



Leading Asia's Financial Future - Hong Kong Green Investment Bank

Financial Services
Business Council (FSBC)
of the European Chamber of Commerce
in Hong Kong

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Foreword - Green Finance

The European Chamber of Commerce in Hong Kong and Macao launched its Financial Services Business Council in 2010 to serve as a platform for advocacy and networking and to protect and advance the interests of its members.

Members hail from the Banking, Asset Management and Insurance sectors. The Financial Services Business Council engages with market participants, regulatory authorities and other stakeholders on important issues concerning the financial services industry.

Over the last 12 months, the Financial Services Business Council has written and published four position papers and has hosted four events and seminars in which Financial Services Business Council members were able to discuss and debate their opinions and ideas. Led by its Chairperson Julia Charlton and Vice-Chair Ching Yng Choi since 2016, the Financial Services Business Council actively promotes bilateral and multilateral trade relations and active engagement between key industry players.

Using its unique European perspectives in order to further enable the development of European business activities in Hong Kong and Macau, the main objectives of the Financial Services Business Council include:

- Writing position papers and providing additional input to the Office of the European Union to Hong Kong and Macao for the formulation of EU bilateral policies and regulatory dialogue on financial issues with the Hong Kong and Macao respective governments, as well as providing feedback or propositions to the local authorities.
- Responding to consultation papers issued by the Hong Kong Securities and Futures Commission (SFC) and the Hong Kong Stock Exchange (HKEx).
- Developing research work on finance-related issues of concern in Hong Kong and Macao, such as green and environmental friendly finance opportunities.
- Identifying opportunities for emerging markets in the financial industry for Hong Kong and Europe.
- Organising industry events to facilitate the sharing of ideas and insights into the local markets in both Europe and Hong Kong and Macau.
- Providing a networking platform for the business community.

Initiated in 1997, the European Chamber of Commerce in Hong Kong (EuroCham) is a non-governmental business interest group. The EuroCham is a 'Chamber of Chambers' with its member-

ship comprising 15 European Chambers based in Hong Kong and one in Macau. The appointed representatives of these chambers make up the EuroCham board of directors.

The EuroCham's key objectives are:

- Providing a channel of communication within European chambers in Hong Kong and economic circles.
- Promoting commercial, industrial, financial, scientific and other economic exchanges between Hong Kong and the European Union.
- Identifying the problems that European companies may encounter in their life cycles within Hong Kong and the Mainland Chinese market.
- Hosting functions that allow members to discuss and network with Hong Kong and European officials.

Acknowledgements

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Executive Summary

To maintain its competitiveness as a global financial centre, Hong Kong must continuously adapt and identify potential for leadership in the emerging sectors of the financial services industry. Green finance is a rapidly advancing sector that capitalises on opportunities created by the increasing convergence of economic and environmental factors driving global growth. The establishment of a Hong Kong Green Investment Bank (GreenBank) would position Hong Kong in the forefront of this increasingly important area of finance in Asia.

- **Green finance will be a key driver of future competitiveness in the financial markets**

As low carbon businesses are enjoying rapid expansion globally, financial market competitiveness will be increasingly influenced by levels of expertise in green finance. Major capital markets, notably London, are establishing a strong position in this sector, while green finance is already a key policy focus in several important Asian countries, including China, Japan and Indonesia.

Hong Kong has a significant opportunity to build on its existing market strengths to establish a leading position in the central activity underpinning green finance: funding for low carbon and climate friendly infrastructure. Estimated annual spending requirements for green energy, transportation and urban development in Asia run into the trillions of dollars, while investment on the ground falls far short of this.

To meet this challenge, a number of governments around the world have created “green investment banks”, including in the UK, Australia and Japan, and several states in the US. These represent a new kind of government financial institution set up specifically to channel private finance into low carbon infrastructure (such as renewable energy, energy efficiency, water and waste management) and climate friendly construction. A green investment bank uses public funding to provide financing tools and market support that encourage commercial and private sector financing for green projects on acceptable terms.

- **Leadership through GreenBank**

While other global financial centres may have greater expertise in selected areas of green finance, GreenBank would directly leverage Hong Kong’s strong position in structuring and raising financing for infrastructure in Asia. Through HKEx and its banking, asset management and insurance sectors, Hong Kong has enormous experience and long established regional networks that underlie its clear leadership in this area.

- **Role of Hong Kong government in GreenBank**

As a quasi government entity, GreenBank would be backed by the financial resources and robust credit rating of the Hong Kong government, which would initially capitalise the bank. GreenBank would be operated separately from the government and its role would be to use its public funding only to the extent necessary to encourage private finance to participate in the projects it

sponsored. Rather than subsidising green infrastructure, GreenBank would structure projects on a commercial basis and seek to create liquid markets that can stand on their own. GreenBank would be expected to break even and over time to return a profit.

The use of government funds to move markets is not new in Hong Kong: Hong Kong Mortgage Corporation was set up to perform a similar function, for example. Hong Kong has also committed significant funds to platforms for financing infrastructure overseas, such as the World Bank and AIIB. Similar government involvement in GreenBank would support local projects and lead to direct benefits in Hong Kong itself.

- **GreenBank provides the vehicle for scaling up investment in low carbon infrastructure**

Investment in low carbon infrastructure tends to be constrained by concerns about new technology and project risks, and limited expertise of potential providers of finance with analysing and managing these risks, as well as a simple lack of awareness of the potential growth and profitability in these sectors.

GreenBank would serve as a centre of expertise in Hong Kong that would help to educate banks and investors about the opportunities in low carbon sectors and increase their capacity to exploit them. GreenBank could directly finance low carbon projects, or provide capital to other financial entities which would then deploy it in projects. It would offer a range of financial mechanisms to reduce the risk of green investments for private investors, such as coinvesting, insurance, loan loss guarantees and provision of subordinated debt or equity funding.

GreenBank would provide a central hub for information about green investments and a platform for companies and financial institutions to increase their competencies and develop low carbon business pipelines. It would also provide a centre for collaborating on projects with regional governments and global public and private financial institutions.

- **Operating in Hong Kong and across Asia**

GreenBank would operate both in Hong Kong and across the region. Opportunities to deploy renewable energy technologies locally may be limited, but there is a great deal of scope for improvements to energy efficiency, waste management and pollution control. In addition, GreenBank would also work with local businesses and financial institutions on projects around Asia, including funding for Belt and Road infrastructure, predicted to require US\$1.4 trillion of investment over the next five years.

