



Green & Resilience Banks

HOW THE **GREEN INVESTMENT BANK MODEL**
CAN PLAY A ROLE IN SCALING UP CLIMATE FINANCE
IN EMERGING MARKETS

Natural Resources Defense Council
Coalition for Green Capital
Climate Finance Advisors



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Team

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or CMI, is accelerating the shift to a greener, more prosperous economy that benefits everyone. We aim to implement new approaches to finance and investment that offer strong profit potential and increased opportunity for people of all income levels. Our experts collaborate with private- and public-sector leaders to accelerate the adoption of more resilient, inclusive, and efficient investment models.

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is the nation's leading expert on Green Bank institution creation and financing. For nearly a decade, CGC has partnered with over 15 states and with multiple national governments to help them understand the Green Bank model and implement new public-private financing solutions in their market. A 501(c)(3) non-profit, CGC has designed and created Green Bank institutions that have spurred nearly \$1.5 billion of total clean energy investment. CGC is the go-to expert on innovative clean energy finance programs and solutions for governments and key stakeholders around the United States.

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Executive Summary

This November, the Paris Agreement entered into force as the first global, coordinated response to address climate change. It is built on explicit national commitments to action and an overall ambition to keep warming well below 2 degrees Celsius. It is also built on the understanding that finance is a critical component to meeting these objectives. The amount of investment needed for a low-carbon, climate-resilient economic transformation is substantial – by some estimates up to \$6 trillion per year, or \$90 trillion by 2030.

This policy working paper explores the utility of “Green Investment Banks” (GIBs) to help meet the financing needs to address climate change, support countries’ Paris Commitments, and meet the challenges specific to scaling investment in low carbon and climate resilient (LCR) infrastructure in emerging and developing economies.

The need for private finance is a fact. Public funding alone cannot finance the investment needed to address climate change. This has been emphasized numerous times leading up to the Paris Agreement. It was further underscored this year in the G20 Green Finance Synthesis Report which noted that financing environmentally sustainable growth will require substantial investment – both public and private – and may require complementary financial policy efforts such promoting sustainable banking principles, scaling up innovative instruments to address maturity mismatch and efforts to reduce information asymmetry. Transforming the financial system to deliver the scale and quality of capital needed will require addressing systemic barriers within the financial system itself.

Given the time it may take to achieve systemic transformation of the financial system, efforts to mainstream climate considerations throughout the financial systems and its institutions must continue, and, at the same time, specialized financing vehicles, blended finance approaches and institutions like GIBs must be scaled up.

As of 2016, thirteen GIBs were operating in local and national jurisdictions around the world. In each case, they were established by policy makers as part of a broader set of solutions to address market failures and barriers to low-carbon, climate-resilient investment. In its recent report, “Green Investment Banks: Scaling up Private Investment in Low Carbon, Climate Resilient Infrastructure,” the OECD provides a comprehensive assessment of the operations of GIBs and related institutions and concludes that “...GIBs are making a case that centralizing expertise in a new independent institution dedicated to mobilizing green private investment can be an effective approach to unlocking larger flows of private capital”. As a specialized financing vehicle focused on LCR infrastructure with the mission of crowding in private capital, a GIB can provide a national and local solution to fill the financing gaps and scale up these types of investments.

For emerging markets, GIBs can, when carefully designed, well capitalized and dutifully managed, address many of the barriers inhibiting investments in LCR infrastructure. Existing GIBs have a common set of characteristics, including being purpose-built to serve local markets, having a narrow climate-focused mandate, and blending public and private capital. GIBs can be established and capitalized in a number of ways, but historically their initial capital has been from public sources. For new GIBs in emerging markets, domestic public funds may be available, but international sources of public funding – whether bilateral or multilateral development finance or climate finance – can play an important role in the creation, establishment, and promotion of domestic GIBs.

The GIB model can be a useful approach for countries to consider, particularly because of the model’s focus on acting at the local and transactional level, where investment decisions are made. A GIB will need to be part of a broader set of solutions to address market failures and barriers preventing investment. In many developing and emerging economies, technical assistance and capacity-building activities will be critical components of the broader set of solutions.

There are three key ways the GIB model can help increase LCR investment in developing and emerging economies. GIBs could (i) help countries achieve climate goals articulated within their NDCs, (ii) be a locus of financial innovation to meet local market needs, and (iii) be a complementary partner for international sources of climate finance and Development Finance Institutions (DFIs). This paper explains the GIB model in depth, and explores the potential roles GIBs can play in scaling up climate finance.

Chapter 1

Introduction



The world is warming – about that there is no doubt. Without new policies and action to address climate change, the risks posed to humanity are perhaps the most significant threat of our times. The Intergovernmental Panel on Climate Change (IPCC) noted in its most recent scientific assessment that warming and sea level rise could continue for centuries, caused by emissions already produced.¹ It also noted that while efforts to mitigate emissions will need to increase dramatically to slow warming, adaptation efforts will also need to be scaled up to ensure resilience to warming that is already locked in. Building resilience to the effects of climate change that are already unavoidable – otherwise known as “climate risks” – will be paramount to countries’ efforts to adapt to climate change. Climate risk is ubiquitous, but it manifests differently across sectors, industries, regions and projects. Unlike efforts to reduce emissions, which are primarily focused on energy production and consumption, effective adaptation and resilience efforts and investments will necessarily be local and contextual and will need to be undertaken across all sectors and segments of society. Furthermore, action today can help avoid significant risks from climate change in the future.²

The IPCC report also noted that “substantial emission reduction could increase the prospects of effective adaptation,” supporting the parallel political negotiations for a global treaty to address climate change. That global treaty was established in December 2015 at the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), held in Paris, France. In the year that followed, 193 member countries signed the historic Paris Agreement, and 100 countries representing more than 69% of global emissions had ratified the agreement by the time it went into force on November 4, 2016. In further evidence of collective and global leadership, and recognizing that addressing emissions of non-CO₂ greenhouse gases, such as hydrofluorocarbons (HFCs) and methane, is equally important, the 197 countries that are parties to the Montreal Protocol reached another historic agreement in October 2016 that established a timeline for all developed and developing countries to phase down production and consumption of harmful HFCs, commonly found in cooling systems. The agreement, if fully implemented, could avoid up to 0.5°C in global warming by 2100.³

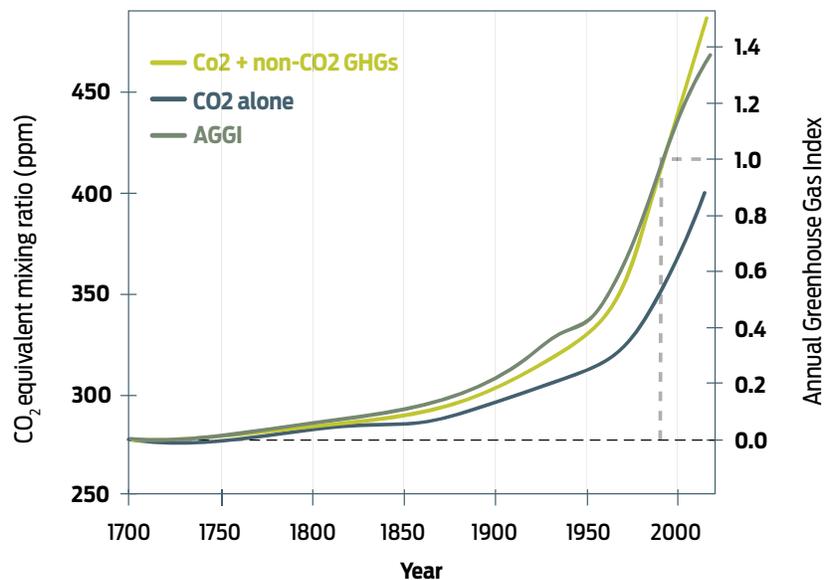
The Paris Agreement is historic precisely because it is the first global, coordinated response to addressing climate change that is built on explicit national commitments to action and overall ambition to keep warming to well below 2°C above pre-industrial levels.⁴ These commitments include, in Article 2.1(c) of the agreement, making finance flows consistent with the investment needed to meet this ambition.⁵ In the lead-up to COP 21 in Paris, 163 countries put forth country-specific strategies, goals and action plans to reduce greenhouse gas emissions and adapt to climate change impacts that are grounded in their unique local context and stage of economic development. These plans, known as Nationally Determined Contributions (NDCs), have the potential to increase tangible investment in clean energy, sustainable agriculture, climate-smart urban development and climate-resilient infrastructure.⁶

The economic shifts required to achieve this will be significant. These shifts must include both mitigation efforts aimed at reducing emissions and adaptation efforts that can make existing and new infrastructure resilient to expected future climate conditions.

COSTS OF FAILING TO MITIGATE

The costs of failing to reduce emissions are high. There is also growing evidence that increasing emissions is not necessary for economic growth. Carbon-intensive energy and industrial processes represent 62% of global greenhouse gas emissions⁷ and remain a major component of development, growth and overall economic activity. At the same time, both developed and developing economies are effecting a gradual but steady transition toward lower-emissions technologies in energy and other sectors. Over the last two years, International Energy Agency (IEA) data indicate that progress is slowly being made with respect to energy-related CO₂ emissions. In March 2016, the IEA announced that for the second year in a row, global economic growth rose while global CO₂ emissions stabilized, with renewables playing an important role.⁸ While that is promising, we are far from the point where we can collectively say our emissions trends are aligned with the Paris objectives. In fact, the latest Annual Greenhouse Gas Index, produced by the National Oceanic and Atmospheric Administration (NOAA), indicates that greenhouse gas levels are not just continuing to rise, but that their growth rate is also accelerating.⁹

More than US\$13.5 trillion in low-carbon and energy efficiency investments are expected to be required for full implementation of the pledges made by countries supporting the Paris Agreement, and keeping warming below 2°C could require an additional US\$11 trillion.^{10,11} The net cost, however, may be lower as shifting to green (and clean) investment comes with synergies and efficiencies, including lower fuel costs. The G20 Green Finance Synthesis reinforced these conclusions and further noted that the vast majority of green investment will have to come from the private sector.¹²



Source: Annual Greenhouse Gas Index, produced by the National Oceanic and Atmospheric Administration (NOAA), May 2016

COSTS OF FAILING TO ADAPT

While the amount of investment needed to transform the energy sector alone is substantial, significant investment is also necessary to integrate resilience measures into existing and new infrastructure to minimize the damages associated with extreme weather events linked to climate change. By some estimates, we may have already “locked in” enough warming (approximately 1.5°C) to experience changes to our climate for which we are unprepared.¹³ Whether that locked-in warming manifests in increased intensity of storms and drought or greater frequency of floods and fires, the built environment we have today needs to be made more resilient.

With greater warming, the costs of climate change will continue to put pressure on government budgets and undermine economic growth. Regardless of the measure, the financing requirements far surpass the estimated actual flows currently supporting climate-smart investment on either the mitigation side or the adaptation side.¹⁴

Meeting the financing needs of this challenge will require all parts of the financial ecosystem – from public finance to various sources of private finance – to pull together, share risks, incorporate climate considerations and ultimately ensure that a far greater number of climate-smart investments are made, and quickly. It may also require filling gaps in that ecosystem in new ways or with new institutions.

“GREENING” FINANCE vs. GREEN FINANCE

Whether for meeting total NDC commitments or for infrastructure only, public funding alone cannot finance the necessary transformation required to address climate change – either for mitigation or adaptation. While figures vary, the estimated investment needs are significant. In their latest report, the Global Commission on Climate and the Economy estimates that up to US\$90 trillion in investment is needed over the next 15 years (cumulatively) for the low-carbon transition necessary to keep warming under 2°C.¹⁵ Public capital needs to be leveraged and a significant portion of financing flowing through the financial system also needs to be reoriented toward climate and broader sustainability goals.

There is a strong argument that what is needed to meet these levels of investment is no less than a full transformation of the financial system.

