

Innovative Finance to Address Africa's Infrastructure Needs

Financial Innovations Lab® Report



April 2016



MILKEN INSTITUTE



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Financial Innovations Labs®

Financial Innovations Labs® bring together researchers, policymakers, and business, financial, and professional practitioners to create market-based solutions to business and public-policy challenges. Using real and simulated case studies, participants consider and design alternative capital structures and then apply appropriate financial technologies to them.

Acknowledgments

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This report was prepared by Caitlin MacLean and Harlin Singh.

About the Milken Institute

A nonprofit, nonpartisan economic think tank, the Milken Institute believes in the power of finance to shape the future. The Milken Institute produces rigorous, independent economic research—and maximizes its impact by convening global leaders from the worlds of business, finance, policy, academia, and philanthropy. By fostering collaboration between the public and private sectors, we transform great ideas into action.

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INTRODUCTION

From the viewpoint of Africa as a single economic region, the continent is growing rapidly. Its natural resources, agriculture, and industry have the potential to support and strengthen its vulnerable populations—Africa has struggled with political instability, high levels of poverty, and Ebola outbreaks, but its economic growth remains robust. Sub-Saharan Africa, in fact, which contains the bulk of Africa’s population, enjoyed an average economic growth rate of 4.5 percent in 2014.¹ This area includes nine of the world’s fifteen most rapidly expanding economies, creating an environment ripe for investment.²

Of the impediments to trade and growth, infrastructure scarcity is recognized as the most severe. In most African countries, particularly the lower-income countries, the poor state of infrastructure, by which we mean electricity, water, roads, and information and communications technology, is found to reduce GDP by 2 percent annually and to lower business productivity by as much as 40 percent, as great an impact as corruption and crime.³

The largest infrastructure deficit is in the power sector, where sub-Saharan Africa’s consumption is alarmingly low. The costs associated with closing this infrastructure deficit are estimated at US\$75 billion per year, including annual operations and maintenance fees. At current rates, this would consume almost 12 percent of Africa’s current GDP.⁴

Funding infrastructure is a key challenge. Historically, African state governments have financed infrastructure development on their balance sheets, with the result that infrastructure rollout has been constrained by budgetary restrictions. Few local governments have the mechanisms in place to issue bonds, and local banks have typically lacked the capacity to supply loans needed for long-term infrastructure investment. Some form of collaboration with the private sector is essential to meeting sub-Saharan Africa’s infrastructure backlog.⁵

To help facilitate new types of public-private partnerships, the Milken Institute convened a Financial Innovations Lab[®] in London in October 2015, bringing together leaders from private equity funds, commercial banks, development finance institutions, and corporations, as well as institutional investors, with the goal of producing specific recommendations about infrastructure finance models.

Financial Innovations Lab participants agreed that there is no a single operational or finance model that can solve the tremendous problem of funding infrastructure investment in sub-Saharan Africa. But there are solutions that can help chip away at the overarching problem of perceived risk and a lack of reliable information about local financial and economic conditions, regulations, and practices, as well as the relative dearth of information about returns on investment in recent transactions. All participants agreed that a more mature market, more innovative financing, and more “boots on the ground” information are essential to closing the region’s infrastructure gap.⁶

The Financial Innovations Lab was one of a series of meetings convened by the Milken Institute in partnership with the US Agency for International Development (USAID), Liquidnet, and Symbion. While the first meetings, earlier in 2015, were meant to survey the potential financing options and outline recommendations to move toward implementation, the recent London Lab focused on a prioritization of the “low-hanging fruit” of funding structures that could be most easily accessed, while addressing key issues around product availability, liquidity, and exits.

Financial Innovations Labs are miniature think tanks in action, designed to devise new business models, capital structures, and financial technologies that can achieve concrete goals. By bringing together a diverse group of stakeholders, the Labs encourage collaboration among parties who may not normally interact. These intensive workshops explore the potential of financial tools to solve specific challenges.



ISSUES AND PERSPECTIVES

The countries of sub-Saharan Africa constitute an engine of growth for the entire world economy in the coming decades. Even with the political instability, disease outbreaks, and high rates of poverty that media tend to focus on, growth in the region is projected to increase to 5.1 percent in 2017.⁷

Investment in public infrastructure is essential to leveraging the region's potential. A rising population strains resources; roads, power, clean water, and health and education systems are essential for maintaining and expanding economic growth. Power consumption in sub-Saharan Africa, 124 kilowatt-hours per capita, is one-tenth what it is in similar developing regions. This is the equivalent of using a 100-watt light bulb for just three hours.⁸ At the same time, nearly 600 million Africans, approximately half the population, have no access to any electricity.⁹

A transportation infrastructure that includes roads and ports is equally integral to the success of the region's industries. Unfortunately, goods move slowly across the continent, affecting both imports and exports. Importing a twenty-foot container to sub-Saharan Africa takes about 283 hours, while the same container from port to destination in Singapore takes about 36 hours.¹⁰ To become competitive with other developing regions, it is clear that investments must be made to expand the transportation infrastructure, as well as power, water, and other social needs. As seen in figure 1, sub-Saharan Africa trails other regions in nearly every category, in terms of deficits. Without this investment, local economies will face increasing bottlenecks, which will stunt growth and deter capital flows from foreign and domestic investors.

