement and in the construction and operation of networks. There are ample opportunities to create effective international partnerships for the development of national information infrastructures. Development banks can help governments design effective PPP frameworks and policies to ensure that the private sector has sufficient incentive to invest and operate networks efficiently, and in remote areas that are viewed as less commercially viable.

Beyond sectorial planning and deregulation, the public sector should also help guide the harmonization of ICT infrastructure standards that will enhance competition in services, equipment and infrastructures. Development banks and other public agencies can also step in to help support pre-feasibility and feasibility studies to assist risk assessment of innovative ICT projects that may lack a historic market track record. Ultimately, the goal of the public sector should be to create healthy investment environments and help guide private capital towards financing ICT infrastructure projects. It is important to have ongoing engagement between the public sector and private service companies, rather than adopt a predetermined policy approach. Ireland's government-sponsored Industrial Development Agency (IDA), for example, has been a driving force behind the growth of IT services in the country. IDA not only provides investors with support to get started, providing financial incentives

and property solutions, but also works with investors to maximize their contribution to Ireland's economy. Nine of IDA's 13 board members are from the private sector (WB 2009).

A critical investment barrier is also the lack of skilled labor in the ICT sector in many developing countries, coupled with limited in-service training opportunities. In South Africa, DBSA notes, ICT curriculums in schools and universities are inadequate. Given the importance of ICT in the new global knowledge-based economy, the public sector should also focus on education and ICT skill building initiatives.

Universal Access

In market economies, responsibility for providing ICT infrastructure and services has rested primarily with the private sector. ICT networks are developing mainly in potentially profitable city and intercity corridors. As a result, people living in commercially less attractive rural and low-income areas are often left behind. In China, for example, development of fixed wideband networks in rural areas has been slow, according to CDB, not only due to construction and maintenance challenges but also low project returns –rural wideband networks are costly investments and often have a small number of users. CDB believes better public policy incentives and subsidies would help quicken the pace of rural ICT development in the country.

One of the primary roles of the public sector in terms of ICT sector development, besides the liberalization and deregulation of the market, has been to establish mechanisms like universal service funds and output-based aid that offer incentives for operators to provide services in rural and remote areas that would otherwise not be commercially feasible. These funds can be financed through several means, including direct or indirect levies on consumers, funding from the proceeds of privatization and spectrum license fees, and public funding through taxation revenue. An increasing number of emerging countries are using universal access funds to support not only the ubiquitous deployment of basic telephone equipment and services, but also access to digital devices, broadband Internet connections, and localized content and services.

In South Africa, DBSA notes that expansion of mobile and fixed broadband networks to rural and low-income areas has been quite limited, due to a lack of private sector interest in projects characterized by low financial returns. Although regulations in South Africa require telecommunications operators to serve underserved areas, they are generally ineffective. Legally, licensing conditions in South Africa require that 25% of rollouts must be directed to low-income and rural areas. However, there is limited compliance by operators due to low penalty fees. In addition, although 2% of the revenues collected by the regulators from the operators is supposed to be directed towards subsidizing the rollout of networks for underserved area networks, the resources are often directed elsewhere. A combination of market reforms and targeted incentives to promote universal access to ICT networks will be needed in developing countries like South Africa. Improved ICT policy-based management and coordination and regulatory compliance supervision will be vital to ensuring universal access funds and initiatives are successful.

The largest unfulfilled ICT markets are in developing countries, where disposable incomes are rising at a level that demands far lower costs. In Latin America, for example, CAF notes that broadband deployment to low-income areas is often limited by affordability barriers; internet access prices represent an important percentage of income for users. The trend in consumption ICT and its supporting infrastructure is to ever more mobile communications –lighter physical support infrastructure that entails a much quicker rollout has become increasingly important for both technical and economic reasons. For the world's poorest populations, mobile offers the first and only chance to

telecommunicate. The cost of ICT infrastructure access per subscriber will be the critical factor for universal access in developing countries. Policy makers will need to continue to promote competition, through deregulation and liberalization, to keep access prices low and diffusion levels high. Apart from avoiding barriers to entry, governments should also ensure that competing operators are able to interconnect with incumbent operators' infrastructure, to avoid economic and technical bottlenecks and duplicate investments.

