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POLICY BRIEF

Developing a Pathway for Universal Infrastructure Coverage

Paul Clements Hunt, Gordon Noble
The Blended Capital Group

February 2021

Introduction

The economic and social disruptions caused by the COVID-19 pandemic are likely to persist long after the virus has dissipated. Beyond the obvious unprecedented challenges to public health, a significant impact is that the world will emerge from this pandemic more indebted. According to the Institute of International Finance, the global debt —which was already over USD 10 trillion in 2019—is set to rise dramatically for 2020 (Tiftik & Mamood, 2020).

High levels of debt will have a number of long-term implications for governments. As developing economies examine the tools at their disposal to rebuild while simultaneously seeking to ensure that they are prepared for future risks—including most particularly climate change—more than ever, there will be a need for private sector investment in infrastructure.

The question is: how can private infrastructure investment be increased at scale post-pandemic?

There is broad agreement that there is a need for more infrastructure investment to address the challenges of climate change. Just two years ago, at the 2018 Buenos Aires G20 summit, the Organisation for Economic Co-operation and Development (OECD), UN Environment, and the World Bank released a 2018 report, *Financing Climate Futures: Rethinking Infrastructure*, that argued that investing in infrastructure is not only vital to the sustainability of the planet, but it also has the capacity to drive economic growth. Introducing the report, Gabriela Ramos, OECD chief of staff and G20 Sherpa, said, "We are losing time though—if we want to deliver, we need to move much faster and achieve a systemic shift of trillions of dollars in green investment" (OECD, 2018).

The urgent need for new infrastructure investment coupled with the financial impacts of the COVID-19 crisis coincides with the rapid disruption of infrastructure through new technology. The impact of this disruption is so profound that, for the first time in history, it is possible to articulate an ambition of universal infrastructure coverage.

The need for infrastructure to adapt in an uncertain world raises the core question of how infrastructure should be structured. The current global mindset is that infrastructure should be established as a project.

This discussion paper argues that, for developing countries in particular, structuring infrastructure as a business has many advantages over structuring infrastructure as a project. Specifically, an infrastructure business enables governments and the private sector to work collaboratively as co-investors on local stock exchanges.

Developing a new investment model that enables and facilitates universal infrastructure coverage will require new capabilities, including the development of stewardship principles that will align the management of an infrastructure business with its community. Turning the current trickle of capital that is being invested in developing-country infrastructure into a mighty river comes down to three simple propositions:

1. Recognize that the emergence of distributed infrastructure is a game-changer that creates the possibility of universal infrastructure coverage.
2. Establish infrastructure as a business that is co-owned by governments and institutional investors and that is listed on local stock exchanges.
3. Support the management of infrastructure businesses through the development and implementation of stewardship principles.

Establishing an ambition for universal infrastructure coverage recognizes that the disruption that is occurring in infrastructure is reducing the capital cost that is required to deliver outcomes.

2.0 Leveraging Technological Disruption for Universal Infrastructure Coverage

The term "universal infrastructure coverage," first raised by The Blended Capital Group at the Infrastructure Investment Frontiers Conference that took place in London on June 6, 2019 (International Institute for Sustainable Development, n.d. It references the United Nations General Assembly resolution from December 12, 2012, that urges countries to accelerate progress toward universal health coverage (UHC)—the idea that everyone, everywhere should have access to quality, affordable health care—as an essential priority for international development (UHC2030, n.d.). According to the World Health Organization, UHC means that all people have access to the health services they need, when and where they need them, without financial hardship (World Health Organization, 2021).

Despite the acknowledged importance of infrastructure, we have yet to translate the urgent need to invest in infrastructure into a common language and a common ambition.

Infrastructure is a critical component to delivering the Sustainable Development Goals (SDGs). If we are unable to provide universal infrastructure coverage for communities across the globe, then the task of delivering the SDGs and addressing climate change becomes exponentially more challenging.

Establishing an ambition for universal infrastructure coverage recognizes that the disruption that is occurring in infrastructure is reducing the capital cost that is required to deliver outcomes. Energy is an example: expensive investments in electricity grids are no longer the only pathway to energy generation. With the combination of solar and battery technology, micro-grids are not only feasible but preferable in many remote regions. Coupled with the provision of stand-alone, off-grid solar systems through for-profit, Pay-As-You-Go (PAYGo) last-mile distributors, the pivot to a distributed energy infrastructure offering deeper energy security in combination with the on-grid architecture becomes a powerful developmental engine for change.