FIGURE 1 || Infrastructure deficit in sub-Saharan Africa

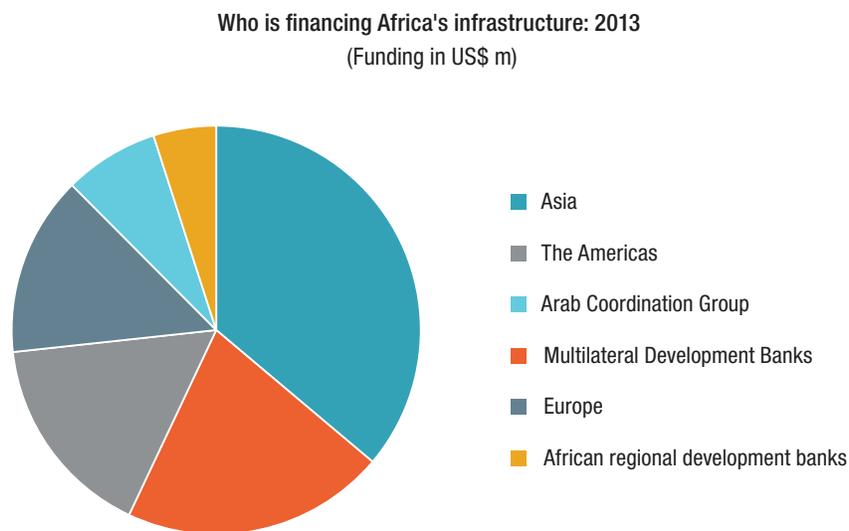
NORMALIZE UNITS	SUB-SAHARAN AFRICAN LOW-INCOME COUNTRIES	OTHER LOW-INCOME COUNTRIES
Roads		
Paved-road density	31	134
Total road density	137	211
Telecommunications		
Main-line density	10	78
Mobile density	55	76
Internet density	2	3
Electricity		
Generation capacity	37	326
Electricity coverage	16	41
Water and sanitation		
Improved water	60	72
Improved sanitation	34	51

Source: Yepes, Pierce, and Foster (2008) and reproduced in Foster and Briceño-Garmendia (2009: 1-2).

Note: Road density is measured in kilometers per 100 square kilometers of arable land; telephone density in lines per thousand population; generation capacity in megawatts per million population; electricity, water, and sanitation coverage in percentage of population with access to services.

Traditionally, infrastructure has been financed by African governments. New sources of project financing in recent decades include development finance institutions (DFIs) like the Overseas Private Investment Corporation (OPIC), the International Finance Corporation (IFC), the World Bank, and the African Development Bank; Chinese government financing; and private participation in infrastructure investments. Since the global recession, private investment from external sources, as well as bilateral donors, has become a larger share of the capital available. China has emerged as a leading public sector donor, committing over \$13 billion in financing for infrastructure in 2013 and an estimated \$1 trillion in investment expected over the next 10 years.¹¹ As seen in figure 2, development finance institutions from Asia contributed the largest amount of investment, by region.

FIGURE 2 || Multi- and bi-lateral investment in infrastructure by region



Source: Infrastructure Consortium for Africa "Infrastructure Financing Trends in Africa - 2013."

Infrastructure development is supported by project finance, a combination of both equity and debt offered by a range of public and private investors. A project starts with early-stage equity from project sponsors (usually private equity firms) that funds development before the end assets, such as a power plant or port, are generating cash flows. Later stages of product development require long-term debt, often from commercial banks or governments, to continue the expansion and provide for ongoing maintenance. The cost of capital of this kind of project financing, i.e., how much return must be paid to investors, can be a challenge. There is often either not enough "risk capital,"—the funding that is used during the earliest stages, when projects face development, operational and political risk—or the equity is too expensive and thus projects don't get off the ground. Commercial lending has also faced difficulties with the regulatory environment after Basel III, which tightened restrictions on bank lending. Consequently, accessing both the equity and debt can be problematic for project developers.

BARRIERS TO INVESTMENT

The Africa Progress Panel, a group of experts led by former UN Secretary Kofi Annan, has warned that there is no comprehensive analysis detailing either the specific risks that deter investment or the types of risk instruments needed to unlock private investment in sub-Saharan African infrastructure projects. However, one exception, telecom, has been able to draw on private investment in infrastructure, due in no small part to the restructuring of the sector (including industry deregulation and the breaking up of state-owned monopolies).