- **Economic Benefits to Hong Kong**

GreenBank's involvement of the private sector in low carbon infrastructure would create a powerful "demonstration effect" – showing the market that these projects are viable. This would help to grow the pool of capital available to green businesses, increasing the number of projects that can be financed.

Expanding economic activity generated by GreenBank would create multiple benefits for Hong Kong companies. For the financial services sector, GreenBank would stimulate incremental business, fee income and return on investments, while sending a strong signal to the region about Hong Kong's ability to drive financial innovation in this area. Through working with GreenBank, local banks could develop new profitable business lines, while equity and bond markets could benefit from new listings of green bonds, asset backed securities or energy yieldcos.

GreenBank funded projects and technical support could help to create more business for Hong Kong technology, construction and supply chain companies, generating local jobs and spill over benefits. It could also provide Hong Kong companies with a competitive edge when bidding for projects overseas.

- **Social and Environmental Impact on Hong Kong**

GreenBank funded projects in Hong Kong could have a direct impact on Hong Kong's environment. Projects which improve the energy efficiency of buildings and industrial processes, for example, can achieve meaningful cost savings, which can be passed on to businesses and consumers, as well as having a positive impact on air quality, pollution levels and carbon emissions. Waste management and waste to energy investments could help to tackle Hong Kong's significant waste problems.

The operations of GreenBank would also create a positive reputational impact, confirming Hong Kong's efforts to support China's energy transition and positioning Hong Kong's financial market at the forefront of Asia's transition to a green economy.

A. Rationale - Asia's Future is Green

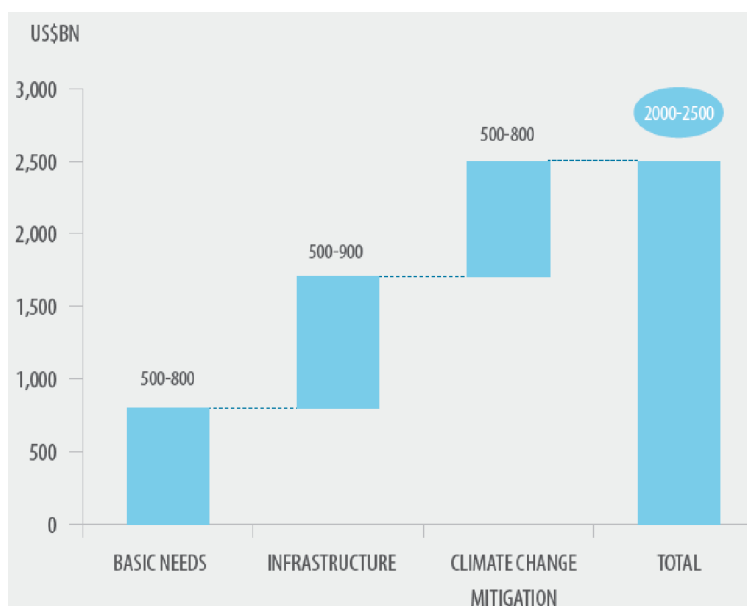
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Asian Economic Growth - Switching to Low Carbon Pathways

Over the past two decades, Asia has been the fastest developing region in the world. Many countries have achieved spectacular economic growth, which has delivered prosperity to many and led to significant industrial upgrades and rapid urbanisation.

However, 1.6 billion people are still living in poverty, with 800 million lacking access to electricity. The region faces a significant challenge to close infrastructure gaps and build cities that offer an improved quality of life. Moreover, as home to over half of the world's people, but much less than half of its natural resources, sustainable economic prosperity in Asia depends on being able to transition to cleaner and more efficient modes of development.

The United Nations (UN) predicts that investment of some US\$2.5 trillion a year until 2030 is needed for sustainable development in Asia: to upgrade basic services and infrastructure and to protect the environment, enhance energy efficiency and respond to climate change.¹



Source: United Nations Economic and Social Commission for Asia and the Pacific, 2014

Policy makers in Asia increasingly recognise that economic growth strategies that cause large scale environmental damage are unlikely to be viable over the long term. Regulatory and policy trends emphasise improved management of natural resources and heightened enforcement

of environmental standards. Many countries are gradually transitioning to “green growth”, by aligning economic strategy to respond to problems such as energy constraints, water availability and climate impacts.

At the same time, Asia is the fastest growing source of new greenhouse gas emissions and will need rapidly to decarbonise energy supplies and infrastructure in order to meet international commitments agreed during the global climate change negotiations.² Not only must the region shift away from investments in carbon intensive infrastructure and towards greener alternatives, but policy makers are looking to prioritise the construction of long lasting, climate resilient assets. Roads, airports, power plants, water systems and other major installation works will be designed to withstand potential future changes in the weather and natural ecosystem.

• **Developing Asia**

Currently, developing Asia³ alone invests an estimated US\$881 billion annually in infrastructure, but this is inadequate to support future development of emerging markets in the region, according to Asian Development Bank (ADB) forecasts. ADB estimates developing Asia will need to invest closer to US\$1.7 billion per year on climate smart infrastructure up until 2030, with total investments of US\$14.7 trillion required for power and US\$8.4 trillion for transportation.⁴

“The demand for infrastructure across Asia and the Pacific far outstrips current supply. There is a huge gap still to provide power and roads and railways. All these things are missing.”

Takehiko Nakao, President, Asian Development Bank⁵

Moreover, increasing the volume of climate smart development is becoming more than a distant aspiration for emerging markets in Asia. Under the 2015 Paris Agreement on climate change, countries have each put forward so-called Nationally Determined Commitments (NDCs) through which they have pledged to reduce carbon emissions by developing low carbon energy and greener infrastructure. With that agreement now in force, the policy focus is shifting to how each country’s NDCs can be turned into clear investment pipelines.

• **Significant new market potential**

Targeted economic development on this scale creates significant markets for low carbon technologies and generates enormous opportunities for businesses in the region.

Cities	By 2030, more than 550 million people are expected to move to cities in Asia, where they will generate more than 85% GDP. ⁶ Opportunities for urban housing, infrastructure and mobility systems could reach US\$1.5 trillion in 2030. Investment in affordable housing alone could reach US\$505 billion. ⁷
Transport	Electric vehicles are projected to reach 35% of overall car sales in Asia by 2040. ⁸

Energy and materials	By 2030, transitioning to sustainable energy and materials systems could generate business opportunities worth US\$1.9 trillion. ⁹
Agriculture and food	Adoption of sustainable business models in agriculture and food production, distribution and retailing could produce business opportunities worth US\$1 trillion in 2030. ¹⁰

2

Green Finance – Strong Global Momentum

The confluence of the environmental and economic drivers underpinning future global growth is transforming energy markets and creating unprecedented demand for clean technologies and low carbon infrastructure. Nevertheless, as stated in the previous section, the funding gap between the estimated annual spending requirements for green energy, transportation and urban development around the world and actual investment on the ground is substantial.