Transforming the financial system to deliver the scale and quality of investment needed will require addressing systemic barriers within the financial system itself. These efforts are often called “greening finance” or “mainstreaming,” as they imply profound shifts within all parts of the financial ecosystem. Mainstreaming in this context includes aligning policies, standards and regulations for national and international markets with sustainability goals. It also includes bringing climate considerations into the investing decisions of many types of financial actors, including institutional investors, pension funds and asset managers, as well as international and national commercial financial institutions, development financial institutions and local financial institutions. “Mainstreaming” means ensuring investors have the right tools and are incentivized – through robust portfolio planning, risk assessment and mitigation, investment, and disclosure standards and climate-sensitive market pricing – to ensure that climate considerations are fully integrated into their investment decision-making processes.

Mainstreaming climate considerations across all areas of financing – regulation to standards to banking and investment – will take time, and may happen at a difference pace from institution to institution and market to market. Much of the work

that aims to address these policy failures is dependent on a variety of actors outside of financial institutions, including governments, policy makers and regulators. Public policy makers, financial regulators and market participants will need to coordinate to deliver common frameworks, common definitions and other necessary supporting infrastructure to build local, cross-border and international markets.¹⁶ While coordination among these groups can help to promote mainstreaming of climate considerations faster, in practice, political considerations often result in measured approaches and incremental improvements over time. This means the comprehensive paradigm shift required of the financial system to integrate

sustainability and sustainable development, remove incentives for fossil-based activities, fully integrate a measure of climate risks and incentivize climate-smart opportunities will take time.

Greening the Financial System Requires Policy Efforts, Incentives and Products Which Accelerate Systematic Change.

The work of several organizations, including UNEP’s Inquiry on Sustainable Financial Systems, the Financial Stability Board’s Task Force on Climate Related Financial Disclosures and the G20’s finance group have helped to create a body of research which supports “greening finance” efforts. In fact, the topic of greening finance will continue into this year’s G20 work. Many of the recommendations coming out of this work focus on policy efforts, incentives and products which can accelerate the systemic change necessary in the financial system. Some examples of these recommendations include: reduction of fossil fuel subsidies, carbon pricing, tax or trading mechanisms, climate risk standards and disclosure mechanisms, and incentives for specialized financial products, such as green bonds or green IPOs. Each of these would provide the right market signals that can help investors, asset managers and banks include the costs of climate change into their financing, providing additional impetus for financial flows to go green.

The link between “greening” finance through financial policy efforts, which seek systemic shifts, and “green finance” is manifest in the tools and products established – often by policy makers – to stimulate and incentivize such investment. For the most part, efforts to create systemic shifts are, by their very nature, top-down policy and regulatory innovations. Some of the efforts at “greening finance” within the financial sector are built around the idea that the private finance institutions need to – and would benefit from – integrating climate considerations throughout their operations and their investment decisions. The intended long-term outcome of this approach is for all investment to be climate-smart and to have a measure of sustainability.

Given the time it may take to achieve fundamental transformation of the financial system, a twofold approach is necessary. This twofold approach means that both (i) efforts to achieve these types of systemic changes within the financial system should continue (and accelerate), and, at the same time, (ii) targeted incentives, special financing vehicles, blended finance approaches and institutions that are established to meet policy objectives may be needed to accelerate efforts and “crowd-in” private capital, particularly at the local level and for infrastructure.

THE RATIONALE FOR PUBLIC-PRIVATE APPROACHES FOR GREEN FINANCE

The rationale for targeted incentives, special financing vehicles, blended finance approaches and institutions that promote and accelerate policy objectives is not new. Across developed and developing economies, private finance and investment is driven by a principle of “commercial viability” of an investment, including the need for investors to cover costs and receive a risk-adjusted return. Where this principle works well, financial markets and the private sector generally meet financing needs of projects, and approaches that use public money to catalyze private investment are not necessary. However, there are circumstances in which under-investment occurs in sectors or areas where investments have strong societal benefits, such as those that support sustainable development goals, such as ensuring access to affordable, reliable, sustainable and modern energy for all, or accelerating climate resilience and adaptation investments. These cases can result in low or non-existent levels of reasonably priced financing options from the private sector, and a public-private solution may be warranted in order to catalyze investment more quickly, and at a scale that might not otherwise happen without such interventions.

In general, there are two rationales for a public-private approach to green finance:

MARKET FAILURES

Market failures such as information asymmetry, mispricing, regulation with unintended disincentives or consequences, or a perception of excessive risk can undermine economic efficiency and result in underinvestment.

SOCIAL, EQUITY OR DISTRIBUTIONAL GOALS

Beyond the question of market failures, many countries support equity or distributional goals, such as clean drinking water or access to clean energy for their citizens.

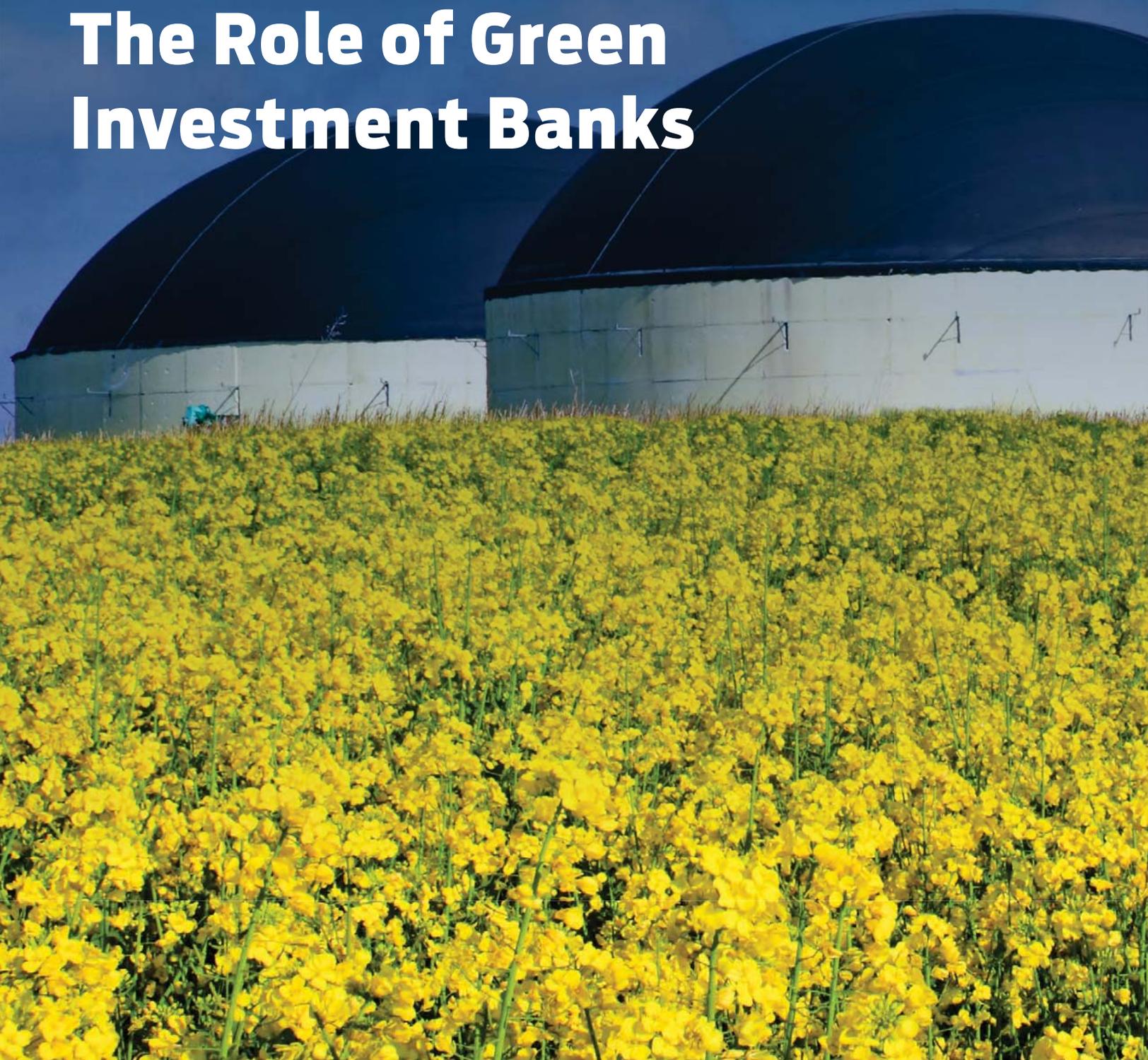


Investing in and scaling up low-carbon, climate resilient infrastructure (LCR) will be key for ensuring that we collectively meet the Paris goals. Much like other parts of the world, in developing and emerging economies, climate change threatens infrastructure that is critical for development and the economy. Roads, airports, water systems, power plants and other key infrastructure need to be built to withstand future changes in climate, and innovative approaches and financing tools will be required to scale up both mitigation and adaptation investments.¹⁷ Indeed, those public-private solutions that can most effectively leverage public funds to “crowd-in” private capital to help fill the investment gap, while at the same time demonstrating the business case to investors and contributing to market transformation, have been proven to be highly effective.¹⁸ **As a specialized LCR infrastructure financing vehicle and a tool established by policy makers to “crowd-in” private capital, Green Investment Banks (GIBs) – can provide a unique national and local solution to close financing gaps in scaling up these types of investments.**¹⁹

This paper explores the utility of GIBs to help meet the financing needs to address climate change, support countries’ Paris commitments, and address the barriers and challenges specific to scaling up investment in LCR infrastructure in developing and emerging economies.

Chapter 2

The Role of Green Investment Banks



What Does “Green” Mean?

As the name suggests, Green Investment Banks make “green” investments. The definition of a “green” investment can vary among institutions, though it generally encompasses investments that reduce emissions or energy use. To date, most “green banks” have focused on mitigation projects – renewable energy and energy efficiency – and have sent a signal to the marketplace that their funding *seeks out* investments that are climate friendly. Given the magnitude of the need to address climate risks and build resilience into infrastructure, GIBs may have a role in financing climate-smart and resilient infrastructure, water projects, and clean transportation projects such as electric vehicles or charging station infrastructure. The choice of what sectors and projects to invest in is up to local policy makers and market participants who can identify the market needs and objectives that the GIB is meant to serve.

As of 2016, 13 Green Investment Banks (GIBs) had been established in local and national jurisdictions around the world.²⁰

Almost all of these entities were formed by national or local governments with a focus on the “pure play” objective of facilitating clean energy, energy efficiency and/or resilient investments.²¹ Existing GIBs are public or quasi-public entities, capitalized with funds that are derived from legislative action, taxes or other contributions of public money into a special financing vehicle. While many have the moniker, none of these institutions are “banks” in the classic definition, meaning they do not take deposits, manage savings, or provide direct financing to consumers.²² They are, however, meant to be stand-alone, self-sustaining finance entities, operating similar to a bank.

GIBs have been established by diverse governments that recognize the potential of specialist institutions that are dedicated to understanding and addressing the specific national and local barriers to increased private investment in LCR infrastructure. GIBs seek to maximize and mobilize private capital into projects at the local and national levels. Part of their mandate is to blend their public funds most effectively to “crowd-in” private capital to fill the financing gap that may be preventing LCR investments. To date, most GIBs have been established in OECD countries, but several developing and emerging economies are actively exploring opportunities to establish a GIB or a GIB-like entity.

Where they exist, GIBs are proving themselves to be effective public-private approaches to catalyze and “crowd-in” private finance in local contexts, responding to local needs often with specialized investment teams. The function and role that they play in the financial ecosystem has proven to be critical to accelerating and scaling up local investment, particularly for clean energy. For developing and emerging economies, specialized financing vehicles and blended finance approaches have played similar functions for scaling up financing where market failures exist and where social objectives – in particular, those tied to development and sustainability goals – need a public-private financing solution.