PPP initiatives will be particularly important for ICT sector development, to harness the technical expertise and financial resources of the private sector to achieve public policy objectives like universal access. The ultimate goal however should be that sector become commercially viable and competitive over the long-run, as demand picks up in newly reached areas. Competitive subsidy and cost-sharing mechanisms to promote inclusion should be modeled in a way to ensure that private actors have sufficient incentive to invest and operate networks efficiently.

Many IDFC members also note the slow pace of digital inclusion initiatives due to a lack of skills necessary to use internet and broadband services in rural and low-income areas. Universal Access is designed to take connectivity to areas where it is not likely to be made available by commercial operators. However, low literacy and education levels also mean that even when services are extended to some remote areas, they may not be put to use by all members of the community - unless they are given appropriate training. An important distinction can be made between the "necessary conditions," such as providing ICT infrastructure, and the actual devices and tools that the people use, and the "sufficient conditions", which refers to conditions that yield maximum usage and benefit of ICT. Poor and rural communities will need the skills to take full advantage of ICT, be able to afford to pay for services, and appropriate local content has to be made available. Universal access programs in some developing countries have made progress in providing the "necessary conditions" for Universal Access, but are far from achieving the "sufficient conditions". Development banks can play an important role in providing technical assistance for capacity building and educational initiatives in this area.

7.3 IDFC Strategies: Noteworthy Projects

CAF: Geostationary Satellite Development

To support the Argentinian government in providing broadband services to rural and low-income populations, CAF helped fund the design, development, manufacture and commissioning of three geostationary orbit telecommunications satellites (ARSAT I, II and ARSAT III). The total program cost reached USD 846 million; CAF providing USD 86 million and the Argentine government funding the remaining USD 760 million.

The operation covers the following components: (a) investment in protecting orbital space, (b) engineering and development associated with the manufacture, integration, testing, safe and satellite launching of the fleet, (c) audits and (d) program management. Besides helping Argentina cover the orbital position assigned to it by the International Telecommunication Union (ITU), the project also helped position the country as one of the premier developers and satellite operators in Latin America, and promoted its role in the development and transfer of scientific knowledge in the industry.

It is expected that the implementation of the satellite system will expand satellite coverage to virtually all of Argentina, including southern provinces that are unattractive to private operators, enhance the Argentina brand for future technological ventures, and help retain more highly qualified human talent.

CDB: Supporting the Hunan TV & Broadcasting Intermediary Co.

Since 2003, China Development Bank (CDB) has provided the Hunan TV & Broadcasting Intermediary Co. with medium-to-long term loans of RMB 7.8 billion, liquidity loans of RMB 480 million, and has underwritten medium-term notes of RMB 1 billion to facilitate its network upgrading and transformation, province-wide cable network integration, digital conversion and two-way transmission construction, and the acquisition and integration of the rural network in Hunan and related digital conversion, as part of the company's sustained growth plan.

With the support of CDB, TV&B Intermediary has seen its principal revenue increase from RMB 970 million in 2003 to 3.8 billion in 2012, and profit increase from RMB 47 million in 2003 to RMB 690 million in 2012. The company ranks among the top 30 strongest culture companies in China. It has also been appointed as a pilot company for the national cultural system reform by the Publicity Department of the Communist Party of China (CPC), and shares its business experience with peers across the country. Hunan is the first province in China to completely transform from wired television networks to two-way digital networks.

CDG: Advancing Telecom Market Liberalization and Growth

Since 1997, the telecom sector in Morocco has undergone major evolution, with the establishment of a new regulatory and institutional framework and the introduction of private competition. In 1999, the second GSM license in the country was granted to Médi Télécom. In 2005, landline telephony licenses were granted to Médi Télécom and Wana Corporate. In 2007, three 3G licenses were granted to Médi Télécom, Wana Corp. and IAM. Since the reformation, the sector has experienced strong growth. The supply of landline telecom services in Morocco expanded to low-speed internet offerings starting in 1995, ADSL broadband in 2003, ADSL TV in 2006 and other data services have since developed using new technologies. Operators have expanded their customer base in the country by implementing innovative and adapted services in terms of quality and price.

In 2009, CDG acquired a stake in Médi Télécom limited company, one of only three telecom operators in Morocco with landline, 2G and 3G licenses. Currently, 40% of shares are held by the France Telecom Group, 30% by Finance.Com Group and 30% by the CDG Group (17.4% through Fipar Holding and 12.6% through Holdco). With the increased local investor support for its extensive investment plan, Médi Télécom has been able to significantly increase its customer base and improve its market share. At the end of 2013, Médi Télécom held the second largest market share, after Maroc Telecom, in terms of mobile telephony and Internet and is the third largest landline telephony operator in Morocco.