Infrastructure is subject to the same forces of technology disruption that have impacted established sectors, including newspapers, music, and high street retail businesses. Today, we stand at a watershed moment where technology is disrupting infrastructure service delivery models. There are many examples of disruption, including across transportation, energy, and water.

2.1 Transport

A range of technology innovations is being implemented that are improving the efficiency of transit systems and are less capital intensive than large-scale infrastructure projects, including:

- On-demand ride-sharing services: Uber and other ride-sharing services are creating new markets for the supply of transit services.
- E-bikes: Driven by new, more efficient models and the growth of inner-city dwelling, e-bikes are growing in demand.
- Intelligent traffic signals: The aggregation of data with smart technology is enabling city planners to address localized gridlock.
- Smart parking: By directing drivers to available car parking spaces, city congestion is reduced.
- On-demand buses: Overcoming the obstacle of waiting for infrequent buses with smart technology, on-demand buses match travellers going the same direction with pick up from stations and drop off at specific destinations.

The rise of electric vehicles (EVs) is resulting in the development of EV infrastructure. For example:

- Singapore's Land Transit Authority is supporting a rollout of EVs with charging stations located in car parks.
- The Philippines Department of Transportation is supporting a trial to transition jeepneys to electric by awarding routes to three cooperatives and providing loans from the Development Bank of the Philippines.
- Brazilian state-owned power company Copel is investigating the potential for EV charging stations to offer ancillary services, including management of voltage and peak loads as part of vehicle-to-grid power flow systems.
- San Francisco's Bay Area Rapid Transit is investing in EV charging stations; its Warm Springs Station is equipped with a 512-kW on-site solar system that powers the station and the EV chargers. The system produces enough energy to power approximately 100 homes.
- LA's Metro has introduced EV charge stations at 10 Metro Park & Ride stations, enabling riders with EVs to charge their cars while using the Metro system.

COVID-19 has led to a massive shift to working from home, which in turn has opened up conversations among city planners around designing spaces to reduce the need for transit so that people can live and work in their communities (Johar & Pitkeathley, 2020). The combination of the application of smart technology, the emergence of EV infrastructure, and shifting transport patterns as a result of COVID-19 is changing the playing field in favour of small-scale infrastructure investments rather than mega transport projects.

2.2 Energy

The rise of low-cost solar energy is changing the fundamentals of electric grid management. In 2013 California's energy system regulator, the California Independent System Operator, labelled anticipated changes to the electric grid from the uptake of large-scale solar photovoltaic (PV) generation as the "duck curve" (AGL Energy, 2020). The duck curve reflects the fact that solar energy is variable, as it is produced only when the sun is shining. As more solar comes into the grid, the net load that electricity grids need to supply from other energy sources falls. The rise of solar has implications for sources of energy such as coal-fired power stations, which are unable to easily adapt the level of energy supply. The impact of the duck curve is to influence new infrastructure investments. Instead of needing large-scale power stations, demand is shifting to adaptable energy sources, including the development of battery storage systems.

In light of shifting energy supply and demand patterns, some energy participants, such as New Zealand's Mercury and Australia's AGL, are transforming their business models. Future energy businesses will not only be in the businesses of supplying energy. Mercury is piloting an EV subscription service aimed at opening up access to EVs without up-front commitment or costs, insulating drivers from depreciation, maintenance, and insurance costs. AGL's EV subscription service charges a monthly fee in return for the installation of EV charging infrastructure at the home, insurance, and maintenance (AGL Energy, n.d.).

The assumption that power needs to be delivered from one central place (coal-fired power station) to another (city) is being challenged by the growth of PAYGo systems that are delivering off-grid solar sector to 420 million users (International Finance Corporation, 2020). In the Mwezi case study (2021), clean energy was delivered in Kenya via PAYGo solar systems. The critical fusion within the for-profit Mwezi model is the coming together of low-cost solar with efficient last-mile distribution executed on a digital, data-driven, community-focused platform offering affordable credit with the potential to wrap in insurance services. Mwezi goes beyond pure energy provision and offers solar-driven productive technologies to boost household income for agricultural out-grower families. Operating from 17 branch locations around Lake Victoria with its head office and training centre in Nairobi, Mwezi has sold in excess of 52,000 PAYGo solar systems, energy-efficient cookstoves, and associated clean energy products, reaching 225,000 people in 55,000 family units (personal communication, M. Sherry, 2020).

The development of distributed water supplies, which includes the installation of household water tanks and local treatment of bore water, is turning households into water suppliers as well as consumers.