While many GIBs have demonstrated success in developed countries at accelerating the adoption of clean energy technologies, the model may be applicable in developing and emerging economies to LCR investment and to achieving other goals, such as the Sustainable Development Goals.²³ In fact, in developing and emerging economies where the financial sector is nascent or in early stages of growth, and where governments see a need to have a focused approach to catalyzing investments (particularly those that meet the country’s climate change goals), GIB institutions can play a critical role in getting the local financial sector comfortable with LCR investments, as well as in linking the local financial sector with international capital providers looking to make green investments.

GIBs can, when carefully designed, well capitalized and dutifully managed, play a role in mitigating risks and addressing many of the barriers inhibiting LCR investments in developing and emerging economies. This blended finance approach has already been tested at the international and regional levels through a range of international finance institutions, primarily public or intergovernmental, which currently have funds, facilities or mechanisms aimed at increasing the amount of funds committed to LCR investments. These vehicles have played a significant role in crowding-in private investment in developing and emerging economies over the last decade, particularly in clean energy projects. The Climate Policy Initiative’s most recent report on climate finance notes: “Public concessional or lower-than-market-rate finance, including loans with longer tenors and grace periods, play a catalytic role by supporting the establishment of policy frameworks, strengthening technical capacity, lowering investment costs, and reducing investment risks for the first movers in a market.”²⁴ Many of these funds or facilities are housed within larger development finance institutions and often allow those very institutions to move beyond their own “business as usual” approach, providing the right type of capital, including incentive grants and technical assistance, to promote investments that would not have happened without such sources of funding and related capacity building.²⁵

“A green bank is an institution that is more than the sum of its parts. Green banks are a new kind of specialized intermediary designed to accelerate the growth of clean energy markets. Their role is not to replace or ‘crowd out’ commercial banks and private investors but to ‘crowd in’ private capital. What this means in practice is different in each country. Green banks are tailored to the country’s goals, resource endowment, market opportunities and market risks. Green banks use private-sector experience and discipline in the service of the public good. They play a transformative role because neither traditional government programs, with their limited engagement with markets, nor the private sector, with its competitive pressures and fiduciary constraints, can reliably achieve this outcome.”

Source: NRDC, “Greening India’s Financial Market: Opportunities for a Green Bank in India.” <https://www.nrdc.org/sites/default/files/india-financial-market-opportunities-green-bank-report.pdf>

In many markets, a GIB will need to be part of a broader set of solutions to address market failures and barriers preventing investment. In many developing and emerging economies, technical assistance and capacity-building activities will be critical components of the broader set of solutions, including those efforts that are sector specific, such as technical training for equipment installers, standardized contracts and other measures that may help facilitate market-specific development. In addition, technical assistance and capacity building for macro issues, such as improving the business enabling environment, legal frameworks or reducing subsidies for fossil fuels, will also play critical roles in enticing private investment.²⁶

What will differentiate GIBs from many other funds or facilities is their pure LCR focus at a national or local level, and their focus on catalyzing private finance. In this regard, it may be easier for GIBs to target and fund local projects which may be smaller or are perceived to have higher risk. They can also target and attract local capital and focus on projects where other sources of similar financing may be lacking. Notwithstanding the large amounts of financing that could be tapped to support LCR investment (whether they be from international sources such as the Green Climate Fund or Climate Investment Funds or from larger institutional investors and international banks), efforts to track climate financing flows continue to show a relatively small amount of overall funding flowing to these types of investments.

The unique regulatory, technology and performance risks, as well as informational and institutional barriers, may require committed and knowledgeable local players. GIBs are dedicated institutions with a focus and mandate to attract and deploy capital for clean energy and green projects. As an institution with a declared objective, there is an immediate organizational orientation that is relatively uncomplicated compared to many other existing institutions that support LCR investment and may have broader mandates. In many of those institutions, the effort to integrate climate considerations is a process of mainstreaming. Focusing LCR investing within a dedicated finance institution may have considerable operational value relative to an ad hoc program area of an entity already focused on other matters and activities. In GIBs, clean and green investments do not need to compete for resources against projects in any other industry or sector.



In playing their unique role and function, GIBs may have several critical advantages to promote LCR investment at the local and national level. Existing GIBs have demonstrated several key advantages which have helped them achieve their success in scaling up LCR investments. These advantages have included:

- Knowledge about local market, technology, policy and political conditions;
- Relationships with local developers, politicians and finance institutions;
- The ability to source local project deals;
- Local risk assessment and risk mitigation capability;
- The ability to nimbly target market niches to stimulate market development; and
- The ability to “crowd in” local and international capital by reducing perceived and actual project-related risks.

Local knowledge, risk mitigation capability and market micro-targeting are particularly important in developing countries where capital markets are underdeveloped and often both domestic and international investors struggle to assess risks and source deals.

To address the localized institutional and investment gaps in climate finance, countries or sub-national entities can establish their own GIBs. New GIBs can become critical nodes in the global network of financial institutions, including providing a complementary and corresponding set of partners for international finance, both public and private.

Existing GIBs Address Barriers in Clean Energy and Energy Efficiency



UTILITY AND LARGE COMMERCIAL AND INDUSTRIAL RENEWABLE ENERGY PROJECTS

SME-SPONSORED PROJECTS:

Lack of ability to provide guarantees or equity, lack of track record, high cost of structuring financing

INNOVATIVE TECHNOLOGIES:

Projects considered risky due to unfamiliarity with technology, lack of liquidity



DISTRIBUTED SMALL AND MEDIUM SCALE RENEWABLE ENERGY PROJECTS

Lack of interest from financial institutions due to small size

Inability to provide guarantees, equity, etc. due to the size of the sponsor

High cost of structuring financing

Unfamiliarity with technical and operational profile of the technologies

Difficulty perceiving the economic benefits

Lack of specific financial instruments



ENERGY EFFICIENCY PROJECTS

Difficulty perceiving the economic benefits

Perception that payback periods are too long

Lack of specific financial instruments

Incipient level of development of ESCOs

Note: Barriers for investing in LCR will vary across sectors, regions and countries. The above illustrates some common barriers currently addressed by existing GIBs (not exhaustive).

DEFINING CHARACTERISTICS OF GREEN INVESTMENT BANKS

Though GIBs vary across nations, with varying structures, missions and tools, they have a core set of defining characteristics. Some of these defining characteristics are similar to those of international and national development finance institutions, in particular those that work with the private sector and aim to provide a level of “additionality” in the market.²⁷ Also, many development finance institutions and GIBs have a focus on accountability for their development and climate mandates through the use of metrics and measurement of operations against development objectives, as well as their focus on being cost-effective. Some of the key characteristics of GIBs include: ²⁸

NARROW MANDATE

GIBs generally have a narrow mandate focusing mainly on LCR investment and mobilizing or “crowding-in” private capital, using interventions to mitigate risks and enable transactions.

INDEPENDENT

GIBs are typically established as special-purpose public or quasi-public entities which are granted independent authority to meet their mandates. Most GIBs are governed by a board with public and private sector expertise and have in their operations a degree of latitude to design and implement investment products based on the needs of the markets they serve.

ADDITIONALITY

Like many development and policy-driven institutions, GIBs seek to “crowd in” private capital only in transactions where there is a gap that is not being filled by the markets. In this role, GIBs are facilitating transactions that wouldn’t otherwise happen.

COST-EFFECTIVENESS

GIBs mobilize private capital using least-cost solutions in order to reduce public expenses as part of an organizational mandate for profitability.

ACCOUNTABILITY

GIBs are evaluated using metrics such as the amount of private capital mobilized, return on capital, number of jobs created and greenhouse gas reductions. GIBs’ public reporting on their performance typically includes transparent calculation methodologies to build credibility.

CAPITALIZED WITH PUBLIC FUNDS

Like existing development finance institutions, GIBs have, to date, been capitalized with public funds. In the case of GIBs, these funds often come from federal, state or local governments or through utility bill surcharges, government budget allocations or the use of tax proceeds. Funding to capitalize existing GIB institutions has occurred in a number of ways, but often the money used to establish these institutions comes from public coffers.

BUILT TO SERVE LOCAL POLICY AND MARKET NEEDS

The market failures and barriers preventing LCR investment vary across markets. GIBs have been established with the specific purpose to deal with these circumstances, and have been driven by the policy objectives of the local or national government. Existing GIBs have operated within specific local market conditions, addressing barriers such as grid electricity cost and lack of strength or depth of the banking sector to finance certain investments, such as clean energy.

DESIGNED TO LEVERAGE PRIVATE CAPITAL

By design, the approach GIBs take to finance projects seeks to use as little public and low-cost capital as is necessary to drive the private investment that is needed to achieve their LCR investment goals.

Leverage: An Important Metric for Success

Among the indicators that many GIBs (and indeed, most development banks) highlight as a measure of “success” is leverage. Simply defined, leverage is meant to convey the notion that each public dollar deployed can result in additional investment from private sources, thus “leveraging” the public dollars and “crowding in” private capital. Many refer to leverage interchangeably with mobilizing, catalyzing, co-financing and co-investment by the private sector. In this way, the leverage indicator can lead one to conclude a level of causality between the public intervention and the actions of private investors.

While leverage may be for some an important indicator of success, it is not the only indicator to measure success of GIBs or GIB-like institutions. In many cases, a development indicator such as the amount of greenhouse gases reduced, gigawatts of clean energy installed or even measures around “market transformation” (e.g. were subsequent projects financed with fewer or no public dollars) can be useful.

Evaluating success on an indicator of leverage alone can be misleading and it can create perverse incentives for GIBs and GIB-like institutions. This is in part due to the fact that mobilizing additional sources of finance varies by project, sector and even investment products. For example, risk-sharing mechanisms, such as guarantees, may provide high leverage for public dollars (in some examples, more than 20 times) due to the way the instrument is structured and when public dollars are paid out. Conversely, infrastructure investments (particularly with new technologies) through debt or equity may achieve leverage in the single digits but still achieve the policy objectives. In both cases, the GIB public dollars spent will have an equally important role in facilitating the development in a project that would not have happened without those funds. Focusing only on achieving high leverage will have unintended consequences for the products and investments that a GIB will undertake and may ultimately reduce the effectiveness of a GIB to transform markets.

Green Investment Banks Around the World



Commercial or Concessional? That is the Question

Much debate surrounds whether GIBs should operate on fully commercial terms or on “concessional” terms. In development finance institutions, much of the debate around whether to provide financing to the private sector on “concessional” terms focuses on the desire to minimize market distorting practices, something which many believe is a consequence of subsidies. Nonetheless, in seeking to both (i) catalyze private investment to achieve development objectives and (ii) minimize market-distorting practices, many DFIs use blended finance judiciously, seeking to structure each investment with the minimal amount of “concessional” funding required to fill the financing gap. Market-based financing is the benchmark against which this structuring happens, and in practice, the exercise of structuring the minimum amount of concessionality may be challenging because market terms are constantly evolving.

Many GIBs use public capital to provide loans, insurance, credit guarantees or other financial products, including grants (as technical assistance), at sub-market rates or with other favorable terms such as long tenor or low collateral. Such terms may be justified in the service of environmental, job creation, industrial development and other goals. This approach is not new, and has been used, for example, by national export-import banks, which lend on preferential terms to firms that create jobs or promote domestic business interests.

Generally speaking, the presence of these types of funding vehicles – whether through GIBs or development institutions – is itself a signal to the markets that there is willing capital to invest in these projects. Should that signal result in private capital fulfilling each investment need without GIBs or blended finance, in many ways this is a measure of success. For the most part, however, these sources of funding continue to play a critical role, and the fact that they are capitalized with public funding, have a narrow and focused mandate for certain types of investments, and have the ability to bring additional (financial, credit) benefits through flexible lending terms is highly valuable in the efforts to scale up financing, quickly towards climate-smart investments.