KfW: Financing the Eastern Africa Submarine Cable System

In 2010 the Eastern Africa Submarine Cable System (EASSy) project was commissioned. The project included the construction of a submarine fiber-optic cable of approximately 10,000 km. The EASSy-cable runs along the east African coast, from the southern tip of the continent to the African horn. With extensions to 13 adjoining landlocked countries as well as to the Comoros Archipelago, 21 African countries have been provided high-quality internet and international communication services and a missing link to the larger global network of submarine cables has been closed. By now, some 250 million people are benefitting from improved service quality and a reduction in bandwidth costs.

The project could only have been realized through a major institutional effort combining the capabilities of many divergent African institutions. The investment company created, WIOCC, bundles the efforts of 14 shareholding telecommunication companies in the region. The project was financed through equity contributions of US\$ 20 million and a syndicated loan of US\$ 70.7 million from KfW, the African Development Bank (AfDB), the European Investment Bank (EIB) and the International Finance

Corporation (IFC). With additional direct capital investments of major African and international telecommunication companies, WIOCC obtained the necessary financing volume. It is important to note that the financing arrangements of the development banks included specific covenants to strengthen price and service competition for promoting economic development in the target region.

THE WAY FORWARD

In the developing world, fiscal pressures, discontentment with the performance of publically owned utilities and the need for new investment and modernization are driving public policy changes towards fostering more private sector involvement in the infrastructure sector. Nevertheless, in many emerging countries, market liberalization, regulatory reform and restructuring of state-owned monopoly utilities is just beginning. Furthermore, given the large sunk costs, natural monopoly elements and the political sensitivity of infrastructure development, there remains strong justification for state participation.

Development banks correspond to an estimated 15 to 20 percent of financing of total infrastructure investments in developing countries (Estache, 2010). These institutions help correct market failures, caused by high country and regulatory risks, the mismatch of socioeconomic versus financial returns and often, underdeveloped local financial sectors. Development banks occupy a unique position; they not only finance infrastructure projects, but also serve as financial catalysts, providing risk mitigation and leveraging mechanisms that help bring new lenders to the table. Development banks' international credibility and pan-regional perspective allows them to serve as an important bridge between global public and private stakeholders in their client member countries.

The World Bank's Public Private Infrastructure Advisory Facility estimates that private participation in infrastructure has represented around 1% of developing countries' GDP p.a. over the last decade (WB, 2010). In the transport sector, private investment has really only been feasible when users can be directly charged, requiring the projects to be self-contained and have no similar alternatives. Privately financed schemes typically include bridges, toll roads, tunnels, railroads and some ports and airports. According to the World Bank's Private Participation in Infrastructure (PPI) Database, between 2000 and 2010, private participation in transport projects occurred in 76 developing countries, encompassing 753 projects and absorbing roughly USD 179 billion in capital. In the water and sanitation sector, financing has derived almost entirely from the public sector and this trend is expected to continue for the foreseeable future. Between 2000 and 2010, the private sector invested just USD 34 billion in 575 projects in 53 developing countries. In the energy sector, the largest share of current investment is directed towards the extraction and transport of fossil fuels, oil refining and the construction of fossil fuel-fired power plants. Private participation in energy projects from 2000-2010 occurred in 93 developing countries, covering some 1350 projects and utilizing USD 374 billion in capital. The telecom sector is the most attractive sector in terms of private investment, due to improving market deregulation and liberalization, attracting some USD 221 billion in investment commitments for 314 projects in 119 different developing countries between 2000 and 2010.

With an estimated USD 1 trillion in private investment in global infrastructure projects (Ernst & Young, 2007) the annual financing gap holds at roughly USD 2 trillion. In view of their size and depth, global capital markets have the potential to fund all economically viable infrastructure projects in the developing world. However, infrastructure investment involves complex and protracted contracting processes relative to most other parts of the economy, operated under the dual imperative of ensuring financial sustainability while meeting customer needs and public goals. The challenges are even more acute when governments bring in international investors, particularly sensitive to the commercial risks

involved in working in foreign environments and exposed to public and political scrutiny. As such, attracting investors will require transparent and consistent international mechanisms for cross-border investment regulation, competition rules, and robust national regulatory frameworks.