Not surprisingly, many other areas of infrastructure still face major barriers to investment. Lab participants did not focus on the barriers, as these had been discussed during previous Lab sessions. As a summary, however, we have listed the high-level risks below, as noted in a May 2015 Lab Report, “Innovative Financing Models for Energy Financing in Africa.”

Credit and Sovereign Risk

The credit and sovereign risks associated with a country’s macroeconomic and political environment remain a major barrier to investment. The absence of independent or impartial regulatory systems, weak procurement laws, and inefficient tendering processes can result in canceled or postponed transactions and tariffs that do not provide for inflation or changes in cost. Regulatory risks include breach of contract, regulator bias, and the inability to obtain tariff modifications as circumstances change over the (typically lengthy) course of projects. Guarantees from a sovereign can be difficult because of balance sheet constraints; political risk insurance from multilateral agencies, such as the World Bank, are limited because of the time and cost needed to purchase. Consequently, there is very little to mitigate against the country’s economic and political risk.

Financial Risk and Limited Product Offerings

Investors are concerned with financial risk, including currency and foreign exchange (FX) risks and payment delays. Given the long time horizons for energy projects, another major barrier to investment, any potential insurance or exchange hedging instrument is likely to be either too expensive or not viable. Apart from currency risk, infrastructure projects are also subject to financial risks, depending on the structuring and strength of cash flows.

Additionally, most countries lack functioning capital markets, and tapping into international markets can be expensive in terms of the cost of capital; therefore, the types of products, from debt to equity, are limited. Without clear exit strategies, the lack of product means that often the option is to hold on to the asset, and while this may be attractive to some long-term investors, it does not provide the opportunity for the widest variety of capital allocators to participate.

Because sub-Saharan Africa in general is seen as a high-risk environment, many investors seek higher returns on equity, usually at least 30 percent Internal Rate of Return (IRR), despite historic returns ranging from 15–17 percent. Consequently, the type of financing needed to meet investors’ expectations may not match the cash flows generated over time by the projects. It is crucial, therefore, to better understand the real risks of these projects in order to better match the price to the underlying asset.

Deal Implementation

Infrastructure projects simply take too long to implement in much of sub-Saharan Africa; the current average is close to seven years from start to finish. There are few mechanisms in place to speed up deal transactions, and bloated government structures may result in unnecessary replication of functions. As noted previously, this contributes to investor confusion when trying to assess and price the risks of a given investment. Regional and subnational regulatory frameworks are not standardized, making public-private partnerships incredibly complicated—and few government officials possess the skills to execute them. Project preparation and time to execution also add to the costs of the projects, lowering the potential upside for investors.



OPERATIONAL SOLUTIONS

Bridging funding gaps requires both financial and operational solutions to ensure that the investment capital flowing to projects is allocated effectively and efficiently. Lab participants agreed that tools to better assess and price risk would mitigate a number of the current market barriers. They discussed two operational solutions: a deal “exchange” and shadow ratings.

DEAL “EXCHANGE”

Given that a lack of understanding and information flow about current or proposed projects is a barrier to investment, participants considered the utility of a deal “exchange” that could match investors with “investable” projects.

A deal exchange would take the form of an online platform that would enable investors, both public and private, to access investment opportunities in emerging and frontier markets. One such model is called Convergence, an investor platform created by Dalberg Global Development Advisors and the Global Development Incubator, both based in New York. Its purpose is to help public and private investors find and connect with each other so they can co-invest in deals. Launched in January 2016 at the World Economic Forum, Convergence (now an independent organization headquartered in Toronto) will also offer market building tools, such as training webinars and workshops to teach practitioners how to use blended finance and how investment processes work for their counterparts. The platform will also enable users to share experiences and increase collaboration.

Convergence hopes to address challenges to implementing blended finance at scale—challenges that Lab participants agreed are daunting to any sort of infrastructure investment in the region. These include:

- 1. High Design Costs.** The risk and expense associated with developing and testing new blended finance models hinder innovation and experimentation.
- 2. Lack of Knowledge and Data.** There is a limited understanding of blended finance, how it works, and when to use it, which hinders use among public and private institutions. Insufficient data on blended finance transactions prevents investors from making informed investment decisions.
- 3. High Search Costs and Limited Networks.** Investors tend to operate within limited networks, which constrains deal flow. There are also high costs to searching for new investments and inefficiencies in sourcing deals and identifying investment partners.
- 4. High Transaction and Intermediation Costs.** Blended finance deals are complicated to structure and execute, especially if they involve diverse stakeholders with differing priorities and incentives.
- 5. Unsupportive Enabling Environments.** Blended finance deals are often hindered by inadequate policy frameworks that do not enable public-private investment activity, as well as limited incentives and a dearth of legal/fiduciary authorities (especially within public actors).