UNIQUE ROLE OF GIB FUNDING

The effect of the characteristics outlined above is that GIBs – and their funding – play a unique role in the markets they serve and the projects they finance. As discussed in Chapter 4, the products and tools that GIBs deploy have the ability to mitigate risks and enable transactions through the structuring aspects of their financing. This does not necessarily imply a high level of “concessionality,” nor does it imply GIB funding is provided on par with other commercial financial institutions. In their unique role, GIB funding brings a number of benefits to the projects they finance, and their “additionality” means their funding fills financing gaps that the market is not otherwise filling.



Chapter 3

Ways to Create and Capitalize a Green Investment Bank

Creating and capitalizing a GIB are two separate issues, but closely related. Most existing GIBs have been established as a result of a policy measure or legislation and driven by the need to provide financing mechanisms for specific policy goals.

Existing GIBs have been created in a number of ways, including through administrative action or the passage of a new law. In some cases, GIBs have been newly formed institutions, and in others, they have consolidated existing, related programs under one entity, the difference depending on local institutional and legal conditions. In developing and emerging economies, establishing a GIB can occur in similar ways, including through government directive, by policy measure or by legislation. Policy makers in countries with these economies may also choose to establish (or convert an existing entity into) a GIB as a means to support climate objectives, complementing existing climate funds, development finance and other sources of capital with similar objectives.

Regardless of what public policy action is taken to establish a GIB, new entities will require the authority needed to operate as a financing mechanism in the market, with the ability to lend, guarantee and otherwise structure funding into projects to meet project needs and fill financing gaps, with the goal of leveraging additional private capital.

In some cases, while administrative, policy or legislative action is needed to create the GIB; regulatory or other programs are needed to capitalize the GIB. See the box below titled “Illustrating the Many Ways to Establish a GIB” for examples.

GIBs can be created as a brand new entity, or they can be created out of existing institutions.

Determining the right approach to create a GIB in a country with a developing or emerging economy should involve consideration of a number of factors, including the need for policy action to create a GIB mandate, the capacity of existing institutions to function as a GIB and the capital sources that will be used to capitalize the GIB.

Creating a GIB as a new entity may maximize the ability of the GIB to target markets and the impact it seeks to achieve and potentially deploy capital more quickly than otherwise might occur.

Focused, pure play types of entities like these examples are often perceived by the markets as a single point of contact for financing for certain types of activities. In the case of GIBs, particularly those that have been established with a simple, clean energy mandate, they have been helpful to target funding at specific projects that are aligned with that clearly defined, narrow mandate. However, establishing new institutions is not always straightforward, and there may be complexities and potential delays that come with the challenge of creating a new institution.

Creating a GIB by either repurposing an existing entity or consolidating existing programs into one entity may provide benefits, in particular with respect to leveraging existing organizational structures, staff or processes.

However, the process of reorienting the focus of existing institutions may present challenges with transforming business lines, winding down programs and activities that do not meet the narrow mandate, and the potential delays resulting from organizational culture change which may impact productivity. The capacity of lending officers and back offices to measure and monitor risk may not extend to green technologies. A hybrid model can also be used by creating a new division or subsidiary of an existing entity.

CAPITALIZATION OF GIBs

GIBs can be capitalized in a number of ways, but given the fact that they are primarily driven by policy makers’ desire to stimulate and incentivize certain types of investment, the initial capitalization of GIBs has in the past been primarily from public sources, usually domestic. This does not preclude GIBs from receiving or being capitalized by other sources.

The sources of funds used to capitalize GIBs are important, as those funders will require the GIB to use the funds in specific ways, including delivering certain development impacts. Development impact will be a requirement of most public sources, including bilateral donors, multilateral donors and climate funds. This is also true of private capital that may be sourced to capitalize or invest in a GIB and which will be driven by both investment returns and impact (which returns taking priority). The range of possible sources of funds to capitalize GIBs is described in the following chart.

Source of Funds	Examples	Common Requirements
DOMESTIC PUBLIC SOURCES	Public budgets Tax revenues Revenues from utility services Bond issuances Carbon pricing revenues	Development impacts, local economic needs/goals Policy mandates implemented Sector investment increased
INTERNATIONAL PUBLIC SOURCES - BILATERAL/DONOR FUNDING	DFID USAID GIZ KfW	Development impacts Sector investment increased (depending on the source): no losses/ minimize concessionality
INTERNATIONAL PUBLIC SOURCES - DEVELOPMENT FINANCE INSTITUTIONS	IFC ADB IADB EBRD	Development Impacts Sector investment, including downmarket (depending on the source): returns, but not necessarily fully commercial
INTERNATIONAL PUBLIC SOURCES - CLIMATE FINANCE	GCF GEF CIFs Adaptation Fund	Development Impacts Sector investment increased (depending on the source): no losses/ minimize concessionality
PHILANTHROPIC, IMPACT INVESTORS	MacArthur Packard	Development Impacts Sector investment increased Patient return expectations
INSTITUTIONAL INVESTORS, PENSION FUNDS, OTHER PRIVATE	CalPers APG	Returns commensurate with risk/ market based

Existing GIBs have used a number of public sources to capitalize their institutions. New GIBs, especially in developing countries, can look to a number of internal and external sources of capital for funding. The following section describes the potential sources that can be used to provide initial or ongoing capital to a GIB.

DOMESTIC SOURCES OF PUBLIC FUNDING

To date, existing GIBs have been primarily funded with domestic public funds. Sometimes this involves raising new public resources to be committed to the GIB, but it also might mean repurposing existing public funds to go into a GIB. Under this approach, GIB capitalization becomes part of an ordinary government budget and appropriations process. However, unlike typical government programmatic expenditures, the funds allocated to the GIB will not be fully expended, with replenishment needed the next fiscal year. Rather, the public funds are preserved and used to build up a capital base.²⁹

REGULAR BUDGET FUNDS

A GIB could be funded through the ordinary government budgeting process. This is the most simple and direct way to fund GIBs but is often the most challenging. Both Australia and United Kingdom GIBs were capitalized in this manner. However, it may be difficult for other nations, developing or otherwise, to look to government budgets that tend to be tight.

CAP AND TRADE / CARBON TAX REVENUE

A number of GIBs have used the revenue from carbon-based fees and policies to capitalize their GIBs. Both Connecticut and New York partially funded their GIBs using the revenue earned through participation in the Regional Greenhouse Gas Initiative (RGGI), a regional cap-and-trade program. India may convert its existing green financing agency – the Indian Renewable Energy Development Agency Ltd. (IREDA) – into a GIB and capitalize it with funds from the national coal tax, known as the “coal cess.” The province of Ontario in Canada has announced intentions to create a GIB that would be capitalized by its own cap-and-trade program. GIBs are a logical place to use funds collected from carbon-based fees, as GIBs will deploy the clean energy solutions that allow energy users to avoid using the taxed fossil-fuels, as is the intention of any Pigouvian tax. Without creating a clear path to move away from carbon-based energy sources, the tax may not have direct connections to investing in LCR infrastructure. GIBs help avoid this outcome.

UTILITY SURCHARGE

A number of GIBs have been and continue to be capitalized by collecting funds from electricity ratepayers through a utility bill-based surcharge. These “system benefit charges” are common in the United States and have historically been used to fund subsidy programs for energy efficiency. Though this is a large pool of funds and common in some markets, it likely has low applicability in low-income countries.

NATIONAL DEVELOPMENT BANKS/FUNDS

While many national development banks (NDBs) exist, often they have broad mandates beyond low-carbon, climate resilient investment. Funding from these institutions could be provided to help capitalize a GIB that complements the NDBs’ work or fills gaps in local financing where NDBs may not participate.

Illustrating the Many Ways to Establish a GIB

Existing GIBs have been established in a number of different ways. The UK, Australia and Japan GIBs were created as new entities. The Connecticut GIB was created by fully repurposing existing programs into an existing entity. The Malaysia and New York GIBs were created as divisions or subsidiaries of existing entities. There is no one right approach – it depends on local context.

LEGISLATIVE APPROACH

The Australian Clean Energy Finance Corporation (CEFC) was created by legislative action. The CEFC Act 2012 was passed by the Australian parliament to both create the Corporation (as a Commonwealth Authority) and to fund the CEFC. The Act also established the CEFC Special Account to fund the CEFC, which would receive a special statutory appropriation of AU\$2 billion per year for five years.

REGULATORY AND ADMINISTRATIVE APPROACH

New York chose to create its Green Bank through a combination of administrative action and regulatory rulings. It was determined that a GIB could be created without legislation, because the existing state energy office, the New York State Energy Research and Development Authority (NYSERDA), had the authority to create and operate a finance entity. Thus, NY Green Bank was established as a distinct division under NYSERDA without any legislative action. The initial funding source for NY Green Bank was a reallocated pool of ratepayer funds already being regularly collected to support rebate programs. Because these were ratepayer dollars, the state sought approval by the Public Service Commission, which regulates public funds, to redirect a portion of those funds to the GIB. This approval was granted, and NY Green Bank will receive US\$1 billion over the next decade, from this source as well as from Regional Greenhouse Gas Initiative (RGGI funds) and, beginning in 2017, as a part of the state's Clean Energy Fund.

REPURPOSE/CONSOLIDATION APPROACH

The Connecticut Green Bank was formed by fully repurposing an existing quasi-public entity, the Connecticut Clean Energy Fund (CCEF). The CCEF played a dual role as a subsidy provider and investor in cleantech businesses in Connecticut. Through the legislation that formed the Green Bank, the CCEF was fully reincorporated with a new mandate, a new board and a new operating method as a project finance provider. However, the law stipulated that the new Green Bank had to operate a few legacy programs. This included the existing residential solar subsidy program. The Green Bank was tasked with ramping down the subsidy while increasing the availability of financing.



INTERNATIONAL SOURCES OF PUBLIC FUNDING: CLIMATE FINANCE

International sources of climate finance may be by far the most relevant source (outside of domestic budgets) to capitalized and seed a new GIB.³⁰ The role of climate finance in the context of the UNFCCC and the Paris Agreement is central to the goals of limiting warming to 2°C and building resilience and adapting to climate change. These goals are achieved through countries' Nationally Determined Contributions, which are meant to outline how emissions reductions and adaptation needs will be met.

The sources of climate finance in this context are critical to helping countries achieve these objectives and will require these funds to be leveraged with private capital to meet financing requirements. These funds are meant to have a critical role in financing the following activities to support climate-related investments in developing and emerging economies:³¹

- Developing an enabling environment and building capacity in local markets, laying the groundwork for scaling up LCR investment;
- Supporting the development of financial instruments that can help fill market gaps, particularly those that help mitigate or share risks;
- Co-financing projects and investments that meet UNFCCC and Paris objectives;
- Supporting and building capacity at local commercial and development banks, including deepening local capital markets;
- Financing infrastructure adaptation investments;
- Supporting the development of low-carbon technology, where these types of funds may be needed; and
- Strengthening monitoring of outcomes.

These sources of funds are - by their nature - concessional. They are meant to fund projects that aren't currently happening because they present a higher level of risk (perceived, real or both) than private capital will bear. These funds are designed to be more patient, be used to underpin and credit enhance investments, and in doing so play a catalytic role supporting climate objectives - both mitigation and adaptation. Both because of the objectives they seek to achieve and because of their concessional nature, the "function" of international sources of climate finance would be aligned with the capitalization needs of a GIB.

There are almost 100 individual climate finance funds. The Climate Fund Inventory (CFI) database of the OECD lists 99 bilateral and multilateral public climate funds existing to support countries with their climate change mitigation and adaptation actions, as well as with readiness activities. These climate-dedicated funds target different fields of activities (e.g., adaptation, mitigation, capacity-building), sectors and regions, and they enable support via different financing mechanisms.³² Three of the more well-known multilateral and multi-focus climate funds are:

GREEN CLIMATE FUND (GCF)

A multi-focal fund established in 2010, currently capitalized at more than US\$10 billion, this fund will channel funds through accredited intermediaries to projects in developing and emerging economies.