The value proposition of infrastructure assets cover attractive returns and long term, stable predictable cash flows, low sensitivity to market fluctuations, low return correlation with other asset classes, good inflation hedge, low default rates and social responsible investing. These investments present a particularly good match for investors with long-term liability structures. However, infrastructure as an asset class differs from the traditional equity or credit assets in a variety of ways: infrastructure projects are public-good in nature, carrying implications of government obligations and other economic externalities, the development of projects are complex and life-cycles lengthy, with varying levels of operational and financial risk associated with each stage, requiring high levels of technical expertise. Consequently, infrastructure investments need to be clearly defined and standardized, so that assets can be efficiently created and attract more capital. As a comprehensively defined asset class, infrastructure would be far better positioned to attract greater private financing.

In light of the prevailing governance and management problems in the infrastructure sector, it is clear that further technical cooperation assistance is needed. Grant funding for capacity training for project developers and organizing authorities, strategy formulation, vocational training, and intellectual production, such as research on appropriate financing models, tax reform and design of viable payment schemes would help tackle some of the current investment barriers. IDFC members can also continue to support initiatives that ensure the optimal and concerted allocation of resources that incorporate both economic viability and environmental sustainability, as well as support the development of new tools for measurement, analysis and monitoring.

IDFC members can also help ensure more long-term sustainable financing by assisting ministries to structure infrastructure programs that appropriately distribute funding among tariffs, taxes and grants and implement policy reform that strengthens market incentives. As IDFC members are in a position to absorb more risk than the private sector, they can also back more innovative development approaches such as wastewater reuse and desalination, among others. One of the primary roles that development banks serve is to improve investment climates by guiding PPP policy and institutional framework reform, backing PPP pilot projects and structuring financing vehicles that help provide the risk/return profile that the private sector expects. Offering more competitive local currency debt financing would also help alleviate some of the infrastructure funding constraints in many developing countries. IDFC members could also prioritize funding for comprehensive programs rather than project approaches, to promote more long-term and integrated development strategies, as well as increase co-financing through coordinated multi-sector donor efforts.

Ultimately, the financing of most forms of infrastructure requires a combination of project promoters, lenders, development institutions, and export credit agencies. In this context, improving coordination among market players is often cited as one of the major challenges to strengthening the sector. Collective efforts to deal with issues of corruption, governance, and a lack of project performance information would also foster greater support for large-scale infrastructure projects that require multiple sources of funding. In this way, the IDFC and other coordinated development agency networks are striving to reduce the current knowledge gap, and to help ensure that scarce international and national financial resources are directed towards cost-effective and sustainable infrastructure projects.