Green finance has emerged in recent years to address that funding gap. Green finance includes funding for climate and environmentally sensitive investments, as well as practices that embed sustainability more broadly across the financial services industry.

“The financial system should also play an important role in promoting the green transformation of our economies”

Governor Zhou Xiaochuan, People's Bank of China¹¹

There has been considerable momentum behind green finance over the past decade, moving it rapidly from a niche agenda to an increasingly mainstream industry that is influencing financial sector development in many countries. The world's central banks and regulators are considering sustainability in industry rules, while stronger requirements for disclosure on environmental issues have become the norm.

Meanwhile, rapidly expanding appetite among investors for low carbon and green assets creates incentives for the finance industry to develop new products and processes to channel capital into these sectors.

Environment Theme Funds

The universe of environment theme funds has expanded exponentially over the last decade. These funds invest specifically in environment related industries (such as water, energy and waste) and in themes that have a proven impact on the environment (including clean transport and sustainable agriculture). As of March 2017, there were around 230 green funds (including nearly 600 sub funds) sold in Europe over the last ten years. Of these, 165 (including 466 share classes or sub funds) were still open for investment at the end of 2016. These 165 together have €22 billion assets under management.¹²

Climate Bonds

The climate bonds market first emerged in 2007 with investment grade bonds issued by the European Investment Bank and the World Bank, both multilateral institutions.¹³ Corporate bonds were first issued in 2013. Since then, issuance has grown rapidly. As of September 2017, there are almost 3,500 climate bonds outstanding, representing total funds of about US\$895 billion. Issuers include banks, companies and municipalities bodies, with proceeds funding sustainable transport, energy, waste, water, land use and buildings.¹⁴

The development of the green finance industry was accelerated in 2016, when G20 heads of state for the first time recognised the need to “scale up green financing”¹⁵ and identified a number of measures that could be taken globally to achieve this. Policy makers and financial market participants are responding rapidly. During the twelve month period from June 2016, the greatest number of green finance measures was undertaken globally since 2000, including initiatives to reallocate capital, improve risk management, enhance transparency and clarify responsibilities of financial institutions.¹⁶

• Green finance in Asia

Several Asian countries have been active in making innovations that foster a more sustainable financial system and facilitate green finance. Green disclosure requirements are being adopted across banking, insurance and capital markets, including data on pollution levels and carbon emissions. The Hong Kong Stock Exchange (HKEx) upgraded its own environmental and social reporting framework for listed companies in 2015¹⁷, and sustainability indices and benchmarks have also been designed in other regional markets, including Malaysia and Singapore. In some countries, such as China and Bangladesh, banking regulators have introduced green credit guidelines. At the same time, credit rating agencies across Asia are beginning to incorporate climate risk into their analytical processes.

PBOC's Green Finance Task Force

The Green Finance Task Force, convened by the People's Bank of China (PBOC), with support from the United Nations Environment Programme (UNEP), published a report in 2015 on "Establishing China's Green Financial System".¹⁸ The report proposed that establishment of a comprehensive green finance system would allow China to attract private capital into green industry, and made 14 recommendations on development of a green finance ecosystem, including:

- Specialised investment institutions: green development banks, local green banks, green funds
- Policy support: guidelines for green loans, green bonds, green IPOs
- Financial infrastructure: carbon markets, green ratings, green indices, investor networks
- Legal infrastructure: disclosure requirements, mandatory insurance

Under PBOC's leadership, green financial reforms are an integral part of the 13th Five Year Plan (2016-2020).

Otoritas Jasa Keuangan

In 2014, the Financial Services Authority (OJK) in Indonesia launched its "Roadmap for Sustainable Finance in Indonesia"¹⁹, a framework for promoting a green finance industry, which includes regulatory incentives, design of specific products and capacity and awareness building. OJK cooperates with government ministries to educate financial services professionals "so that they understand about strategic environmentally friendly projects".²⁰ Initiatives under development include:

- Priority allocation of capital to green sectors
- Environmentally responsive capital weighting for banks
- Enhanced reporting requirements

3

Hong Kong Can Be a Leader ... Or Be Left Behind

As governments prioritise greener economic growth strategies and low carbon businesses expand rapidly around the world, financial market competitiveness will be increasingly influenced by levels of expertise in green finance.

A number of the world's leading financial centres have identified particular opportunities for leadership in supporting a global transition toward a low carbon economy, and are already taking steps to foster green finance capabilities.

City of London Corporation

In 2016, City of London Corporation launched a Green Finance Initiative, aimed at making London the world leader in green finance.²¹ The initiative (involving banks, insurers, accountants, academics, regulators and government) will improve the financing options for sustainable infrastructure projects and support the development of the green sector. Focus areas are:

- Improving the flow of projects generating green bonds in the UK and pushing for a low carbon infrastructure strategy
- Enhancing transparency and accreditation standards to give market participants greater confidence in green products
- Better informing and incentivising the market to consider green investments

Green finance is growing rapidly, but is still at a relatively early stage of maturity in most markets in Asia. This creates valuable opportunities for financial institutions which can build relevant expertise and deploy innovative funding solutions to support companies doing business in green industries.

While government policy is an important driver of low carbon development, public funding alone cannot finance the transition to a greener economy in Asia. Government reserves are far outweighed by private funds, much of which are managed in the global capital markets. PBOC, for example, forecasts that China needs to spend over US\$1 trillion annually for the next five years to meet its environmental targets – of which government has the capacity to finance only 15%, while the rest must be met by private sources.²²

One of the measures of competitive success in the evolution of the green finance industry, therefore, will be the ability to mobilise private funding for green development, specifically Low Carbon and Climate Resilient (LCR) infrastructure in Asian emerging markets.

Low Carbon and Climate Resilient Infrastructure

LCR infrastructure is a term used by the Organisation for Economic Cooperation and Development (OECD) throughout its literature on green investing. There are two parts to the definition:

- Low carbon implies “mitigation”, or development of infrastructure that produces lower greenhouse gases than has been typically the case. This could include renewable energy, energy efficiency, green buildings or low carbon transportation.
- Climate resilience implies “adaptation”, and refers to the need to address climate risks and vulnerability to potential weather impacts in the future. Adaptation measures include physical infrastructure and climate proofing for companies, as well as new ways of managing resources such as water.