THE GLOBAL ENVIRONMENT FACILITY (GEF)

The GEF comprises a number of sub-funds, including the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), and the GEF's main trust fund. It is also operated through intermediaries that finance projects that meet its objectives.

THE CLIMATE INVESTMENT FUNDS (CIFs)

The CIFs are comprised of four funds: the Clean Technology Fund, the Pilot Program on Climate Resilience, the Small Renewable Energy Program and the Forest Investment Program. The CIFs are channeled primarily through the multilateral development banks and have US\$8.3 billion in funding.

Each of these funds has within its mandate and funding priorities the ability to support and capitalize national level GIBs or GIB-like entities. Both the GEF and the CIFs have provided funding to support local financial institutions in developing and emerging economies in their efforts to scale up climate-related investments, including clean energy and energy efficiency. While the GCF is in the early days of investing, it too can provide capital that can be useful in the creation of a GIB entity. Furthermore, each of these funds allow its intermediaries to use its capital to on-lend, provide guarantees and risk sharing mechanisms, and in some cases provide patient equity capital. In doing so, their funds play a key role in risk sharing and mitigation for other sources of capital, including private investors and development finance. Using any of these funds to initially capitalize a domestic or local GIB (alongside additional funding from an intermediary) would also support the national enabling environment, capacity building and deployment of investments that are tailored to the local context and needs.

INSTITUTIONAL INVESTORS, PENSION FUNDS, OTHER PRIVATE INVESTORS AND CAPITAL MARKETS

It may be possible for a GIB to access private sources of capital to fund its operations and activities. However, in almost all circumstances, these sources will require risk-adjusted and market-based returns for their investments.

The dual mandate of the GIB to achieve development goals and leverage other sources of private capital into projects means that any constraints that funders provide for their capital – including expected hurdle rates, return expectations or requirements – will by default impact the investment decisions that the GIB will make. The decision to source funding from private capital should take into account the ways the return requirements of that capital will impact the GIB’s ability to fill financing gaps in the market and achieve overall development impact.

That said, GIBs that issue “green bonds” as a refinancing tool for bank loans once projects and portfolios have an operating track record can help lower overall costs of LCR capital intensive projects. In

issuing bonds in this way, GIBs can free up capital that can be recycled into other or earlier-stage projects in the pipeline. GIBs such as the Connecticut Green Bank have successfully executed this strategy. The

necessary conditions may include (i) having sufficient portfolio size to attract bond investors, (ii) having sufficient credit or public capital to allow the GIB to leverage government guarantees or other obligations (thereby reducing the risk to bondholders), and (iii) meeting market requirements for issuing green bonds, for example, as put forward by the Green Bonds Principles and Climate Bonds Initiative.

Lessons of Unintended Consequences: Why the Source of Capitalization Matters

It is not uncommon for any source of funds – public, private, those from development finance sources or even philanthropic – to come with conditions. For GIBs or GIB-like entities, sources of funds have come from a variety of places, including utility surcharges, carbon tax revenue, aid or general public budgets. Typical conditions of these funds have incorporated the desired impacts and the public purposes policy makers wished to achieve, and these have translated into goals for the GIB institutions, such as clean energy investments, sustainability objectives or even private sector leverage.

Over the last decade or more, many public sources of funds have been used in GIBs and GIB-like entities for the purposes of providing “non-grant” investments, leveraging public dollars, having an impact on the direction of private financing flowing into investments, and minimizing subsidies overall to the greatest extent possible (as grant based programs are effectively pure subsidies). However, in the course of broadening the use of public capital beyond grants, some funders have incorporated restrictions on the instruments, terms or structures the funds may take when invested into projects.

Restrictions on the types of instruments that can be provided in the market, setting specific return requirements (even if patient), tenors and other conditions on the funds used to capitalize a GIB can have unintended consequences, and may limit the ability of the GIB to fill market needs at the project level or play a truly catalytic role in promoting private investment.

A photograph of several large, white offshore wind turbines standing in a row in the ocean. The sky is a clear, light blue, and the water is a deep blue with gentle ripples. The turbines are viewed from a low angle, making them appear tall and imposing. The text is overlaid on the left side of the image.

Chapter 4

Products and Tools to Fill Underserved Markets

Because GIBs are often driven by policy directives, they have the potential to play a key role in mitigating risks and enabling transactions that may not have otherwise happened, and they can focus their funding on market gaps for local investment that private investors and lenders are not currently addressing. These market gaps often exist downstream, at the project level, where availability of capital for particular LCR technologies in small countries or subnational regions is scarce or limited. GIBs can also facilitate access to financing upstream, by being a conduit for institutional investors, particularly once a portfolio of investments is available and can be aggregated.

In this way, GIBs can fill a financial ecosystem “gap” by serving as a locus of capital, risk mitigation, local market expertise, and deal origination for foreign investors who may not otherwise have the know-how or comfort to enter the market. GIBs have the potential to sit at a key leverage point in the global climate and development finance system, where they can both attract capital from various sources and then package and deploy it to fill local needs.

As public or quasi-public institutions, GIBs also often have not only the ability but also the responsibility to respond to public policy priorities and government mandates in order to advance investment market development. Few countries have dedicated local financial institutions that serve as a hub in this way for LCR investment, bridging the gap between larger institutions and investors and smaller, local, tailored LCR investment and financial sector needs. In addition, GIBs may enjoy a greater level of credibility in local environments given their targeted mandate around LCR investment, their links with policy mandates around LCR, and the greater degree of country knowledge and “ownership.”

Furthermore, and as mentioned previously, GIBs often operate on a principle or requirement of “additionality,” with the explicit objective of exiting a market segment once private investment is flowing and GIB support is no longer needed. Many GIBs and institutions with similar functions around the world have already demonstrated this approach.

Like many financial institutions and banks, GIBs use a wide range of tools and approaches to both attract and deploy capital. Many of the techniques are already used in other forms of partnerships that blend public and private capital, and some are innovative approaches for scaling up LCR investment. The following section summarizes some of the financial instruments and tools that GIBs could deploy to address barriers and financing gaps. While the instruments are not exhaustive, the following are general approaches that GIBs have taken for deploying their capital.

Progress From Green Investment Banks

As of November 2016, the six founding members of the Green Bank Network (GBN) have closed transactions expected to mobilize over US\$22 billion for clean energy projects around the globe, putting them on pace to exceed their collective goal of US\$40 billion over five years announced in 2014. Green Banks are mobilizing as much as US\$8 in total investment for every one dollar of public capital invested in clean energy projects.

GBN members include: New York Green Bank, Connecticut Green Bank, the Australia Clean Energy Finance Corporation, the UK Green Investment Bank, Malaysia's Green Technology Corporation and Japan's Green Finance Organization. These GIBs are investing across the technology spectrum, including on and offshore wind power, solar power, energy efficiency, low-carbon vehicles, combined heat and power, LED street lighting, geothermal power and energy storage. They are financing at all scales – from multibillion dollar offshore wind farms to energy efficiency in low-income housing – and the green bank model is already succeeding at bringing in more private investment to clean energy projects.

In FY 2015-16 alone, the Australian Clean Energy Finance Corporation made 15 new investment commitments of AU\$837 million (US\$643 million), including projects with a total value of AU\$2.5 billion (US\$1.91 billion). The UK Green Investment Bank's Offshore Wind Fund is now the UK's largest renewable energy fund. Projects supported by Malaysia's Green Technology Corporation have led to the creation of over 4,200 jobs. The Connecticut Green Bank has mobilized just under US\$1 billion for energy efficiency and renewable energy systems since its formation in 2011 by creating several innovative structures to attract private capital to the residential and commercial-scale clean energy marketplace. Japan's Green Finance Organization is investing in projects that not only reduce emissions, but also stimulate local economies. NY Green Bank, the largest green bank in the United States, has made investments in New York supporting clean energy projects with a value of US\$953 million which are expected to reduce greenhouse gas emissions by up to 4.2 million metric tons, the equivalent to removing over 49,000 cars off the road for 19 years.

In its September 2016 Progress Report on Approaches to Mobilising Institutional Investment for Green Infrastructure, the OECD outlined the role of public funding as a “risk mitigant” or “transaction enabler” for institutional investors and found that existing GIBs are playing an important role. Of the transactions OECD reviewed, five GIBs, located in three countries (UK GIB, Australia CEFC, NY Green Bank, Connecticut Green Bank, Hawaii GEMS), were involved in [one quarter](#) of the deals. This is particularly notable given the relatively recent establishment of GIBs.

CO-INVESTMENT THROUGH DEBT AND EQUITY

Co-investment involves direct GIB investment in a LCR project alongside a private investor.

Co-investment can take multiple forms and can be provided as debt and equity, often at preferential terms. In addition, these instruments can have a variety of structures, terms and tenors depending on the needs of the project investment. A GIB may provide senior debt, subordinated debt, or equity in a project, filling a financing gap in order to enable other private lenders or equity to participate in the financing. GIB funding can take a longer tenor, take a differentiated pricing structure, be subordinated to senior lenders or be more patient than other equity participants, and through these structuring mechanisms, GIB participation helps to mitigate and share risks in the investment. The leverage achieved on these co-investments will vary and may depend on the precise product structure. Nearly all GIBs operating around the world provide this kind of financing.

RISK MITIGATION AND CREDIT ENHANCEMENTS

GIBs use a range of different credit enhancements with the goal of increasing private lending activity and/or improving the terms of private financing. GIBs accomplish this through multiple means, including loan loss reserves, loan guarantees and risk sharing mechanisms. This technique is often used to draw in local financial institutions that may be hesitant to enter a market due to perceived risks. A credit enhancement can either pull that capital into the market and/or encourage that lender to offer more favorable lending terms. Under a loan loss reserve structure, a GIB could put aside capital to cover a certain portion of a lender's losses, up to a certain lending threshold, dollar amount or percentage of each project's losses. A reserve can be in the first loss or second loss position in relation to the lender. This structure provides a lender assurance that some portion of potential losses would be shared with the GIB while addressing any moral hazard issues that may be present if the lender did not have sufficient "skin in the game" to adequately assess credit risks of underlying borrowers. These kinds of investments can achieve high leverage ratios, stimulating many dollars of private investment per public dollar invested.

UK GIB Offshore Wind Equity Investment Fund

The United Kingdom has significant natural offshore wind resources. However, traditional ways of funding offshore wind projects, including long-term investments from utilities and long-term bank financing, can lead to high costs of capital for developers. Attracting new capital and creating a liquid market for operating assets is crucial to the continued growth of the offshore wind sector and also helps to reduce the long-term cost of finance. New investors also allow the original developers to sell down their stakes and use the proceeds to finance new projects. To address this capital need, the UK GIB established the Offshore Wind Fund to invest in operating offshore wind farms in the UK. The GIB is a limited partner in the fund with a £200 equity investment. The objective of the Fund is to provide long-term institutional investors with the opportunity to invest in offshore wind farms in the UK and to help project developers use proceeds from refinancing to fund new projects. The fund has closed multiple investment rounds with private institutional investors most of whom had never invested previously, and it has invested in five projects to date.

Sources:

1. <http://www.greeninvestmentbank.com/news-and-insights/2014/uk-green-investment-bank-invests-240m-in-uk-offshore-wind-sector/>
2. <http://www.greeninvestmentbank.com/funds/offshore-wind-fund/>
3. <http://www.cityam.com/226385/green-investment-bank-says-it-has-raised-818m-for-offshore-wind-farms>

While GIBs are still nascent in developing and emerging economies, local GIBs could be a useful partner to facilitate credit enhancement within those economies at the local level with government support.

Credit enhancement approaches, including risk sharing mechanisms, would be useful not only in targeted local bank financing but also for many types of projects in those markets to access regional and international capital markets. Examples of projects that may benefit from credit enhancement that a GIB may provide include municipal and sub-national investment, aggregation funds and, in some cases, LCR infrastructure in developing and emerging economies.