REFERENCES

- AsDB. (2009). *Infrastructure for a Seamless Asia*. Asian Development Bank Institute.
- Banerjee, S. G., Bhatia, M., Azuela, G. E., Jaques, I., Sarkar, A., Portale, E., Bushueva, I., Angelou, N., Inon, J. G. (2013). *Global tracking framework*. Vol. 2 of *Global tracking framework*. Sustainable energy for all. Washington, DC; The World Bank.
- Berne Union. (2013). *2013 annual report*. Exporta Publishing & Events Ltd. Retrieved May 23, 2013, from <http://www.berneunion.org/pdf/Berne%20Union%20Yearbook%202013.pdf>.
- Bhattacharyay, B. (2010). *Estimating Demand for Infrastructure in Energy, Transport, Telecommunications, Water and Sanitation in Asia and the Pacific*. (ADBI Working Paper No. 248). Tokyo: Asian Development Bank Institute.
- CAF. (2011). *La Infraestructura en el Desarrollo Integral de América Latina*. (IDEAL series).
- CAF. (2012). *La Infraestructura en el Desarrollo Integral de América Latina. Financiamiento. Metas y Oportunidades*. (IDEAL series).
- Demircuc-Kunt, Asli & Leora Klapper. (2012). *Measuring Financial Inclusion: The Global Findex Database*. (Policy Research Working Paper 6025). The World Bank. Development Research Group. Finance and Private Sector Development Team.
- Engel, Eduardo, Fischer, R. and A. Galetovic (2002). A New Approach to Private Roads. *Regulation*, Vol.25, No.3, Fall 2002.
- Ernst & Young. (2007). "Investing in Global Infrastructure 2007: An Emerging Asset Class." Retrieved from <http://www.ey.com/infrastructure>.
- Estache, A. (2010). Infrastructure finance in developing countries: An overview. *Public and private financing of infrastructure: Policy challenges in mobilizing finance, EIB Papers, Volume 15 (2)*. Retrieved from http://www.eib.org/attachments/efs/eibpapers/eibpapers_2010_v15_n01_en.pdf
- Estache, A., & Garsous, G. (2012). *The impact of Infrastructure on Growth in Developing Countries*. (IFC Economics Notes). Retrieved on May 29, 2013, from <http://www1.ifc.org/wps/wcm/connect/054be8804db753a6843aa4ab7d7326c0/INR+Note+1++The+Impact+of+Infrastructure+on+Growth.pdf?MOD=AJPERES>.
- Estache, A., Ianchovichina, E., Bacon, R., Salamon, I. (2013) *Infrastructure and Employment Creation in the Middle East and North Africa*. Washington, DC: The World Bank. Retrieved on May 31, 2013 from <https://openknowledge.worldbank.org/bitstream/handle/10986/12237/NonAsciiFileName0.pdf?sequence=1>.
- Export Finance and Insurance Corporation. (2012). *Export Credit Agencies in the Asian Century*. (submission to the 'Australia in the Asian Century' White Paper). Australian Government.
- George E. Peterson (2006). *Land leasing and land sale as a in infrastructure-financing option*. Policy Research Working Paper, No. 4043. Washington, DC: The World Bank.

- Gijon, Jose. (2008). *SWF and Infrastructure Investment in Africa: Challenges and Perspectives*. Presentation at the NEPAD-OECD Africa Investment Initiative meeting in Entebbe. OECD Publications.
- Hulten, C. (1996). *Infrastructure Capital and Economic Growth: How Well You Use It May Be More Important than How Much You Have*. (NBER Working Paper 5847).
- IADB (2008). IDB, Panama sign loan agreement for expansion of the Panama Canal, biggest infrastructure project in Latin America. Retrieved May 24, 2013 from <http://www.iadb.org/en/news/news-releases/2008-12-10/panama-canal,4934.html>.
- IEA (2013). *World Energy Outlook 2013*. Paris: IEA/OECD Publishing.
- IEA (2014). *World Energy Investment Outlook Special Report*. Paris: IEA/OECD Publishing.
- IFC Energy Service Company Market Analysis. (2011). Econoler Publications.
- IFC Global Infrastructure Fund Completes \$1.2 Billion Fundraising. (2013). Retrieved from <http://ifcext.ifc.org/ifcext/pressroom/IFCPressRoom.nsf/0/0D9C0CD919A1B09F85257BFE00801AEC>
- IFC, IFC Asset Management Company to Invest \$150 Million to Strengthen Colombia's Infrastructure. (2013). Retrieved from <http://ifcext.ifc.org/IFCExt/pressroom/IFCPressRoom.nsf/0/65447A9473FBEEA585257BBE004280D7?OpenDocument>
- Inderst, G. (2010). Infrastructure as an asset class. *Public and private financing of infrastructure: Evolution of economics of private infrastructure finance, EIB Papers, Volume 15* (1). Retrieved from http://www.eib.org/attachments/efs/eibpapers/eibpapers_2010_v15_n01_en.pdf
- Indonesia Power Project Marks First Loan of ASEAN Infrastructure Fund. (2013). Retrieved from <http://www.adb.org/news/indonesia/adb-loan-help-power-further-growth-bali>
- Innovative Fund to Pave Way for Infrastructure Boom. (2011). Retrieved from <http://www.adb.org/news/innovative-fund-pave-way-infrastructure-boom>
- International Telecommunications Union (ITU). (2010). *The World in 2010: ICT Facts and Figures*. Retrieved from <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2010.pdf>
- Jacoby, H.. (2000). Access to Rural Markets and the Benefits of Rural Roads. *The Economic Journal*, 110.
- Leasing. (2014). Retrieved from http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Financial+Markets/MSME+Finance/Leasing/
- Leipziger, D., Fay, M., Wodon, Q. and Yepes, T. (2003). *Achieving the Millennium Development Goals: The Role of Infrastructure*. The World Bank. (Policy Research Working Paper 3163).
- McKinsey Global Institute (MGI). (2013). *Infrastructure productivity: How to save \$1 trillion a year*. McKinsey & Company.