According to the World Bank, the off-grid solar sector is now a USD 1.75 billion annual market currently serving 420 million users (AGL Energy, n.d.). With 840 million people without access to electricity and over 1 billion people connected to unreliable grids, the development of off-grid solar enables developing countries to access affordable electricity for all their communities. The opportunity for off-grid solar has come not just from the development of solar technology but from the availability of mobile phones and bank payment systems that are opening up access to PAYGo-enabled products that enable individuals to access the amount of energy needed to suit their needs and circumstances. The development of off-grid solar is ideally suited to a business structure.

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2.3 Water

The importance of water and sanitation systems was recognized during the International Decade of Clean Water (1980–1991) when bringing clean water to an extra 1.2 billion people achieved huge improvements in child mortality. Despite many achievements over the last few decades, 2.4 billion people still lack access to basic sanitation services, such as toilets or latrines (World Health Organization, 2020). More than 80% of wastewater resulting from human activities is still discharged into rivers or seas without any pollution removal (United Nations Development Programme, 2019).

The growth of mega-cities is resulting in the demand for water exceeding what can be delivered by rainwater harvesting. Over 40% of the world's population is likely to be living in river basins that are expected to be under severe stress by 2050. This equates to roughly 3.9 billion people (Sadoff et al., 2015).

Technology disruptions in the water sector include new approaches to demand management and investments to increase supply through desalinization. The development of distributed water supplies, which includes the installation of household water tanks and local treatment of bore water, is turning households into water suppliers as well as consumers. Technology is now enabling small-scale investment in water infrastructure that recognizes the scarcity of water resources. For example, smart water systems enable recycled water to be used for a variety of purposes, including flushing toilets. K-Water in South Korea, for example, is investing in a smart water grid that combines the existing grid with information and communication technologies. A sensor network within pipelines enables K-Water to analyze water quality, pressure, and leakage. In another example, in Denver, Colorado, recycled water from a wastewater treatment plant is supplying 30 million gallons per day to 80 customers, including the Denver Zoo.

Water scarcity that will result from increased population and climate change is likely to blur the boundaries between the traditional activities of water utilities: provision of potable water and removal of wastewater. The development of opportunities to use recycled water in urban contexts is likely to become a fundamental focus for water utilities and offers the potential for households and businesses to become producers, not just consumers, of water.

3.0 Investing in Distributed Infrastructure

The emergence of distributed infrastructure has implications for the structures that can be used to finance infrastructure.

Within infrastructure circles, there is considerable discussion around the terms "project" and "asset." In *Infrastructure as an Asset Class*, Weber et al. provide clarity on the terms, stating: "Investment in infrastructure projects primarily differ from those in infrastructure assets, as, in the former, the investor does not necessarily become the full or partial owner of the assets in question. Rather, the investor invests in or finances the provision of the asset and in exchange is granted either the revenues generated by the project or regular payment from the principal during the course of a clearly defined project" (Weber et al., 2016, p. 14.).

The differentiation between "project" and "asset" is important when it comes to the emergence of distributed infrastructure systems. In the case of distributed infrastructure, a project structure makes little sense. The nature of distributed infrastructure is that the asset, which could include thousands of portable solar systems, is able to be physically owned. Because distributed infrastructure assets can be owned, a traditional company structure, rather than a project structure, is the ideal means to finance the asset. Establishing infrastructure as a business rather than as a project also provides an ideal structure that enables adaptation in the face of uncertainty.

For developing countries, developing infrastructure through a traditional business structure has a number of benefits. A challenge with infrastructure projects is how to capture the spill-over benefits that result from financing, building, and operating an individual project. Currently, with large-scale infrastructure projects, individual project managers take knowledge away from a project, which is utilized in the next project that is delivered. Establishing a business offers the opportunity to retain skills that can be used to build long-term and sustainable regional capabilities. The benefit of building an infrastructure business is that once the governance, capital structure, and management are in place, the business has the capacity to expand, whereas a project structure is limited to the single project that is being delivered.

3.1 Aligning With Institutional Capital Markets

Using a traditional company structure enables policy-makers to consider local stock exchanges as a mechanism to raise finance. Listing an infrastructure business on a local stock exchange aligns with the large pools of institutional capital.