Credit Enhancements by US Domestic GIBs

The Connecticut Green Bank uses credit enhancements in a number of products. For instance, it offers to cover losses beyond a certain level (known as “a second loss reserve”) to any lender in the state. In exchange, the private lenders make capital available at better rates for residential home energy upgrade loans, which can be used for renewables and efficiency. The bank also trains contractors on the value of the newly available loans and connects contractors to lenders so customers can easily be brought to a local lender to benefit. The NY Green Bank has also used credit enhancement to unlock more private investment. The NY Green Bank made a subordinated investment into a centralized warehouse of loan capital made available for residential efficiency loans. By “buying-in” with a credit enhancing investment, the NY Green Bank unlocked US\$100 million of loan capital for New York residents.

Similarly, a GIB could play a role in credit enhancing green bonds and use other strategies to build the green bond market.

Green bonds are a potential avenue for many projects in developing and emerging economies to access regional and international capital markets. GIBs can facilitate many types of credit enhancement for projects seeking to access those markets. For example, GIBs can play a role in credit enhancing a green bond issued to refinance up front development costs of LCR assets after the risky construction phase, serving as a bridge to the capital markets and facilitating recycling of capital, particularly where the project or market is still perceived as risky for international investors. Again, the additionality principle would be important, and any GIB playing this role

would need to ensure it wasn’t crowding out what the markets could achieve on their own. GIBs can also facilitate the issuance of a green bond through aggregation, either by credit enhancing other aggregation facilities or bundling their own loan books and/or creating the standardization necessary for this bundling in the first place. The Connecticut Green Bank did exactly this, selling a bundle of Commercial Property Assessed Clean Energy (PACE) building upgrade loans through a private placement bond issuance.³³ GIBs can also purchase green bonds. The Clean Energy Finance Corporation has been a cornerstone investor in multiple green bond issuances to create liquidity and demonstrate confidence in the Australian green bonds market.³⁴ GIBs can also play a role in promoting green infrastructure definitions for its investments that align with the requirements of green bond investors. For example, the UK Green Investment Bank published its Green Investment Handbook, which has been translated into multiple languages.³⁵

AGGREGATION, WAREHOUSING AND SECURITIZATION

A range of financial tools are often used by GIBs to overcome barriers that prevent financing from flowing to small and disaggregated projects, including small and medium-sized entities. For developing and emerging economies, this is perhaps the greatest underserved area.

Aggregation and warehousing solutions are critical GIB functions used to support financing for small, disaggregated projects (typical for LCR investments). Smaller projects may be less cost-effective for private lenders to underwrite or may be too individually varied. Transaction and appraisal costs are not insignificant, despite smaller investment sizes, and this is often a significant barrier to private investment in small and geographically dispersed projects. GIBs can play a key role in filling these standardization and aggregation needs, even aggregating the financing needs of small and medium-sized enterprises (SMEs) and thus serving as market-facing intermediaries for those enterprises to access much needed debt and working capital. For instance, in some markets, private capital may be readily available to support domestic utility-scale infrastructure, and the additionality of GIB financing for these investments may be questionable. But distributed, rural or off-grid generation may suffer from a lack of capital or a lack of aggregation mechanisms in the market to finance at the smaller scale. Similar gaps in available financing may exist for resilience measures at the urban or national level due to perceived risks by private investors (due in part to information asymmetries), and investments to support building-in local resilience may be unavailable.

US GIBs Play Key Role in Risk Mitigation in Local Markets

NY GREEN BANK RISK MITIGATION AS PART OF A LARGER WAREHOUSING PLAY

The NY Green Bank participated in an innovative investment platform that combines multiple structures in order to increase investment in residential efficiency. A number of organizations in the United States partnered to form the Warehouse for Energy Efficiency Lending (WHEEL). WHEEL is a pool of capital, provided by Citibank, made available to any state that provides a credit enhancing investment into the warehouse. Through a risk mitigating investment into WHEEL, Citi, and its downstream partners make capital available through a contractor network for residential home upgrades in that state. NY Green Bank made a US\$20 million subordinated investment into WHEEL to unlock US\$100 million of loan capital for New York residents.

Source:

<https://greenbank.ny.gov/-/media/greenbanknew/files/Residential-Energy-Efficiency-October-2015.pdf>

CONNECTICUT GREEN BANK RISK MITIGATION TO ENABLE MORE RETAIL LENDING

The Connecticut Green Bank uses credit enhancements in a number of products. One of its main products is called the “Smart-E Loan,” which is a second loss reserve standard offer made available to any lender in the state. In exchange, the private lenders make capital available at better rates for residential home energy upgrade loans, which can be used for renewables and efficiency. Capital is available at lower rates and longer terms, to make deeper multi-measure upgrades cash-flow positive.

Source:

<http://www.energizect.com/your-home/solutions-list/smart-e>

In addition, GIBs can serve the role of intermediary to identify, vet and aggregate (whether in investment products or simply as a clearinghouse) for other investors. Endowed with the authority to prescribe a standardized approach, including a common documentation platform and consistent initial (audit) measurement of baselines, project ROI evaluation methodologies and measurement and verification of projected results, GIBs can bundle together small, dissimilar, difficult-to-evaluate and/or dispersed loans to diversify risk and achieve scale, thereby making the projects far more attractive to regional and international funders. A GIB can accomplish this by underwriting loans directly and warehousing them (i.e., vetting them and either keeping them as on-balance sheet investments or simply aggregating as an intermediary for other investors) until scale is reached.

GIBs can also play a key role in securitizing a portfolio of assets. A GIB can assume the role of off-taker for an origination partner and sell the portfolio of assets to private investors. This can be done either through a private placement of the loan book, a private securitization or a public

securitization. If the GIB is able to sell its entire stake in the portfolio of loans, then 100% of public dollars are replaced with private capital. This technique can be useful for providing small clean energy projects to access low-cost capital from publicly traded debt markets tapped through securitization.

Lien-Based Financing for Commercial Properties (Innovation)

In many nations, commercial buildings consume a significant amount of energy, yet they can often be the most difficult to upgrade for efficiency. Small and medium businesses typically aren't credit rated, making it difficult for private banks to underwrite and assess the quality of credit. This makes financing for clean energy upgrades notoriously difficult to find for this sector. Both the Connecticut Green Bank and Australia's Clean Energy Finance Corporation have attacked this problem with an innovative property tax-based financing structure. A building owner is provided capital for an energy upgrade (efficiency or renewables) and the repayment for that financing is attached to the building itself in the form of a property tax lien, or assessment senior to the building's mortgage and subject to the prior approval of the mortgage lender (justified by the asset value increase due to the energy upgrades). This creates a highly-secured repayment mechanism, which would otherwise be difficult to achieve. This structure has other benefits, including the fact that the financing stays with the property if it is sold to a new owner. The Connecticut Green Bank took this structure one step further, aggregating the property-assessed loans and selling them through a private securitization.

Source:

<http://greenbanknetwork.org/lien-based-commercial-energy-efficiency-financing/>

OTHER INNOVATIVE TECHNIQUES

GIBs in some markets have played an innovative role through subordinated, lien-based or tax credit financing as a way to meet market needs. For instance, the UK Green Investment Bank created an investment fund for offshore wind after finding that there was a need for increased liquidity in the market so that investors could recapitalize and build new wind projects. The Connecticut Green Bank and Australia Clean Energy Finance Corporation both use lien-based financing, by which a loan for an energy upgrade on a building is repaid through a lien or tax placed on the property.



This innovative structure increases security for the lender and also allows the benefits and repayments for an energy upgrade to pass from one building owner to the next as needed. This approach also allows for longer loan terms, which is critical for building efficiency projects.

One particular niche form of GIB, an energy efficiency revolving loan fund, often uses tools of aggregation and warehousing to underwrite investment in public goods. GIBs can play an important role in developing energy efficiency revolving funds for efficiency upgrades, addressing market, institutional or other barriers preventing large amounts of capital flowing into these market segments.

There is significant potential for GIBs in developing and emerging economies to help address foreign exchange risk, which in some markets can add substantial cost to the capital for a project, particularly those seeking international sources of financing.³⁶ This is a particularly acute problem in developing and emerging economies and is considered one of the biggest barriers preventing international investment from flowing into developing and emerging economies. With the right capitalization and mandate, GIBs can provide lower-cost hedging products or credit enhancements to lower that cost brought on from foreign exchange risk.





Chapter 5

How the GIB Model Can Play a Role in Scaling Up Climate Finance in Developing and Emerging Economies

Recognition is growing among climate change policymakers, governments and financiers that new financial tools are needed to deploy and accelerate climate finance flows – particularly in developing and emerging economies. While market failures and barriers vary across markets, for project investing in LCR, existing institutions may continue to have a low level of familiarity with technologies, difficulty assessing technology or credit risk, and low appetite to support new or innovative business models, particularly those that address climate change.

Given these issues, the GIB model may be a useful approach for countries to consider, particularly because of their focus on acting at the local and transactional level, where (i) investment decisions are made after all policies and barriers have been taken into account, and (ii) local knowledge is required regarding risk appetite and perceptions among local banks and investors.

In this way, GIBs would be playing a functional role to fill a gap that exists between policy making at a higher level and localized investment decisions and projects, thus filling a gap in the financial ecosystem at the local level. They can act as a conduit for both upstream financiers (e.g. international sources of funding, international investors) and downstream financiers (e.g. local banks, local or regional investment funds, national or regional development banks), complementing existing actors in the financial ecosystem. This model also complements the global goals outlined in the Paris Agreement, including the need to mobilize finance. Furthermore, GIBs have the potential to work in concert with (i) a country's strategic priorities on climate change (as outlined in its NDC), (ii) national, bilateral and international sources of development finance, and (iii) official sources of climate finance.

There are three key ways the GIB model can play a role in scaling up climate finance in developing and emerging economies. It can:

- Help countries achieve climate goals articulated within their NDCs;
- Be a locus of financial innovation to meet local market needs; and
- Be a critical partner for international sources of climate finance and DFIs



ACHIEVING CLIMATE CHANGE GOALS ARTICULATED WITHIN NDCs

GIBs can be important actors in helping countries achieve their climate change goals, as outlined in their Nationally Determined Contributions (NDCs). NDCs are the blueprint or roadmap enshrined in the Paris Agreement for climate investment priorities established by governments for their own countries. Transforming NDCs into pipelines of bankable projects – both large and small – will take a coordinated effort among policy makers and financial institutions.

GIBs can play four critical roles in financing projects that are part of a country’s NDCs. First, GIBs can bolster bankability by sharing and mitigating risks and creating financing mechanisms and products for local developers and end users. Second, GIBs can incentivize investments to incorporate standards, metrics and other methodologies, which can help track progress towards a country’s NDCs and international climate goals. Third, GIB investments can provide critical demonstration effects, showing market participants and other stakeholders that LCR investments are technically and economically viable. And finally, GIBs can be a useful conduit for building local capacity while also quickly incorporating market information that can inform a country’s climate and business enabling policies.³⁷

GIBs can also be a part of the NDCs strategy a country may have for financing LCR investments. Many countries are already considering establishing GIBs – by creating new institutions, transforming existing institutions or consolidating existing programs. In the context of the NDCs strategy, the goal of establishing a dedicated, specialized financial vehicle can signal to the international community a recognition that a GIB may be important in the execution and delivery of their climate commitments. Establishing a GIB can also bring additional benefits that can contribute to a country’s overall climate strategy, such as creating and building local financing capacity and know-how, establishing standards and metrics for LCR investments and contributing (through demonstration and partnership) to the overall mainstreaming and “greening finance” efforts for a country’s financial system.

GIBs CAN BE A LOCUS OF CLIMATE FINANCE INNOVATION

GIBs are well placed to innovate, pilot and demonstrate new climate finance tools to address local need. GIBs can both develop new tools themselves or be a location where innovative financing approaches can be tested, implemented and potentially scaled up for local markets.