Over the coming decade, Asian financial centres will compete to be a hub for channelling capital into LCR infrastructure in the region. Hong Kong, which houses the most mature capital market in Asia, as well as a concentration of sophisticated financial expertise and deep experience with infrastructure financing specifically, is a logical choice to be a leader in this evolving area.

To establish a clear competitive advantage, however, calls for a dedicated focus on building the expertise required to fund the technologies and businesses making up LCR infrastructure, together with commitment from both government and private sector to allocate resources to these sectors. Developing this market opportunity will require actions to increase local capabilities with green industries, identify new business pipelines and establish Hong Kong as the centre of innovation for designing and executing bankable transactions.

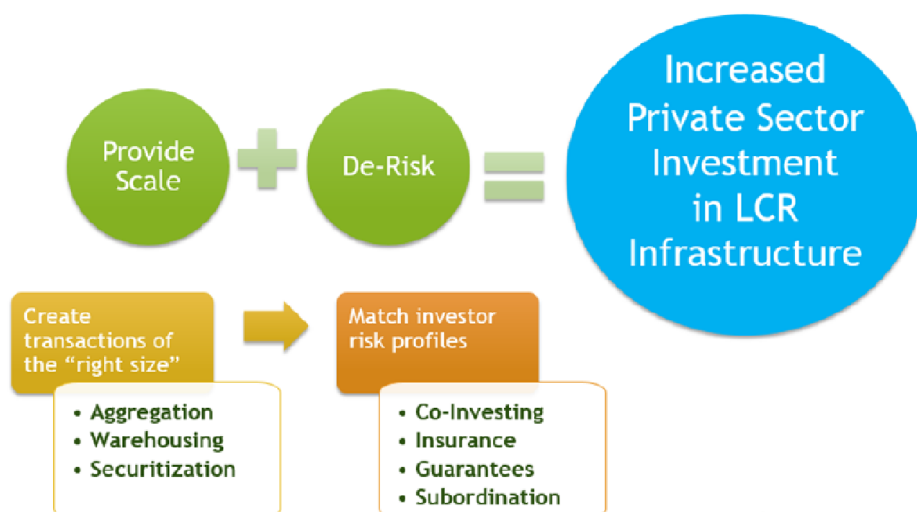
Building on a model successfully executed in other markets, this strategic concentration could be achieved in Hong Kong through the creation of a dedicated financial institution, the Hong Kong Green Investment Bank (GreenBank).

B. Getting Ahead – with a Green Investment Bank

4

What is a Green Investment Bank ?

A Green Investment Bank (GIB) is a new type of public financial institution set up specifically to channel finance into LCR infrastructure. Its role is to accelerate the funding of renewable energy, energy efficiency and other green sectors, such as water and waste management or sustainable transportation, in partnership with private investors. A GIB maximises efficient use of public resources to overcome investment barriers and encourage private sector participation in financing for these sectors.



Source: The Canadian Coalition for Green Finance, 12 Things You Need to Know About Green Investment Banks, 2016

4.1 Why is a GIB needed ?

In most markets, the scale of investment in LCR infrastructure falls far short of the amounts required. Many projects simply do not go ahead because they are unable to raise financing. Typically, financial institutions have had limited appetite for green sectors for a number of reasons:

- **Lack of awareness and expertise**

Employees of financial institutions may have no information about the opportunities presented by LCR infrastructure or little experience with these industry sectors or technologies. Profes-

sionals do not have the expertise to value an investment or to analyse the risks associated with it. Gaining this expertise (externally or in house) takes time and can be expensive.

- **Projects are too risky**

Employees of financial institutions, especially one with a limited track record with low carbon sectors, may consider the risks of LCR infrastructure projects to be unacceptable. Typical considerations may include:

- Technology is new or has a limited track record
- Project developer is inexperienced
- Revenues from the project may not flow as predicted
- Uncertainty about energy regulations and related policies
- Country where project is located is considered high risk

- **Projects are too small**

The small size of, for example, many energy efficiency and off grid energy projects may make them unattractive to a financial institution, as the costs and time required for evaluating and executing the transaction are hard to justify.

"Investors and financiers are generally risk averse in green investment, especially in the case of novel technologies and business models. Investors and financiers also lack relevant knowledge and expertise to evaluate a green investment opportunity. Green Banks can address these gaps by absorbing risk and providing critical knowledge and expertise."

Syed Ahmad Syed Mustafa, Vice President Green Growth, Green Technology Financing Scheme, Malaysia²³

4.2 What does a GIB do ?

A GIB is not a "bank" according to the traditional definition, meaning that it does not take deposits, manage savings or provide direct financing to consumers. It is a specialist institution which addresses the specific barriers constraining private investment in LCR infrastructure sectors.

Scaling investment quickly in new markets or new technologies requires risk mitigation, project pipeline development and focused technical assistance. A GIB exists to fill gaps along the project origination, execution and finance spectrum. It plays a critical role in making the local financial sector comfortable with green investments, as well as in linking its home market with international capital providers looking to make such investments.

- **Attracts private funds**

Public funding alone cannot supply the capital needed to build out green infrastructure and transition to a clean energy economy. A GIB is designed to attract, or “crowd in”, private sector investment into green projects. The GIB provides financing tools and market support that allow for participation by private funders on terms that are acceptable to them.

Crowding In

“Crowding in” occurs when public investment induces greater private investment than would have occurred otherwise. By contrast, “crowding out” takes place when public intervention directly displaces private investment by undertaking projects the private sector would have otherwise financed.²⁴

A GIB’s participation reduces the perceived risks associated with a low carbon investment. It can directly finance projects, or can provide capital to other financial entities which then deploy it in green projects. It may offer a range of financial mechanisms to derisk investments, such as coinvesting, insurance, loan loss guarantees and provision of subordinated equity or debt.

- **Makes green projects happen**

The role of a GIB is to facilitate and participate in projects that would not otherwise have occurred. In other words, it is the intervention of the GIB – by crowding in private sector capital and providing support for market development – that enables a low carbon project to raise the necessary financing it needs to go ahead. This “additionality” is an important part of the mandate of a GIB: the investment it attracts must add to the total capital that would otherwise have been available.

Additionality

The principle of additionality states that for a given intervention, that intervention can only be considered a success if the result is something that would not have otherwise occurred. Public sector resources are used to catalyse private sector actions has resulted in investments that would not have otherwise occurred.²⁵

In addition to mitigating concerns about the risks of LCR infrastructure projects, a GIB can provide solutions to address the issue of investments being too small to attract commercial funders. The GIB may create a pooling mechanism to aggregate small projects into larger vehicles, thereby helping them to reach a commercial scale that is attractive for institutional investors.