Participants expressed mixed reactions to the model. Some thought it could be useful as a screening tool for due diligence, while others thought that deals good enough to be considered “investable” would be marketed in the traditional manner and not even make it to the exchange. Some participants thought the exchange format could be useful for helping investors evaluate projects already under way—e.g., projects partially constructed or already in commercial operation.

SHADOW RATINGS SYSTEM

Given the expense and impracticality of having every infrastructure project rated by an agency like Moody's, shadow ratings could be a source of information about relative risks and opportunities for these investments. Shadow ratings systems could include information on macroeconomic factors, sovereign environment, and project environment, as seen in table 1.

TABLE 1 || Building a shadow ratings system

Macroeconomic factors
<ul style="list-style-type: none"> ■ GDP growth ■ Level of development ■ Inflation ■ Balance of payments ■ Dependence on donor funding relative to the size of the overall economy ■ Depth and liquidity of the local market ■ Liquidity of local currency market ■ Interest rates ■ Maximum tenors ■ Debt available for projects
Sovereign Environment: Evaluating the political and regulatory environment
<ul style="list-style-type: none"> ■ Onerousness and quality of investment regulations ■ Rule of law, including government stability ■ Government receptivity to infrastructure projects and investment ■ Government's payment history ■ The number and type of issues brought by investors, domestically and internationally
Project Environment: Evaluating the ease of developing projects by country
<ul style="list-style-type: none"> ■ New data: Local-industry project track records and structure ■ Infrastructure-specific regulation, policy, and legislation ■ Creditworthiness of specific government agencies

Source: Milken Institute Global Opportunity Index.

The Milken Institute Global Opportunity Index could be used as one basis for shadow ratings. This index aggregates data from various sources to provide overall ratings, by country, of capital flows. Sources include the World Bank Group's Ease of Doing Business Index and the World Economic Forum's Global Competitiveness Index.

Participants agreed that while a shadow system is one tool that investors can use to screen projects, such a system could never substitute for due diligence, "boots on the ground," and, especially, a track record of success. But participants also agreed anything that helped bring transparency, standardization, and simplicity to the process would be welcome. Shadow ratings could reduce time and complexity, and thus be useful tools.

Rating governments and individuals rather than investment deals was seen as a potentially reasonable hedge against the risks posed by limited local knowledge. Participants were intrigued by the idea of a survey or ratings system for local governance, and governance entities involved with specific kinds of projects, which could provide a more granular understanding of the particulars of each project.

FINANCIAL SOLUTIONS

Financing Africa's infrastructure, for the purposes of this report, means matching specific financial models to the risk-return profiles of the investors. Participants reviewed and discussed the feasibility of various finance models. Each solution presented here suggests potential structures that would mitigate for risk and encourage local investment. The group also suggested next steps for implementation.

PROJECT BONDS

Infrastructure project bonds raise capital from both domestic and international capital markets to fund specific projects. The bonds are repaid with profits generated by the new infrastructure, leaving bondholders with the risk of the project's viability. These bonds have the potential for stable returns, low volatility, and a flexible financing structure, and have been successfully implemented in Kenya and Nigeria. While most of Africa is new to using project bonds, Nigeria and Kenya have certain tax exemptions in place that encourage the use of such bonds as funding sources. But most local governments lack the authority and capacity to raise infrastructure funds through bond issuance, so efforts made through partnerships with the private sector have been impeded by bureaucracy and uncertain timing for budget approvals.¹²

Lab participants agreed that local investment in bonds would be crucial to mitigating political risk and attracting foreign investment by creating the impression of long-term commitment to infrastructure projects. Some participants, however, argued that project bonds are difficult enough to sell even in the developed world and would serve only as an unrealistic panacea for Africa. Participants were enthusiastic about the idea of DFI or monoline insurance companies providing risk guarantees. And they agreed that the lack of such risk guarantees would be a major barrier to investment in project bonds.

In general, the group agreed that building capacity would be essential to making bond projects successful; this includes the capacity to develop the initial proposal (which can consume as much as 10 percent of the project cost); government capacity to create enabling environments, perhaps with the help of development finance institutions; and the capacity to identify viable projects (which would ideally be based on inter-regional cooperation). Participants agreed that if a precedent for success is established, markets would follow. But again, they saw the lack of investable projects that could prove this precedence throughout the region to be a major barrier.

NEXT STEPS

Research regulatory requirements for issuing project bonds and model costs and risks associated with the issuances.