There are several global and international initiatives that seek to develop innovative financing approaches that can address gaps in financial structure through new products and tools and can contribute to scaling up financing for climate-related and LCR investments. Over the last two years, the Global Innovation Lab for Climate Finance and Financing for Resilient Investment (FiRe) have been successful in crowd-sourcing ideas from a variety of financial institutions, investors and developers around the world.³⁸ In some circumstances, innovative financing tools that have been proposed or are under development could be tested, implemented and potentially scaled by local GIBs. Examples of some of the ideas potentially suitable to be implemented by a local GIB are profiled below.

CASE STUDIES

CURRENCY HEDGING RISK MITIGATION FACILITY FOR LOCAL CURRENCY-DENOMINATED LCR INVESTMENT

In December 2015, at COP21, the German Environment Ministry announced it would provide €30 million through KfW Development Bank to the hedging specialist TCX, which is, along with IFC, an implementing entity for the Global Innovation Lab for Climate Finance's new Long-Term FX Risk Management Instrument. TCX will start using these funds in 2016 to promote renewable energy and energy efficiency investments in Sustainable Energy for All (SE4All) projects in Sub-Saharan Africa with innovative hedging instruments.³⁹

International debt finance is usually sourced in international hard currencies but projects' revenues are usually in the local currency. This means that in the case that the local currency loses value, the borrower risks not being able to pay back their foreign-denominated debt. Often, there are not sufficient hedges available. When hedges are available, the risk premium attached may eliminate the lower interest costs associated with the hard currency borrower. Renewable energy investments' long timeframes mean it is not unusual for the value of a currency to change by 50% over the life of an investment. The Long-Term FX Risk Management Instrument seeks to engage in currency hedging to reduce currency risk for projects in developing countries with high currency and interest rate risk. The concept has great potential, and GIBs can play a complementary role in helping to facilitate and enable transactions using this tool at the local level. The India Innovation Lab for Green Finance, has released a similar hedging product designed for the Indian market. GIBs can play a role in testing and scaling up such instruments. [Learn more about the idea here.](#)

ENERGY SAVINGS INSURANCE

Investing in an energy efficiency upgrades with a longer payback period requires both the technical expertise to assess the potential of such a project and the confidence that it will deliver the expected energy savings. It is uncommon for SMEs or local banks to have this capacity, leading to a lack of investment in the energy efficiency market. Energy savings insurance mitigates the risk of a consumer suffering losses due to less than expected energy savings by helping SMEs with loan repayment if the project underperforms. Analysis by the Global Innovation Lab for Climate Finance indicates that energy savings insurance can absorb up to 80% of this underperformance risk. Because energy efficiency underperformance is a perceived risk which often exceeds actual risk, an "energy savings insurance" product has the potential to be offered cheaply and profitably by insurance entities which could insure energy efficiency loans made by local banks to local businesses. Energy savings insurance has such great potential to spur energy efficiency markets, and this year IDB is expected to establish a regional Energy Savings Insurance Facility to pilot the tool in additional Latin American and Caribbean countries and sectors. Energy insurance instruments are being considered in several regions outside of Latin America, including in India.⁴⁰ The Global Innovation Lab for Climate Finance estimates that if replicated on a global scale, energy savings insurance could drive US\$10-100 billion in investment and emissions abatement of 27-234 MtCO₂ annually by 2030.⁴¹ GIBs can play a role at the local level in complementing this product with local lending and investment in energy efficiency, including promoting market uptake and bringing technical expertise. [Learn more about the idea here.](#)

BOTTOM-OF-THE PYRAMID (BOP) SOLAR ENERGY ACCESS INVESTMENTS

In August 2016, the Green Climate Fund (GCF) agreed to provide US\$25 million in equity capital and grants for the Acumen Fund (a private sector accredited entity) to create the KawiSafi Ventures Fund. Through KawiSafi, Acumen will invest in companies along the off-grid solar power value chain to further strengthen the sector, helping it to expand its reach to low-income consumers in East Africa. Building out the energy infrastructure in this clean way contributes not only to meeting the objectives of the UNFCCC, but also to the Sustainable Development Goal of sustainable energy for all.⁴²

In a private equity play, KawiSafi will seek to invest in 10 to 15 companies that use the innovative business models in the off-grid energy solutions space to scale up deployment of solar technologies, such as solar lanterns, solar home systems and solar minigrids. KawiSafi will also deploy working capital facilities, consumer financing vehicles and technologies that further enable the use of mobile payment and remote monitoring by off-grid energy providers.⁴³ The for-profit business model is novel in targeting a 6-to-1 leveraging ratio of private capital and attractive returns while addressing energy access, climate change and human objectives.⁴⁴ If successful, this approach could be widely replicated in other developing countries to crowd in private capital to promote access to energy services, displace fossil fuels and unsustainably harvested biomass fuels, improve air quality and human health, and reduce greenhouse gas emissions. In countries where these types of funds exist, GIBs would be well-situated to complement these funds and provide valuable co-financing at the local level (possibly in local currency) to the same investments that KawiSafi would target. [Learn more about the idea here.](#)

GLOBAL RENEWABLE INDEPENDENT POWER SUPPLIER (GRIPS)

The Global Renewable Independent Power Supplier (GRIPS) concept provides a model for reliable, clean energy outside of public grids, and may be useful in developing and emerging economies where grid power may be unavailable, limited or unreliable, or result in dependences on diesel generators for reliable electricity.⁴⁵ GRIPS finances and operates grid-independent, hybrid power plants (generally smaller than utility scale but larger than micro scale) and sells the energy to commercial and industrial energy consumers. Its customers access clean energy on a pay-per-use basis without any capital expenditure, and GRIPS aggregates the projects into an investable portfolio.⁴⁶ Because it fills a geographic and market niche (mid- and small-sized renewable energy projects) where renewable energy providers are few and capital is scarce, the GRIPS is a model well-tailored to GIBs. GIBs can mobilize capital that is provided by investors rather than power consumers under the GRIPS model, and match funders, project developers, and power off-takers. [Learn more about the idea here.](#)

GIBs CAN BE A KEY PARTNER FOR INTERNATIONAL CLIMATE FINANCE AND DFIs

As mentioned previously, GIBs have the potential to complement international development finance sources (such as DFIs, MDBs and others) and play a role in facilitating the deployment of international climate finance, thus filling a gap in the financial ecosystem. While multilateral and national bilateral development institutions and government agencies collectively account for nearly US\$150 billion in annual climate finance flows,⁴⁷ finance is still not available for many underserved segments of the climate finance arena: adaptation and resilience, energy efficiency, smaller-scale projects and other under-resourced LCR projects, especially in least developed countries.

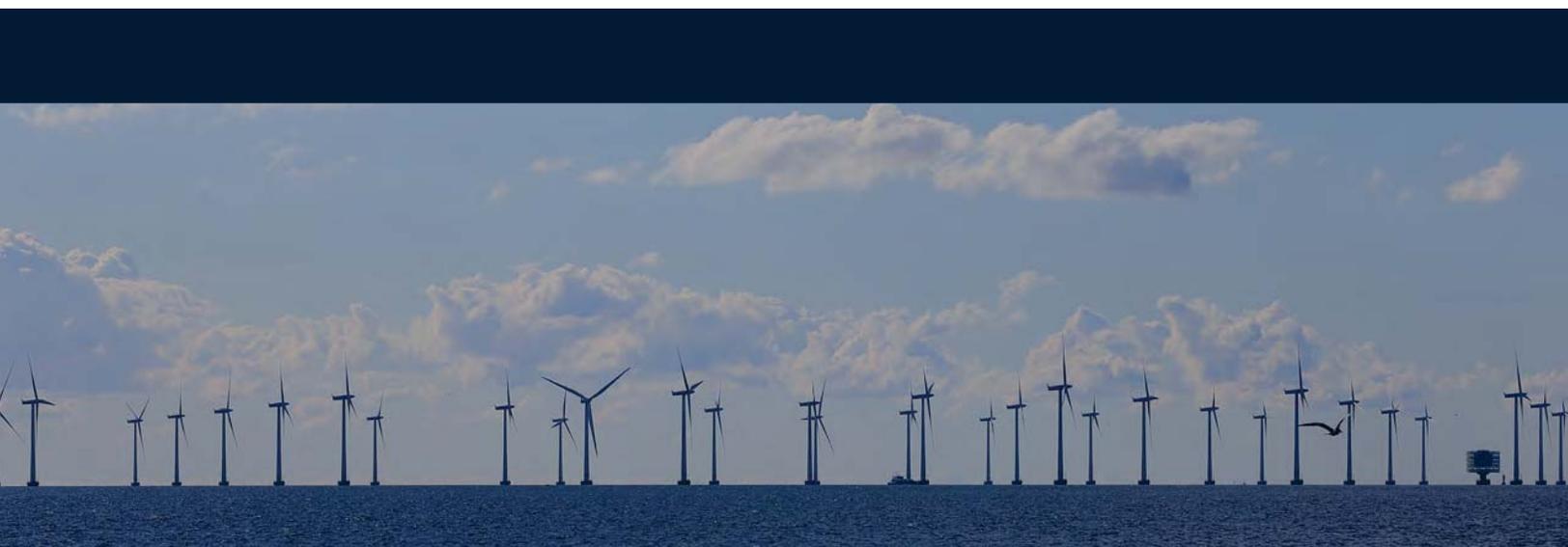
The benefit of establishing domestic, LCR infrastructure-focused GIBs in developing and emerging economies can further leverage DFIs and climate finance entities by playing a key role at the local level. GIBs can complement many existing bilateral and multilateral development finance institutions by addressing various market-related, economic and financial barriers, which result in insufficient financing for LCR investments. As highlighted by OECD in their paper, Policy Perspectives: Green Investment Banks, GIBs “may be able to work alongside multilateral development banks and other sources of public climate finance to de-risk LCR infrastructure projects to enable private investment capital to flow.”⁴⁸

In addition, funding from DFIs can be used alongside climate finance and domestic sources to facilitate the capitalization of GIBs and provide a unique partner within the local financial sector. If designed strategically, these GIBs can help ensure finance is made available and used in market-responsive ways that attract maximum private capital at the local level, especially for climate and Sustainable Development Goal-related investments that reach underserved segments or where access to capital continues to prove challenging. GIBs can fill this more niche role while partnering with DFIs and climate financiers on capitalization, coordination of global donor activities and shaping the policy framework.

GIBs also can serve to effectively align international climate finance capital with local public resources. Due to their unique objectives, those funds tagged as “climate finance” – including the Green Climate Fund, the GEF and others – could be important sources to capitalize domestic GIBs in developing and emerging economies and to accelerate their achievement of scale and impact.⁴⁹ For these economies, GIBs can be a unique link between country-driven climate objectives and international climate policy. In this role, they can facilitate (i) the acceleration of direct, local LCR investments; (ii) the crowding in of private capital from local and international sources by mitigating perceived and real risks in the market; (iii) the development of in-country capacity by becoming part of the local financial system; and (iv) can inform the development and evolution of the broader LCR investment enabling environment.

In addition to providing initial capitalization for the establishment of a GIB in developing and emerging economies, international climate funds could provide additional technical assistance or capacity-building grants. As mentioned previously, these types of funds will be important to address other barriers in the markets, including capacity building, standardizing approached to financing certain technologies (e.g. standardized contracts), knowledge sharing, and other efforts which can reduce market barriers and perceived risks. These funds may be of high value for the initial stages while the GIB is being established, gaining its legal status or equivalent mandate to operate, and staffing up with qualified investment professionals.

With funding made available through international climate funds, GIBs could be better positioned to take the important strategic lead as domestic, specialized LCR finance vehicles. Perhaps even more importantly, these institutions can play a key role as information hubs and can provide capacity-building and technical assistance to both local financial and project development partners. These roles are critical to catalyzing and scaling up clean energy and resilient infrastructure investments in developing and emerging economies, especially among small and medium enterprises and at the municipal or local level, and they would better position a GIB to be a domestic locus of climate financial innovation. Furthermore, both the financial proposition and the complementary knowledge sharing, technical assistance and capacity building will reinforce overall market transformation efforts.