A GIB can also facilitate incremental investment by warehousing local banks’ green project loans (holding them on its own balance sheet) or refinancing them via the capital markets. This frees up capital which becomes available for banks to lend to new projects.

- **Stimulates a local green finance market**

GIBs also play a leading role in developing a local market for green finance, by providing education and information, coordinating with government departments and identifying public and private partners for implementing and financing LCR infrastructure projects.

- **Information and training**

A GIB plays a key role as an information hub for the market, increasing understanding of opportunities in LCR infrastructure projects and often providing training and technical assistance to both financial and project development partners.

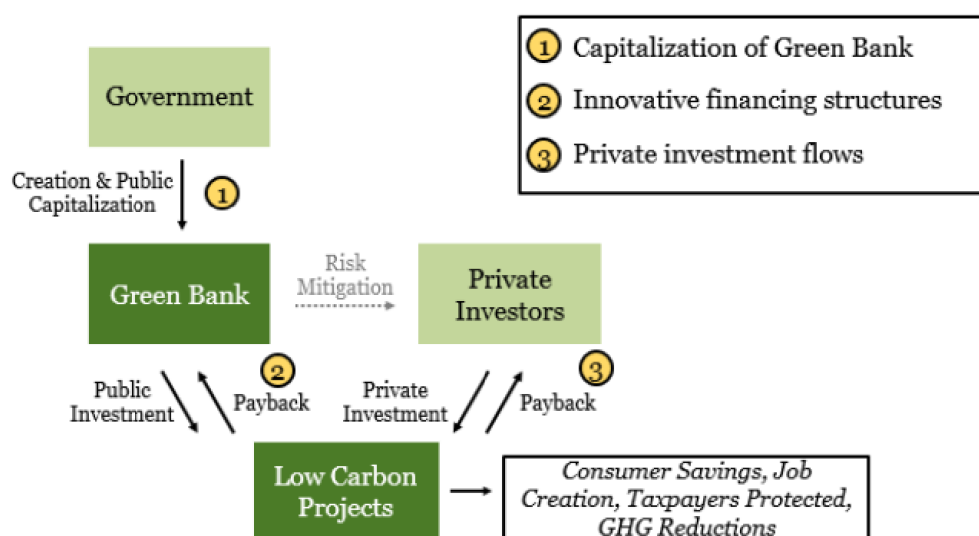
- **Coordination with government**

GIBs seek to complement existing policies and programmes offered by governments, such as subsidies, tax incentives, rebates or grants. Such support is often scattered across multiple departments and accessing it can be complex. The GIB provides a single point of contact for companies or consumers and help to facilitate easier adoption of green solutions.

- **International finance partners**

GIBs are critical hubs in the global network of financial institutions, both public and private, coordinating with their programmes and investments in LCR infrastructure to design projects and enable private capital to flow at scale.

4.3 How is a GIB organised ?



Source: Coalition for Green Capital

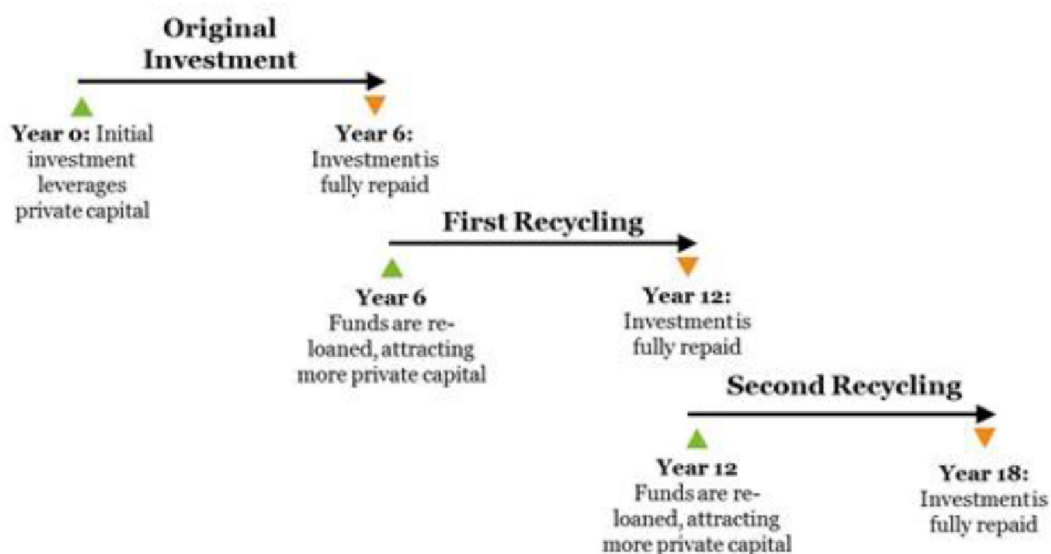
The existing GIBs are all different, with varying structures, missions and tools, but they have important characteristics in common:

- **Structure**

- Specific mandate: GIBs focus on mobilising private capital for LCR infrastructure investments, using financial tools to mitigate risks and enable transactions.
- Public capitalisation: GIBs are typically capitalised with government funds, which may come from tax proceeds, budget allocations or utility surcharges.
- Independent: A GIB is a special purpose public or quasi public entity with independent authority to carry out its mandate. This is essential to allow a GIB to maintain its operating focus, regardless of potential political changes or administrative revisions, and to have flexibility to design and implement investment products dependent on market needs.

- **Use of Capital**

- Cost effective: A GIB uses as little public capital as is necessary to drive private investment, and revolves and recycles its capital to maximise the efficient use of public funding.



Source: Coalition for Green Capital, Growing Clean Energy Markets with Green Bank Financing, 2015

- Commercial: GIB projects and programmes are generally expected to succeed on commercial (or near commercial) terms. Rather than subsidising green industries, GIBs seek to create markets that can stand on their own.
- Profitable: A GIB should be self sustaining, in order to reduce its dependence on public funding, and is intended to create a return for its sponsoring government and private sector partners.

4.4 Benefits of a GIB

A GIB catalyses market development and investor appetite. Its involvement of the private sector in LCR infrastructure creates a powerful “demonstration effect” – proving to the market that these projects are viable.

As private investors become familiar with LCR infrastructure sectors, they become better able to analyse the actual and perceived risks and potential profits associated with such projects. With greater experience, private investors become more confident to participate in these markets – even without GIB support.