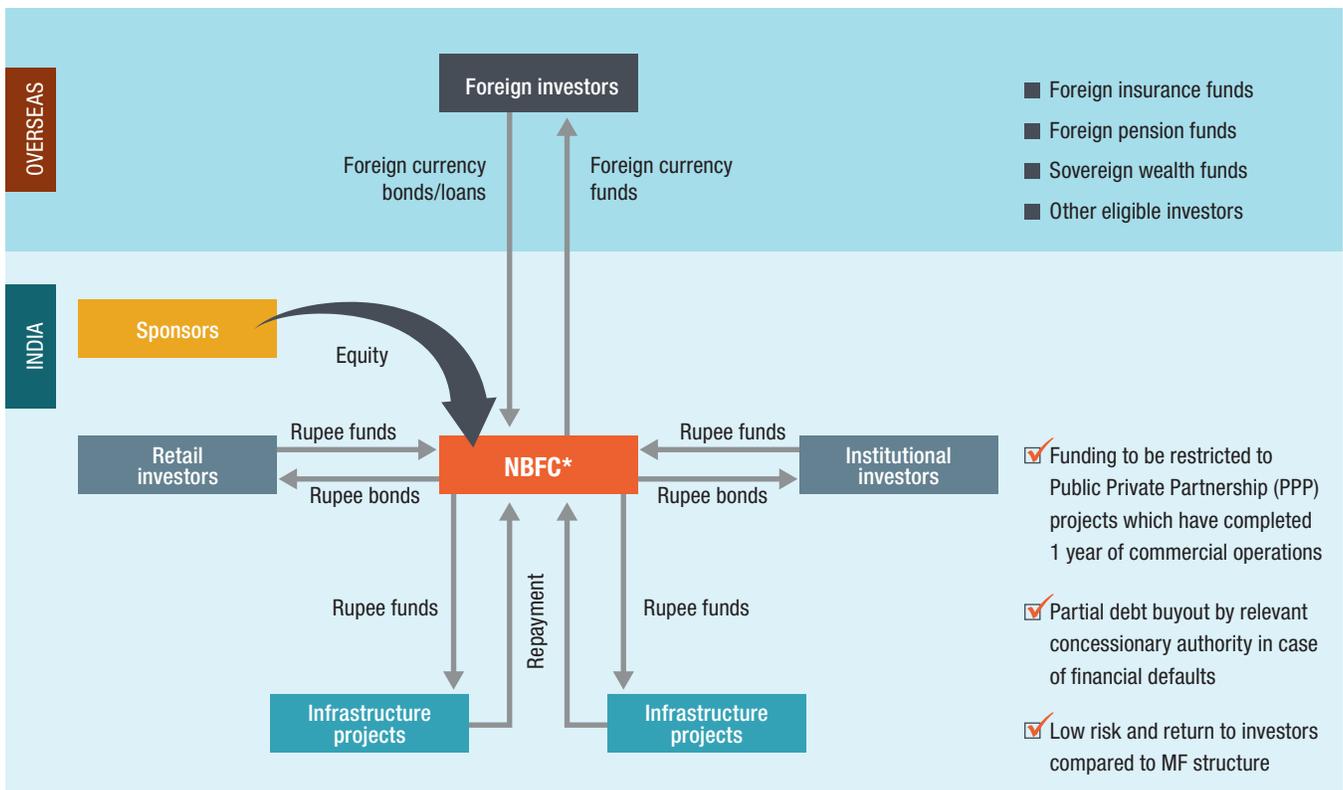
INFRASTRUCTURE DEBT FUNDS

There are few developed capital markets in Africa, and this presents a severe liquidity challenge for the region; investors who try to exit their investments find there is little opportunity to sell off their financing. More developed regions have seen the emergence of synthetic secondary markets, where this kind of debt is traded. This can unlock tremendous financing options for infrastructure projects—and what was once a highly illiquid asset becomes more attractive as a tradable opportunity. Lab participants discussed the most effective types of models to provide synthetic markets; however, it is important to note that many of these financing options would only benefit projects that are already generating positive cash flows and thus would not be as useful for funding greenfield, or new, projects.

One such model is India Infra Debt Ltd. (InfraDebt), a non-banking finance company that seeks to attract domestic and foreign institutional investment for refinancing public-private partnerships after a year of commercial operation. Capitalized by shareholders ICICI Bank, Bank of Baroda, Citicorp Finance (India) Ltd., and Life Insurance Corporation of India Ltd., InfraDebt started with seed capital of \$45 million in equity capital in 2013 and today can finance up to \$30 million per project, up to a total of \$2 billion in infrastructure projects.¹³

As seen in figure 3, InfraDebt issues bonds based on the underlying assets, i.e., the projects themselves. In case of default, it allows for a partial debt buyout by the public-sector authority that holds the concession agreement for the asset itself, creating a guarantee for investors.

FIGURE 3 || India InfraDebt Fund



Source: InfraDebt.

In general, participants concluded that such a fund could work in Africa, although much depends on the particulars of a given project. Some group members objected to the presence of retail investors and thought the model should exclude them in order to make it more appealing to institutional investors, which may include pension funds and endowment funds. These latter investors often need to deploy larger amounts of capital per transaction and apply different time horizons and risk profiles.