Endnotes

1. The IPCC is an inter-governmental body under the auspices of the United Nations that is dedicated to providing policymakers and the public with scientific analyses of the impacts from climate change. The IPCC's Synthesis Report of its Fifth Assessment Report (AR5) can be accessed at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf
2. Some examples of building in resilience today to reduce climate risks in the future include: resilient infrastructure, housing and transportation systems; or they may mean other physical efforts like sea walls and grid hardening, social programs like early warning systems, reforms to public programs like flood insurance, and in some areas, relocation of entire communities.
3. Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC). "Historical Agreement on HFCs reached in Kigali." October 15, 2016. <http://www.ccacoalition.org/en/news/historical-agreement-hfcs-reached-kigali>
4. Prior climate agreements, such as the establishment of the UNFCCC itself and the Kyoto Protocol, only established aspirational global targets, or established national targets in only some countries and without commitments to action.
5. Looking ahead, one key issue will be making sure that short-term contributions and commitments are compatible - or at least not incompatible - with longer-term targets for peaking emissions, shifting investments from brown to green, and making finance flows consistent with these overall goals.
6. A full list of INDCs as communicated by Parties is published on the UNFCCC website: <http://www4.unfccc.int/Submissions/INDC/Submission%20Pages/submissions.aspx>
7. https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf, p. 7.
8. The decoupling of economic growth from emissions is significant, and promising. The potential for developing and emerging economies to continue to grow without necessarily increasing emissions is promising, yet will require increased investment in efficiency, new technologies and other measures. See: <https://www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html>
9. NOAA's Annual Greenhouse Gas Index (AGGI) is a measure of the warming influence of long-lived trace gases and how that influence is changing each year. These observations are based on data and measurements collected from more than 80 sites in NOAA's global air sampling network. More information about the AGGI and its recent results can be accessed at: <http://www.esrl.noaa.gov/gmd/aggi/aggi.html>
10. IEA World Energy Outlook Special Briefing for COP21, p.4. http://www.worldenergyoutlook.org/media/news/WEQ2015_COP21Briefing.pdf
11. IEA 2015 World Energy Outlook, p.40. <https://www.iea.org/publications/freepublications/publication/WEQ2015SpecialReportonEnergyandClimateChange.pdf>
12. See G20 Finance Synthesis Report: http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf
13. Dana Nuccitelli, The Guardian, August 15, 2016. "Climate urgency: we've locked in more global warming than people realize." <https://www.theguardian.com/environment/climate-consensus-97-per-cent/2016/aug/15/climate-urgency-weve-locked-in-more-global-warming-than-people-realize>



Endnotes

14. The Climate Policy Initiative (CPI), OECD/DAC and others track finance flowing toward climate-smart investment, both mitigation and adaptation. Recent CPI estimates indicate that at least US\$391 billion was invested toward these efforts in 2014.
15. The Global Commission on Climate and the Economy, New Climate Economy Report 2016: The Sustainable Infrastructure Imperative. See: <http://newclimateeconomy.report/>
16. Mark Carney, Governor of the Bank of England, raised the need to mainstream green finance and to reach “escape velocity” for the transformation to occur. See: <http://www.bankofengland.co.uk/publications/Documents/speeches/2016/speech923.pdf>
17. See: <https://www.ifc.org/wps/wcm/connect/5f53054c-d88a-4700-9d16-69a552a4ec6c/Note-14-EMCompass-How-to-Make-Infrastructure-Climate-Resilient.pdf?MOD=AJPERES>
18. Green Investment Banks have proven to be effective public-private approaches to catalyze and “crowd-in” private finance in local contexts; In international development finance, many institutions’ blended finance approaches have been effective at demonstrating the ability to catalyze and “crowd-in” private finance into developing countries.
19. “Low carbon, climate-resilient investment” encompasses investments that address climate change adaptation needs, as well as those that mitigate emissions. Often the term is used to refer to infrastructure, as well as investments that help countries transition and meet commitments that support warming below 2 degrees Celsius. OECD (2016), Green Investment Banks: Scaling up Private Investment in Low-carbon, Climate-resilient Infrastructure, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264245129-en>
20. As of December 2015, the OECD identified 13 GIB and GIB-like institutions. See: OECD, Green Investment Banks, Policy Perspectives, December 2015. <https://www.oecd.org/environment/cc/Green-Investment-Banks-POLICY-PERSPECTIVES-web.pdf>
21. OECD, Green Investment Banks, Policy Perspectives, December 2015. <https://www.oecd.org/environment/cc/Green-Investment-Banks-POLICY-PERSPECTIVES-web.pdf>
22. “Green Bank,” or “Green Investment Bank,” is a common term used to describe institutions that have a similar set of operating principles and objectives. Not all institutions that are characterized as Green Banks are actually named Green Banks. For instance, Australia’s national Green Bank is called the Clean Energy Finance Corporation. The UK institution is the Green Investment Bank. Japan’s is called the Green Finance Organization. In some markets, the term “green” is undesirable for practical or political reasons. And in some markets the term “bank” can pose its own challenges. What ultimately matters is the operating principles, powers and actions of the institution, not the name.
23. The Green Investment Bank approach is meant to catalyze the transformation of targeted investments towards commercial sustainability by proving the business case and reducing perceived risks such that private finance can ultimately support those investments without public support. Many activities envisioned by the SDGs may be suitable for a GIB approach, but some may require a greater level of public support and intervention.
24. CPI, “Global Landscape of Climate Finance 2015,” <http://climatepolicyinitiative.org/wp-content/uploads/2015/11/Global-Landscape-of-Climate-Finance-2015.pdf>
25. Almost all the Multilateral Development Banks, and many National Development Banks access international (and often concessional) climate funds and manage them with the specific purpose of catalyzing private investment to “fill the financing gap”, serving a similar function as a Green Investment Bank. These blended finance facilities have been instrumental in helping institutions scale up their climate financing over the last decade.



Endnotes

26. CPI, OECD and others track international climate finance flows – on a “commitment” basis, which does not necessarily give a realistic picture of level of financing that is disbursed on the ground for low-carbon, climate-resilient investment (LCR) projects. CPI’s Climate Finance Landscape reported at least US\$391 billion in climate finance flows in 2014. See: <http://www.climatefinancelandscape.org/>
27. All development finance institutions that seek to catalyze private investment are driven by a principle of “additionality” and development impact. This means investments made should seek to demonstrate the viability (both commercial and sustainable) of the investment and fill the financing “gap” that exists. Fundamental to this concept is that no other sources of available financing can play this role, and thus these funds meet the “additionality” test. In playing this role, development finance institutions – and GIBs – play a critical role in getting projects financed that wouldn’t be otherwise. Furthermore, many DFIs are required by shareholders to measure and track their performance along development metrics, including “private finance mobilized” and (relevant to clean energy investment) greenhouse gas reductions.
28. The OECD outlined five key characteristics of Green Investment Banks: narrow mandate, independence, additionality, cost-effectiveness and accountability. See: Green Investment Banks: Scaling up Private Investment in Low-carbon, Climate-resilient Infrastructure, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264245129-en>
This paper includes additional characteristics common among existing Green Investment Banks which also serve to distinguish them among other financial institutions.
29. The timing of capitalization is important. If a Green Bank is to be capitalized over a number of years from a secure revenue source such as a carbon tax, it can construct its portfolio to account for future capitalization or even securitize the future revenues, as was done in the state of the Hawaii with its GEMs (Green Energy Market Securitization) program. See: OECD (2016), Green Investment Banks: Scaling up Private Investment in Low-carbon, Climate-resilient Infrastructure, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264245129-en>
30. The definition of climate finance can be both broad and narrow, and there is no consensus on the term. Some include as part of the definition funding provided by private sources to projects that support climate objectives. Climate finance in this context refers to the funds provided by governments to meet their various commitments under the UNFCCC agreements, as well as bilateral aid funding that may be counted by host governments as part of their climate finance commitments. See Brookings paper: https://www.brookings.edu/wp-content/uploads/2016/09/global_20160919_climate_finance.pdf
31. Id. Pg. 22-28
32. The OECD undertook an inventory of bilateral and multilateral funds on behalf of the G20 and in response to the proliferation of climate funds established for and by countries. See: <http://www.oecd.org/g20/topics/energy-environment-green-growth/database-climate-fund-inventory.htm>
33. See: <http://ri-cpace.com/connecticut-green-bank-c-pace-unveils-manufacturer-multi-family-perks/>
34. “CEFC commits \$90m as cornerstone investor in Westpac’s first climate bond”, available at: <https://www.cleanenergyfinancecorp.com.au/7033.aspx>
35. The handbook is available at: <http://www.greeninvestmentbank.com/green-impact/green-investment-handbook/>
36. Currently, none of the existing Green Investment Banks play this role explicitly for international investors or sources of capital. Malaysia’s Green Technology Corporation and Japan’s Green Finance Organization do finance in local currency.



Endnotes

37. Climate Policy Observer. "INDC." Accessed October 13, 2016. <http://climateobserver.org/open-and-shut/indc/>
38. The Global Innovation Lab for Climate Finance, established in 2014 by Climate Policy Initiative (CPI), identifies, develops and pilots transformative climate finance instruments. It aims to drive billions of dollars of private investment into climate change mitigation and adaptation in developing countries. CPI also currently manages the Financing for Resilience Initiative (FiRe). See: <http://climatefinancelab.org/>
39. <http://climatefinancelab.org/press-release/germany-to-provide-e30mn-to-the-long-term-fx-risk-management-instrument-for-sub-saharan-africa-climate-investments/>
40. The Global Innovation Lab for Climate Finance. <http://greenfinancelab.in/press-release/energy-savings-insurance-instrument-moves-forward-india/>
41. The Global Innovation Lab for Climate Finance. "Energy Savings Insurance."
42. GCF. "Acumen and GCF sign agreement to implement its first approved project proposal, bringing household solar energy to East Africa." August 4, 2016. <http://www.greenclimate.fund/-/acumen-and-gcf-sign-agreement-to-implement-its-first-approved-project-proposal-bringing-household-solar-energy-to-east-africa>
43. GCF. "Consideration of funding proposals – Addendum Funding Proposal Summary for FP005." October 26, 2015. Document # GCF/B.11/04/Add.05/Rev.01**. http://www.greenclimate.fund/documents/20182/87610/GCF_B.11_04_ADD.05_REV.01_-_Funding_proposal_package_for_FP005.pdf/42195872-c071-4e14-9772-f10da01133bf
44. GCF funding proposal.
45. Finance for Resilience. "Global Renewable Independent Power Supplier (GRIPS)." Accessed October 20, 2016. <http://www.financeforresilience.com/priority/global-renewable-independent-power-supplier-grips/>
46. Voigt, Alexander. "Global Renewable Independent Power Supplier (GRIPS): Making It Happen – Reliable Energy Beyond Fossils and Public Grids" <http://www.financeforresilience.com/wp-content/uploads/2016/03/GRIPS-Pitch-Deck.pdf>
47. CPI, 2015.
48. OECD. "OECD Policy Perspectives: Green Investment Banks." December 2015. With support and input from Bloomberg Philanthropies. <https://www.oecd.org/environment/cc/Green-Investment-Banks-POLICY-PERSPECTIVES-web.pdf>
49. Climate finance has been a formal element of the UNFCCC effort to address climate change since the establishment of the Global Environment Facility, and later the Clean Development Mechanism under the Kyoto Protocol. According to the UNFCCC, climate finance is defined as "local, national or transnational financing, which may be drawn from public, private and alternative sources of financing" for both mitigation and adaptation. The commitment to climate finance was reaffirmed and expanded during UNFCCC meetings in Copenhagen (2009) and Cancun (2010) with the promise by developed countries to mobilize US\$100 billion (from both public and private sources) in annual climate finance for developing countries by 2020. See: http://unfccc.int/focus/climate_finance/items/7001.php