Approximately USD 70 trillion in assets is managed by institutional investors, including pension funds, insurers, and sovereign wealth funds. Pension funds alone have an estimated USD 20 trillion–21 trillion in assets, with the top 300 pension funds in the world managing around USD 15.7 trillion. Equity markets are where institutional investors already allocate the bulk of their capital. The investment models and systems of asset owners have been built around utilizing equity markets as the principal mechanism to allocate capital.

Investing in infrastructure businesses through stock exchanges is not new. There are two major pools of institutional infrastructure equity investment: listed equity and unlisted private equity. According to the Global Listed Infrastructure Organisation (GLIO, 2021), the market

capitalization of listed infrastructure is around USD 2.5 trillion. By contrast, according to infrastructure industry analyst Preqin, as of June 2019, there is USD 582 billion in private unlisted infrastructure assets (Preqin, 2020). The GLIO Emerging Markets Index indicates the extent to which developing countries already utilize stock exchanges for infrastructure investments, with the index tracking 45 companies with USD 289 billion in capital (GLIO, 2020).

3.2 Infrastructure and Local Stock Exchanges

Listing an infrastructure business on a local stock exchange has the potential to support the development of that financial market. If a local stock exchange is able to attract long-term-focused institutional investors, there is the potential that, as confidence is built in the market, the investor expands their horizon to investing in other stocks. In this way, investing in an infrastructure business on a local stock exchange may provide a pathway for long-term-focused institutional investors to support the expansion of developing-country stock exchanges. A local infrastructure business also benefits from increased local market activity in the form of enhanced liquidity, which addresses one of the major impediments that institutional investors experience when investing in less-developed country stock exchanges.

Market liquidity, which is defined as the extent to which an individual or firm can quickly purchase or sell an asset without causing a drastic change in the asset's price, is critical for institutional investors who need to rebalance portfolios to meet the demands of their clients, including pension funds. Oliver Wyman and the World Federation of Exchanges (WFE) (2016) recognizes that liquidity is an impediment to investment in many developing market stock exchanges, with many emerging markets suffering from significantly low levels of trading venue liquidity, effectively placing a constraint on economic and market development.

It is also an advantage for policy-makers that the market architecture for stock exchanges already exists. According to the WFE (2018), there are around 160 separate stock exchanges across the globe.

Investing in infrastructure through a local stock exchange addresses the concern of a lack of transparency for infrastructure projects. The WFE has found that markets with higher corporate governance standards attract more investment. Developing-country stock exchanges have been raising their corporate governance standards to attract institutional investment. An example is the Nigerian Stock Exchange, which launched a comprehensive Corporate Governance Rating System in November 2014 that then linked to new listings. Borsa Istanbul reformed its corporate governance requirements for companies in January 2014 with a focus on leadership, board composition, auditing, and disclosure. Developing-economy stock exchanges have also been focusing efforts on building environmental, social, and governance (ESG) criteria and sustainability capabilities. As an example, Borsa Istanbul has launched its BIST Sustainability Index to benchmark company performance on ESG metrics (World Federation of Exchanges, 2018).

4.0 Developing Co-Investing Models

Investing in partnerships with institutional investors offers an alternative for governments to contractual arrangements such as public–private partnerships (PPPs). An example of a government investing in partnership through a local stock exchange is the New Zealand Government, which holds 51% of Mercury NZ Ltd with the remaining shares traded on the New Zealand Stock Exchange (NZX).

Investing in a partnership through a local stock exchange addresses one of the challenges of the traditional PPP model, which is the difficulty of placing an accurate value on an infrastructure development at the point of inception. If a PPP contract results in higher returns for an infrastructure investor than expected at the time of negotiation, this can create tensions among the local community and lead to pressure for government intervention. The benefit of governments and institutional investors investing together is that, when an infrastructure business delivers a better-than-expected performance, the returns are shared.

Structuring infrastructure as a business that is jointly owned by governments and institutional investors enables the business to adapt. In the case of New Zealand's Mercury NZ Limited, the business has established an e-transport business that enables customers to buy e-bikes and e-scooters at a discount, as well as leasing EVs. The ability of Mercury to move into new markets that reflect the impacts of technological disruption would not have been possible under a traditional contractual structure.

4.1 Infrastructure Stewardship

Establishing infrastructure as a co-owned business provides a platform that enables adaptation.

With the emergence of distributed infrastructure, a shift to building infrastructure businesses requires a focus on business management. For governments wishing to ensure that an infrastructure business aligns with the long-term needs of the community, stewardship principles can provide a way of aligning the way the business is managed with the community.