NEXT STEPS

A next step would be to model a country-specific fund in sub-Saharan Africa. It would be crucial to have a pipeline of projects that will have been in operation for one year already.

INFRASTRUCTURE BANK AND QUASI-PUBLIC PERMANENT CAPITAL FACILITIES

Infrastructure banks have been established in the United States as a way to leverage public funds to attract private investment through public-private partnerships (PPPs). Connecticut Green Bank, for instance, was established as a quasi-public corporation in 2011 with the consolidation of federal and state funding and grants. The bank is authorized to issue tax advantaged bonds, up to \$50 million, and to raise or leverage funds from private investors through low-cost loans or credit enhancements. The bank is not authorized to supplement capitalization with private funds directly into the bank, but a separate entity could raise private funds and partner with or co-invest in the bank. In 2014, Connecticut Green Bank allocated \$74 million to projects, which in turn attracted an additional \$225 million in private investment.¹⁴

Similarly, the Indiana Finance Authority (IFA) is managed by the state's Office of the Public Finance Director, and issues revenue bonds that are used to fund acquisition, construction, and build-out of facilities for state use. The projects range from highways and bridges to airports and state hospitals. Lease income from rentals of the infrastructure to various state agencies are used to finance the bonds.

The idea of an infrastructure bank or some other type of permanent capital facility could be attractive as an alternative to commercial bank debt. With Basel III regulatory restrictions on lending practices, banks face challenges in allocating capital to riskier projects, limiting access to long-term debt for developers. Some type of quasi-public bank or facility could be the platform through which debt investors participate in infrastructure projects and project investors could gain access to affordable loans.

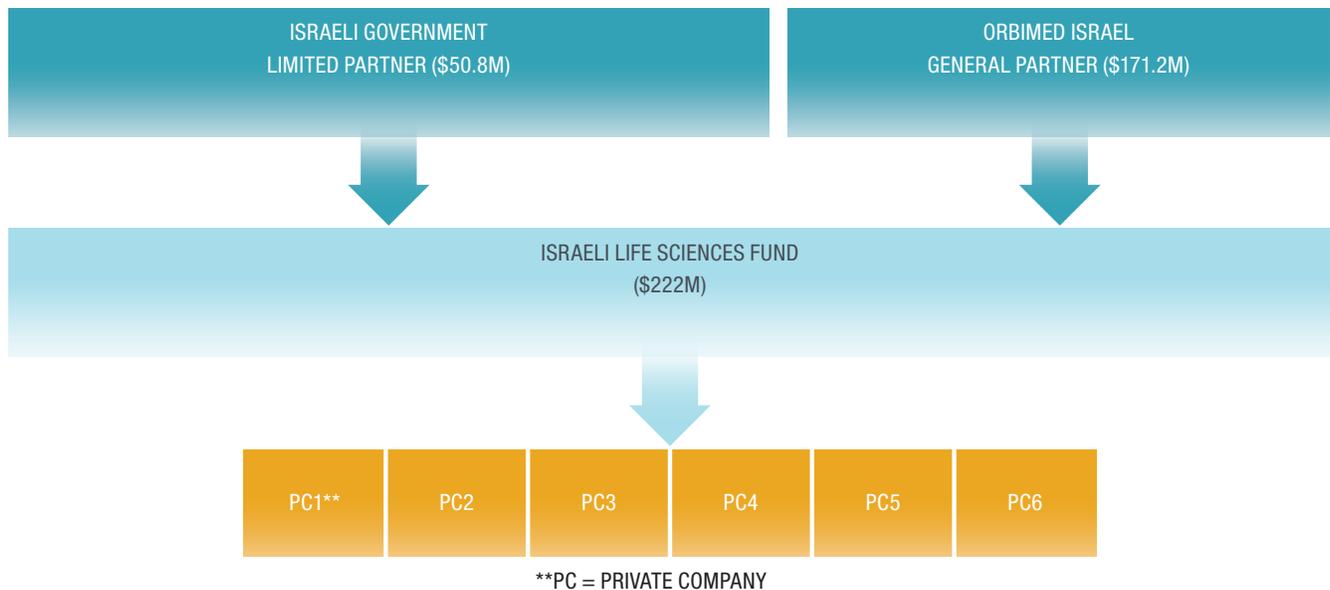
NEXT STEPS

Permanent capital facilities were deemed attractive by many participants, but they questioned the feasibility of capitalizing these potential banks by local governments. Some participants suggested that this might be a place for local institutional investors to allocate funding. Following the Lab, modeling would have to be done on a country-by-country-basis.