A GIB's role is for a limited period to stimulate and develop private markets for LCR infrastructure investment. Once it has helped to create a commercial market for a particular product – so that private sector investment increases, with capital becoming available on reasonable terms – its backing is no longer needed for that product and it can move on to focus its resources on a different activity which still requires public support.

“Based on our experience in Connecticut mobilising over \$1 billion of investment into the state's green energy economy, green banks are dynamic market institutions that are flexible, responsive and able to drive positive change over time. The Connecticut Green Bank, with our public and private partners, has been able to be market responsive by applying risk mitigation where it is most needed to scale up markets while being able to move on and be a catalyst in new market challenges as they emerge.”

Bryan Garcia, President and CEO, Connecticut Green Bank²⁶

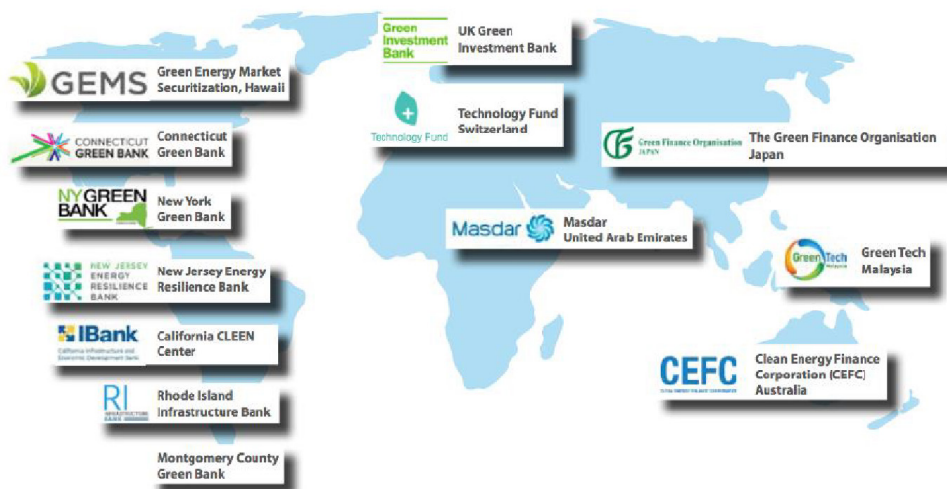
This model of using specialised expertise and selected public financing in order to encourage private sector participation in low carbon projects, thereby generating a new market for funding these sectors, is well established. Many GIBs, as well as multilateral and development banks, have successfully carried out such programmes around the world.

Indian Solar Loan Programme

The Indian Solar Loan Programme was a four year partnership between UNEP and two of India's major banking groups, Canara Bank and Syndicate Bank. Its goal was to establish a consumer credit market for financing solar home systems in Southern India. UNEP support for local banks included an interest rate subsidy, market development and a process to qualify solar suppliers. Although the solar home sector was originally a small, cash only business, at the end of the programme more than 50% of sales were being financed by banks. The subsidy was reduced over time until loans were made on purely commercial terms.²⁷

4.5 GIBs Around the World

The first GIB to receive government approval was the UK Green Investment Bank (UK GIB) in 2012. There are now 14 GIBs operating at national, state or city level. Most of them are located in developed countries, but policy makers in a number of emerging markets are also considering the creation of similar institutions.



Source: The Canadian Coalition for Green Finance, 12 Things You Need to Know About Green Investment Banks, 2016

Based on their particular national and local contexts, each government defines its own rationale and targets underlying the operations of its GIB. Whereas all GIBs share the goal of accelerating private financing of LCR infrastructure, they may also have differing local priorities. For example, Switzerland's Technology Fund focuses on scaling up innovative environmental and low carbon technologies that face a deployment gap, while GIBs in Connecticut and Rhode Island emphasise local job creation and lowering energy costs for businesses and consumers.²⁸

• GIBs in Asia

The two GIBs in Asia serve very different markets. The Green Finance Organisation in Japan is operating in a highly sophisticated and mature economy, whereas the Malaysia Green Technology Corporation (GreenTech Malaysia) seeks to catalyse financing of green energy in a high growth emerging market.

Green Finance Organisation (GFO)

GFO was established in July 2013 to run Japan's Green Fund, using capital allocated out of carbon tax revenues. The Green Fund makes investments in clean energy projects in Japan, alongside private capital providers, and supports deployment of new clean technologies in the country. GFO aims to fund projects with new business models that can be replicated in regional communities across Japan. As of March 2017, GFO has invested US\$110 million into projects with a total value of over US\$900 million.²⁹

GreenTech Malaysia

GreenTech Malaysia, a scheme under the purview of the Ministry of Energy, Green Technology and Water, was set up to develop sustainable and widespread green technology markets and strengthen the local green technology industry. It plays a key role in providing technical assistance to local banks in Malaysia. The government recently committed US\$1.2 billion to extend the scheme until 2022 and is currently considering the potential to convert GreenTech Malaysia into a fully operational green bank.³⁰

Policy makers in several other countries in Asia, including the Philippines and Indonesia, are reviewing the feasibility of establishing GIBs. Plans are most far advanced in India, where there is a proposal to convert the existing green financing agency, the Indian Renewable Energy Development Agency, into a GIB and capitalise it with funds from the "coal cess", a national coal tax.³¹

Progress Towards GIBs in China

2015	China Council for International Cooperation on Environment and Development (CCICED) recommended the creation of a National Green Development Fund, with a capitalisation of approximately US\$47 billion to invest in "resource efficiency, renewable energy, industrial pollution control and advanced vehicle technologies" ³²
2016	Ma Jun, PBOC Chief Economist, announced at the OECD Green Investment Financing Forum that 12 of China's provinces will launch green banks modelled on the UK GIB ³³
2017	PBOC announced green finance pilot zones to be set up in Guangdong, Guizhou, Jiangxi, Zhejiang and Xinjiang ³⁴

5

GreenBank – A Vehicle That Plays To Hong Kong’s Strengths

Financial services is one of four pillar economic sectors in Hong Kong, generating nearly 20% of gross domestic product (GDP)³⁵ and employing over 220,000 people.³⁶ The city houses a sophisticated and liquid financial market and the world’s largest offshore renminbi centre. It is a centre of fund raising, insurance, legal and business services for companies operating throughout Asian emerging markets.

To maintain its competitive position over the longer term, however, Hong Kong’s financial services companies have to demonstrate innovation and the ability to meet (and to lead) market demand in the emerging sectors of the financial services industry. Scaling up investment in LCR infrastructure is a core part of green finance which offers a valuable opportunity to leverage on Hong Kong’s particular strengths.