- Merrill Lynch Wealth Management and Capgemini. (2011). *World Wealth Report 2011*.
- Morgan Stanley. (2007). *Investing in Infrastructure: A Primer*. (Infrastructure Paper Series No. 2).
- OECD. (2006). *Infrastructure to 2030: Telecom, Land Transport, Water and Electricity*. OECD Publications.
- OECD. (2011a). *Pension Funds Investment in Infrastructure: A Survey*. (Project on Strategic Transport Infrastructure to 2030). OECD Publications.
- OECD. (2011b). *Strategic Transport Infrastructure Needs to 2030: Main Findings*. (OECD Futures Project on Transcontinental Infrastructure Needs to 2030/50). OECD Publications.
- OECD. (2012). *Environmental Outlook to 2050*. OECD Publishing. Retrieved May 29, 2013, from <http://dx.doi.org/10.1787/9789264122246-en>.
- OECD. (2014). *Enabling Investment in Sustainable Energy Infrastructure*. (OECD and Post-2015 Reflections. Element 4, Paper 2). Retrieved from <http://www.oecd.org/dac/post-2015.htm#Beyond>
- Orski, Kenneth (1999-2006). *Innovating Infrastructure Financing*. Cambridge, MA: International Mobility Observatory, Massachusetts Institute of Technology (MIT).
- Perrotti, D. and Sanchez, R. J. (2011). *La Brecha de Infraestructura en América Latina y el Caribe*. (Serie de recursos naturales e infraestructura, N 154). Santiago de Chile: CEPAL y Naciones Unidas.
- Planning Commission, Government of India. 2005. *Guidelines: Financial Support to Public Private Partnerships in Infrastructure*. New Delhi: Secretariat for the Committee on Infrastructure.
- Ruthhart, Bill. (2014). First Emanuel infrastructure trust project approved after delays. *Chicago Tribune*. Retrieved from http://articles.chicagotribune.com/2014-01-15/news/chi-first-emanuel-infrastructure-trust-approved-after-delays-20140115_1_75-city-buildings-stephen-beitler-chicago-infrastructure-trust
- Serven, Luis. (2010). *Infrastructure and Growth*. The World Bank. Retrieved May 29, 2013, from <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:22629797~pagePK:64165401~piPK:64165026~theSitePK:469382~isCURL:Y,00.html>.
- Sovereign Wealth Fund Institute. (2013). *Sovereign Wealth Fund Rankings [Data]*. Retrieved On May 26, 2013, from <http://www.swfinstitute.org/fund-rankings/>.
- The World Bank. (2004). *The Challenge of Financing Infrastructure in Developing Countries*. (Global Development Finance).
- The World Bank. (2009). *Information and Communication Technologies for Development: Extending Reach and Increasing Impact*. Retrieved from <http://go.worldbank.org/NATLOH7HV0>
- The World Bank. (2010). *Private Participation in Infrastructure (PPI) Database*. Retrieved from <http://ppi.worldbank.org/>

- The World Bank. (2011). *PPP In Infrastructure Resource Center*. Retrieved from <http://ppp.worldbank.org/public-private-partnership/>
- The World Bank. (2012). *Best Practices in Public-Private Partnerships Financing in Latin America: the role of guarantees*. Retrieved from https://einstitution.worldbank.org/ei/sites/default/files/Upload_Files/BestPracticesPPPFfinancingLatinAmericaguarantees.pdf
- UNCTAD (2011). *Measuring Impacts of Information and Communication Technology for Development*. New York and Geneva: United Nations.
- UNCTAD. (2012). *World Investment Report 2012*. New York and Geneva: United Nations.
- UNESCAP. (2013). Innovative financing options for regional infrastructure development and maintenance. *Forum of Asian Ministers of Transport*. Bangkok: United Nations.
- Water Management Consultants LTd. (2004). *Small Scale Private Sector Participation in the Rural Water Supply Sector*. (R8335 Knowledge Review February, 1788/r1). UK Department for International Development.
- WHO. (2012). *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage*. (WHO/HSE/WSH/12.01).
- WHO/UNICEF. (2013). *Progress on Sanitation and Drinking Water: 2013 update*.