Stewardship is not a new concept, as it dates to ancient times where a council or regent would govern for an underage king. In modern times, renowned strategist Peter Senge took the concept of stewardship forward in 1990 with his book, *The Fifth Discipline*, which introduced the role of stewards as leaders in learning organizations. According to Senge, leaders are stewards of an organization's vision. Later, Peter Block (1993) reframed the concept of stewardship for a corporation. His concept of stewardship was to build companies with a focus on accountability without control or compliance. According to Block (1993), "it is possible for us to decide that stewardship for the long run, for the community, for the earth, is a purpose more important than profit."

Stewardship has more recently been applied to investment. The United Kingdom's Stewardship Code 2020 defines stewardship as "the responsible allocation, management and oversight of capital to create long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society" (Financial Reporting Council, n.d.).

There are a number of tools that developing-country governments can use to embed stewardship principles into management practice.

4.1.1 MASTER PLANS

An infrastructure business should be required to submit a master plan every 3–5 years that outlines the strategic plans for the asset, how this strategic plan is relevant to the needs of tomorrow's citizens, and how sustainability issues will be incorporated into management practices. The process of establishing a master plan provides an opportunity to engage stakeholders to understand their concerns and enables new technology to be embedded into infrastructure on an ongoing basis. A master plan also provides an opportunity to consider what an infrastructure business can achieve outside of its core activities.

An example of the requirement to produce a regular master plan comes from Australia's Airports Act 1996, which established a regulatory framework for privatized airports that aimed to support the delivery of infrastructure services and new capital investment. The act requires airports to establish a master plan that includes specifying the development objectives of the airport. Consultation with local communities is embedded into the requirements of the master plan. In the case of Brisbane Airport's 2020 Master Plan, the opportunity to use the airport's central position and networks is being used to develop property that can provide a wide range of functional uses.

4.1.2 UNDERSTANDING AND MANAGING IMPACTS

Where governments are co-investors of an infrastructure business, the question is how its shareholding can be used to influence the way the infrastructure business is managed. Sustainability should be embedded into the organization's purpose and strategy because an organization's business strategy determines its resource allocation. If sustainability is not embedded into the strategy, then it will always struggle to attract the attention of the organization's executives.

The Impact Management Project (IMP, n.d.), a global forum that is building consensus on how to measure and manage impact, provides a framework that supports stewardship. IMP, which is supported by 2,000 organizations, focuses on taking into account the positive and negative impacts of an underlying enterprise. IMP's five dimensions of impact provide a useful starting point for organizations to embed sustainability impact into strategy.

For governments wishing to ensure that an infrastructure business aligns with the long-term needs of the community, stewardship principles can provide a way of aligning the way the business is managed with the community.

4.1.3 ACCOUNTABILITY AND TRANSPARENCY

Government-owned assets are commonly subject to the scrutiny of parliaments, which provide an opportunity for elected officials to question all aspects of an operation. In many cases, privately owned infrastructure businesses are held in unlisted vehicles where there are no requirements to publicly report performance.

A co-owned infrastructure business should provide a high level of transparency. The enterprise should publicly disclose its performance and ongoing strategy, incorporating best practice reporting and, when it has the capacity, report on climate change. Annual reports should be presented publicly with stakeholders invited to attend and direct questions to executives.

An accountability regime that ensures an infrastructure business is held accountable for its actions, as well as ongoing master plans that set the direction for the future adaptability of the asset, needs to be combined with mechanisms to ensure that the infrastructure enterprise is meeting the needs of customers on a daily basis.

5.0 How to Build Investment "Canals"

The idea that capital flows in a similar way to water was first presented by Walter Bagehot in his classic 1873 book on banking, *Lombard Street*, when he stated, "Thus (English) capital runs as surely and instantly where it is most wanted, and where there is most to be made of it, as water runs to find its level."

The history of human civilization has been about directing the flow of water to where it is needed. The oldest known canals were built in Mesopotamia circa 4000 BCE. Rome's first aqueduct was built in 312 BCE, and the Industrial Revolution was supported by the establishment of the Bridgewater Canal in 1761 between Worsley and Manchester, which resulted in the price of coal halving and "Canal Mania" spreading across Britain.

Bagehot's analogy that the flow of money resembles the flow of water is key to the ambition of delivering universal infrastructure coverage. Just as human intervention created the canals that flowed water to where it was needed, there is a need for intervention from all stakeholders to support the establishment of "investment canals" that will open up a flow of capital into infrastructure in developing countries.

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Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700
Website: www.iisd.org
Twitter: @IISD_news

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