“Hong Kong possesses the right conditions for developing green finance.”

Financial Secretary, Hong Kong, 2017-2018 Budget Speech³⁷

The establishment of GreenBank as a specialised institution for catalysing private funding of LCR infrastructure in Asia would be predicated on the unique combination of attributes Hong Kong enjoys:

- Extensive expertise with investment and capital raising for infrastructure
- International reach, including extensive relationships in China and across Asia
- Significant public financial resources

5.1 Extensive expertise with investment and capital raising for infrastructure

Companies in Hong Kong have high levels of expertise both in underwriting, raising and managing capital, and in implementing and operating infrastructure businesses. GreenBank could draw on the skills of local bankers, accountants, lawyers and risk managers with extensive experience in transactions across Asia to develop and execute a strong pipeline of LCR infrastructure financing. Many financial institutions in Hong Kong are also already exploring new opportunities to provide products and services and to invest in green businesses.

• Trusted regulatory environment

Hong Kong’s status as a leading infrastructure finance centre rests largely on its robust regulatory regime for the banking, securities and futures, insurance and retirement scheme industries, in line with the best global practices and standards. Its emphasis of the rule of law and fair, open

and orderly markets maintain Hong Kong's position as a location of choice for companies and individuals seeking to invest or do business in Asia.

The confidence that investors have in the city's legal and regulatory frameworks also generates a potential competitive advantage for Hong Kong in developing new environmentally focused products and services, such as green ETFs, themed investment funds and green bonds, which raise capital for LCR infrastructure. To be credible, these instruments must be based on transparent and reliable data, which is trusted by buyers (in order to avoid accusations of "greenwashing").

- **Leading centre for infrastructure capital and transactions**

Hong Kong institutions enjoy a strong track record in infrastructure investment and financing with both debt and equity instruments. Whereas "infrastructure" as an asset class has only reached its current prominence relatively recently, Hong Kong's financial services industry has long been servicing companies developing projects and operating businesses in the region.

As interest has grown globally in investment in long term, real assets, new emphasis is being given to financing for infrastructure. This can be seen in Asia in initiatives such as China's Belt and Road, which aims to accelerate economic development across South East and Central Asia, as well as in the establishment of platforms to facilitate investment in these activities.

Infrastructure Financing Facilitation Office (IFFO)

In July 2016, the Hong Kong Monetary Authority (HKMA) created the IFFO as a one stop shop to help companies finance infrastructure projects by providing a platform for information and experience exchange. More than 60 organisations have express interest, including financial agencies, banks, investors and insurance companies.³⁸

- **Project finance**

Hong Kong is the market leader in Asia for project finance: the provision of non recourse finance for infrastructure projects, which is a specialised, complex business, requiring a high degree of expertise. Project finance transactions may involve multiple tranches of equity and debt, which could include bonds, leasing and other financial instruments. Risk sharing or credit enhancement, and the involvement of government linked or multilateral financing institutions, often form part of the financing structure.

Many of Hong Kong's international and local banks are thus well positioned to be potential partners for GreenBank, bringing their experience and expertise to project structuring, and working with GreenBank to deploy its capital in an efficient manner. They may also have the ability to introduce potential transactions to GreenBank and to identify additional investors or lenders from their own commercial networks.

- **Fixed income**

The Hong Kong bond market grew in 2016 to HK\$74 billion of Hong Kong dollar denominated bonds issued, up 46% on 2015. Although the market is dominated by government and public sector debt issues, there has been growth in the corporate bond sector. Corporate issuers were principally financial institutions which accounted for 47% of corporate issues in 2016, while energy companies and real estate companies accounted for 27% and 13% respectively.³⁹

GreenBank may tap the considerable proficiency with this asset class in Hong Kong's banks and professional advisory firms to explore opportunities for financing LCR infrastructure with "green bonds" or through asset backed securitisation. Hong Kong saw its first labelled green bond issue in June 2015, when Chinese wind energy firm, Xinjiang Goldwind Science & Technology, raised US\$300 million.⁴⁰

- **Hong Kong Stock Exchange**

Hong Kong was the top IPO fund raising exchange in 2016. Total equity funds raised through 120 IPOs on HKEx amounted to US\$25.1 billion, and post IPO fund raising in 2016 comprised approximately US\$37 billion.⁴¹

Some of Hong Kong's largest listed companies operate in the energy and infrastructure sectors, and a number of overseas companies pursuing Belt and Road opportunities have recently expressed interest in listing in Hong Kong. Over the last decade, HKEx has also gained substantial experience with listing companies operating in clean energy and environment focused industries, including a number of significant Chinese renewable energy companies, such as Huaneng Renewables Corporation Limited, Shunfeng International Clean Energy and China Longyuan Power.⁴²

- **Preferred location for investment capital**

Hong Kong is Asia's principal international asset management centre, with over 60% of the total fund management business sourced from overseas. Combined fund management business in Hong Kong almost doubled from US\$1.2 trillion to US\$2.2 trillion in the last five years, underpinning an industry which employs more than 34,000 staff.⁴³

In recent years, an increasing number of green themed investment products have been marketed by Hong Kong fund management firms. In addition, several investment funds specialising in energy, infrastructure and green business sectors have established business operations in Hong Kong.

Impax Asset Management

Impax Asset Management manages approximately US\$9.4 billion primarily for institutional clients through both listed and private equity strategies. It invests in “resource efficiency and environmental markets”, aiming to build portfolios of companies providing cleaner, more efficient products and services across the energy, water, waste, food and agriculture sectors. Impax established its Hong Kong operations in 2007 and its Impax Asian Environmental Markets Fund invests in companies throughout the region.⁴⁴

• Highly developed insurance market

Provision of specialised insurance is an essential element in the process of developing and operating infrastructure projects. Success depends on managing project and investment risks in ways that preserve asset value, effectively deploy capital and reduce volatility throughout the project life.

In 2016, Hong Kong had 161 authorised insurance and reinsurance companies, about half of which were incorporated overseas⁴⁵, and the industry as a whole employs nearly 85,000 people in the city.⁴⁶ According to the Office of the Commissioner of Insurance, gross insurance premiums in the first half of 2016 increased 15% year on year to HK\$207.5 billion (US\$26.6 billion), representing 18.5% of the city's gross domestic product. Long term insurance business represented about 88% of the market.⁴⁷

Insurance companies in Hong Kong are already experimenting with new products and services to take advantage of opportunities created by new environmental regulation and green technologies. Typically, green insurance has been aimed at the commercial real estate market, but over time has grown to include manufacturing risks, as well as cover for home owners.