EQUITY FUNDS WITH THE GOVERNMENT AS FIRST-LOSS CAPITAL

One of the challenges to scaling Africa's infrastructure development is the limited availability of equity at the early stages of preparation, which is the riskiest time for greenfield projects. The resulting higher cost of capital is prohibitive for deals with cash flows that will likely not result in the kinds of returns that mainstream investors have come to expect. Consequently, participants discussed models that could help provide risk capital while also making overall returns more attractive.

One such model is a first-loss equity fund, another public-private partnership. In this model, the risks and rewards are shared by both parties, but the government takes the first-loss position in order to attract private funds by assuming the early risks in a project. These structures have worked to finance projects in many areas—for example, the Israel Life Sciences Fund resulted in \$220 million to expand the life sciences sector in Israel. As shown in figure 4, the Israeli government was a limited partner in the fund and took a subordinated position to make the upside potential more attractive for the other partners.

FIGURE 4 || Israeli Life Sciences Fund: A first-loss example

Source: The Milken Institute Financial Innovations Lab 2011, Office of the Chief Scientist, Ministry of Economy, Israel.

As a way of bringing local capital to the table—which makes almost every type of foreign investment more attractive—some participants favored the model of an equity fund structure in which the government took a first-loss position. Others worried that it was politically untenable, given that a government must be willing both to take a loss and repay foreign capital. Some participants, describing themselves as cynics, thought that a first-loss position indicated that a project was untenable and, far from being a “sweetener,” would actually deter foreign investment.

Following the Financial Innovations Lab, the Milken Institute, with help from participants, began to model different first-loss fund structures to understand what type of return benefit could come from some type of subordinated investment. As seen in table 2, for an \$800 million fund, dispersing capital over ten years with a portfolio of thirteen projects, a first-loss mechanism could improve the return rates for private investors (Class P) in a scenario where the salvage value of the investment is lower than the initial investment. In this example, the government (Class G) inherits any loss up to \$200 million in order to provide downside protection for private investors. If the salvage value of the project is zero at year ten (shown below), the government would cover \$200 million of the principal loss for the private investors and the investment would generate a positive IRR, based on the cash flows generated from the projects over the duration of the investment.

This scenario is just one of several ways the government can participate as a first-loss investor. For example, in some cases the government may not participate as an investor into the projects, but just provide some downside protection. In developing markets, this fund could be beneficial in attracting investors who would normally not invest because of higher perceived downside risk.

TABLE 2 Measuring the effectiveness of an \$800 million first-loss fund

Year	Total Invested (in millions)			Class P (in millions)			Class G (in millions)		
	Principal	Dividends	Total CF	Principal	Dividends	Total CF	Principal	Dividends	Total CF
0	-\$150.00	\$0.00	-\$150.00	-\$90.00	\$0.00	-\$90.00	-\$60.00	\$0.00	-\$60.00
1	-\$200.00	\$22.50	-\$177.50	-\$120.00	\$13.50	-\$106.50	-\$80.00	\$9.00	-\$71.00
2	-\$150.00	\$52.50	-\$97.50	-\$90.00	\$31.50	-\$58.50	-\$60.00	\$21.00	-\$39.00
3	-\$200.00	\$75.00	-\$125.00	-\$120.00	\$45.00	-\$75.00	-\$80.00	\$30.00	-\$50.00
4	-\$100.00	\$105.00	\$5.00	-\$60.00	\$63.00	\$3.00	-\$40.00	\$42.00	\$2.00
5	\$0.00	\$120.00	\$120.00	\$0.00	\$72.00	\$72.00	\$0.00	\$48.00	\$48.00
6	\$0.00	\$120.00	\$120.00	\$0.00	\$72.00	\$72.00	\$0.00	\$48.00	\$48.00
7	\$0.00	\$179.93	\$179.93	\$0.00	\$107.96	\$107.96	\$0.00	\$71.97	\$71.97
8	\$0.00	\$184.06	\$184.06	\$0.00	\$110.44	\$110.44	\$0.00	\$73.63	\$73.63
9	\$0.00	\$187.95	\$187.95	\$0.00	\$112.77	\$112.77	\$0.00	\$75.18	\$75.18
10	\$0.00	\$191.63	\$191.63		\$114.98	\$114.98		\$76.65	\$76.65
10	\$0.00	\$0.00	\$0.00	\$200.00		\$200.00	-\$200.00		-\$200.00
IRR			9.69%			13.66%			-2.89%
NPV			-\$8.41			\$72.07			-\$80.47

Source: Milken Institute.

Note: Class P = private investors; Class G = government; CF = cash flow; IRR = internal rate of return; NPV = net present value.

NEXT STEPS

Participants agreed that a more fleshed-out model, with data focused on specific countries and sub-sectors within infrastructure would help to test the overall feasibility of the model.



CONCLUSION

The need for investment in infrastructure in Africa is clear, and the potential benefits to investors are broadly acknowledged. Lab participants agreed that solutions to addressing the funding gap have to address credit and sovereign risk; improve deal implementation and time to completion; and mitigate financial risk through a variety of product offerings.

There is no one-size-fits-all solution to funding infrastructure. Improving access to information about deals, governance, and individuals will help mitigate perceived risk. Offering a wider variety of financial models might be the key to bringing more investors to the table. These models ought to include project bonds, infrastructure debt funds, quasi-public infrastructure debt funds, and public-private partnership equity funds with government taking a first loss position.

Together, a broad variety of financial models and more sources of data about local conditions and risks will address what participants agreed is the real barrier to investment in infrastructure: the perception of outsized risk combined with the lack of a real track record of success in the majority of circumstances. When investors agree that risks can be mitigated and there is a history of successful project implementation, the infrastructure gap will truly be closed.



APPENDIX

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APPENDIX

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APPENDIX

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ENDNOTES

1. For a discussion of the importance of local knowledge in infrastructure investment, see: “A Sub-Saharan Scramble,” *The Economist*, January 24, 2015, <http://www.economist.com/news/business/21640327-private-equity-investors-are-getting-hot-africa-businesses-there-need-all-capital> (accessed November 14, 2015).
2. *Annual Development Effectiveness Review 2014: Towards Africa’s transformation*, African Development Bank Group, 2014, as cited in Ernst & Young’s Attractiveness Survey “Africa 2015: Making Choices,” Ernst & Young Global Limited, see: [www.ey.com/Publication/vwLUAssets/EY-africa-attractiveness-survey-2015-making-choices/\\$FILE/EY-africa-attractiveness-survey-2015-making-choices.pdf](http://www.ey.com/Publication/vwLUAssets/EY-africa-attractiveness-survey-2015-making-choices/$FILE/EY-africa-attractiveness-survey-2015-making-choices.pdf) (accessed November 12, 2015)
3. “World Bank Fact Sheet: Infrastructure in Sub-Saharan Africa,” see: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21951811~pagePK:146736~piPK:146830~theSitePK:258644,00.html> (accessed April 8, 2016). Also “Regional Economic Outlook: Sub-Saharan Africa,” International Monetary Fund, April 2015, see: www.imf.org/external/pubs/ft/reo/2015/afr/eng/pdf/sreo0415.pdf (accessed November 14, 2015).
4. “World Bank Fact Sheet: Infrastructure on Sub-Saharan Africa,” see: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21951811~pagePK:146736~piPK:146830~theSitePK:258644,00.html> (accessed April 8, 2016).
5. The Infrastructure Consortium for Africa Secretariat, “Infrastructure Financing Trends in Africa—2014,” 2014. See: www.icafrica.org/fileadmin/documents/Annual_Reports/INFRASTRUCTURE_FINANCING_TRENDS_IN_AFRICA_-_2014.pdf (accessed April 8, 2016).
6. For a discussion of the importance of local knowledge in infrastructure investment, see: “A Sub-Saharan Scramble,” *The Economist*, January 24, 2015, <http://www.economist.com/news/business/21640327-private-equity-investors-are-getting-hot-africa-businesses-there-need-all-capital> (accessed November 14, 2015).
7. *Global Economic Prospects*, Ch. 2, “Sub-Saharan Africa,” World Bank Group. See: www.worldbank.org/content/dam/Worldbank/GEP/GEP2015a/pdfs/GEP2015a_chapter2_regionaloutlook_SSA.pdf (accessed November 13, 2015).
8. “World Bank Fact Sheet: Infrastructure on Sub-Saharan Africa,” see: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21951811~pagePK:146736~piPK:146830~theSitePK:258644,00.html> (accessed April 8, 2016).
9. “Power Africa: Annual Report 2014,” Power Africa. See: www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/USAID_-_Power_Africa_Annual_Report.pdf (accessed April 8, 2016).
10. “Trading Across Borders,” World Bank Group. See: <http://www.doingbusiness.org/data/exploretopics/trading-across-borders> (accessed on November 15, 2015).
11. “Spanning Africa’s Infrastructure Gap: How development capital is transforming Africa’s project build-out.” *The Economist*: November, 2015. http://ftp01.economist.com/hk/ECN_papers/Infrastructure-Africa (accessed December 2, 2015).
12. Ibid.
13. “ICICI-led Infradebt fund inks Rs 50 cr loan pact for road project promoted by Jaypee group,” (*The Economic Times*), February 7, 2014. http://articles.economictimes.indiatimes.com/2014-02-07/news/47126638_1_jaypee-group-infrastructure-debt-fund-india-infradebt-ltd (accessed on November 15, 2015).
14. “Innovating, Educating and Activating to Accelerate Clean Energy,” Connecticut Green Bank, 2014. http://www.ctgreenbank.com/wp-content/uploads/2015/12/AnnualReport_FINAL_5.4.15-SinglePages.pdf (accessed on November 15, 2015).



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