Allianz / HSBC Insurance

Allianz and HSBC Insurance are partnering to offer green reinstatement insurance, whereby the amount of cover for any losses allows for replacement at a higher environmental standard than what was previously in place:

- covering the costs of rebuilding to higher environmental standards
- encouraging builders to create more energy efficient structures
- offering consumers replacement appliances that are certified green⁴⁸

5.2 International reach, including extensive relationships in China and across Asia

GIBs around the world currently focus almost exclusively on projects within their home markets. Their mandate is to scale up deployment of LCR infrastructure locally. By contrast, recognising

Hong Kong's physical size but reflecting its status as a global financial centre, GreenBank's mandate would include both local and regional elements.

Hong Kong's small land area means that opportunities to deploy renewable energy technologies within the territory are limited, although there is a great deal of scope for improvements to energy efficiency, waste management and pollution control. In addition to financing green initiatives within Hong Kong, therefore, GreenBank would also leverage the considerable experience built up by local development companies and financial institutions of doing business in diverse countries around Asia, and work with them to identify suitable opportunities for co-investment across the region.

".. satisfying local demand while looking ahead to up our game as an international financial centre"

Peter Tam, Chief Executive Officer, Hong Kong Federation of Insurers⁴⁹

Financial institutions in Hong Kong have extensive knowledge of Asian markets, risk levels and local policy regimes. They often have relationships with local infrastructure developers and government bodies are able to source project deals in many markets. They also have close contact with other public and private financing specialists in the region and long histories of doing business together in many cases.

Hong Kong's links with China, in particular, and its participation as a partner in some of China's regional development aspirations, may create sizable deal pipelines for GreenBank and generate opportunities to design innovative financing structures for projects that catalyse substantial international capital investment flows.

• **Belt and Road initiative**

China's Belt and Road initiative covers more than 60 countries with a population of 4.5 billion, accounting for about 60% of the world's population. However, the combined GDP of these countries, amounting to US\$23 trillion, accounts for around 30% of the world's total GDP⁵⁰. Infrastructure in many emerging economies in the Belt and Road region is lacking, severely constraining their economic and social development. This creates enormous potential for infrastructure development in these countries, which is the focus of Belt and Road strategy.

The Research Institute of Finance, part of the Development Research Centre of China's State Council, estimates infrastructure financing needs of Belt and Road countries (excluding China) at US\$1.4 trillion between 2016 and 2020. China is currently playing the leading role in committing funding to Belt and Road development – at the recent Belt and Road Forum in Beijing, the government allocated an additional US\$14.5 billion to the \$40 billion Silk Road Fund, and instructed Chinese financial institutions to provide approximately US\$100 billion of funding to Belt and Road projects.⁵¹

The Hong Kong government has also stated its commitment to support Belt and Road development, through its involvement in the Asia Infrastructure Investment Bank and elsewhere, which has the potential to create huge opportunities for local companies, both in financing and in sustainable construction and green supply chain businesses.

Asia Infrastructure Investment Bank (AIIB)

AIIB is a new multilateral financial institution established to provide funding for public and private infrastructure across Asia. It plans to finance projects in multiple sectors, including energy and power, transportation and telecommunications, rural infrastructure and agriculture development, water supply and sanitation, environmental protection, and urban development and logistics. Hong Kong became a member of AIIB in June 2017.⁵²

5.3 Significant public financial resources

It is the capacity to utilise public funding to catalyse investment in low carbon and carbon resilient investment through partnership with the private sector that would transform GreenBank from another “talking shop” into a powerful economic tool.

The Hong Kong government has considerable financial assets and a favourable credit rating. The government’s financial resources underpin the viability of GreenBank, as the initial capitalisation of the entity would be made out of public funds.

• Government funds

Hong Kong’s latest budget forecasts total fiscal reserves will reach HK\$952 billion (US\$123 billion) by the end of March 2018. Taking into account additional government resources, but excluding reserves held separately by the HKMA, this figure is estimated at closer to HK\$1.8 trillion.⁵³

This means in practical terms that the Hong Kong government has enough money on hand to cover all its spending for two and half years, which has led to calls for the government to spend some of these funds on projects to benefit the territory and its people.

There would be a strong argument for using an allocation from the reserves to capitalise GreenBank, which would be a domestic financial institution directly generating incremental returns for Hong Kong’s economy as well as broader benefits to Hong Kong society.

The use of government funds to move markets is not new in Hong Kong. For example, the Hong Kong Mortgage Corporation (HKMC), a company wholly owned by the government through the Exchange Fund, was established in 1997 in order to develop Hong Kong’s secondary mortgage market. HKMC purchases portfolios of mortgages and loans and provides mortgage credit enhancement to local banks.⁵⁴

In addition, the Hong Kong government has already committed considerable amounts of public funds to external financial institutions for investment in development around the world:

- As of December 2016, Hong Kong had contributed US\$777 million in capital for its membership of the ADB. It has also committed to US\$115 million to ADB special funds.⁵⁵
- In May 2017, the Finance Committee of the Legislative Council approved Hong Kong government funding for its membership of the AIIB of approximately HK\$1.2 billion (US\$154 million).⁵⁶
- In September 2017, HKMA announced a US\$1 billion commitment to the Managed Colending Portfolio Programme operated by the International Finance Corporation (IFC), which is part of the World Bank.⁵⁷

It should be noted that none of these institutions is likely to fund investments within Hong Kong that would lead to positive multiplier effects on the city's economy and society. By contrast, GreenBank would support local projects (such as waste management or energy efficiency) which would have a significant impact on air quality and other environmental indicators.

• Credit rating

Hong Kong has a strong sovereign credit rating, set at AA+ by Standard & Poor's (S&P) and Aa2 by Moody's Investors Service (Moody's).⁵⁸ This allows the government to borrow in the international markets at a favourable interest rate. Public and quasi public entities are usually also able to access financing at the same rate.

A robust credit rating would be essential for GreenBank, as much of its activity is likely to be providing credit enhancement tools for LCR infrastructure projects. This means that investors look to GreenBank's rating to evaluate the risk of a transaction, rather than relying on the project fundamentals alone.

In future, GreenBank may need to raise extra capital to fund its activities. Rather than the government directly providing funding out of its own resources, which would require a capital outlay, GreenBank could issue debt in the international capital markets. As a public entity, GreenBank will benefit from the sovereign credit rating to allow it to borrow cost effectively.

KfW

KfW, a development bank owned by the German government, is one of the largest funders of economic, social and environmental projects in Germany and overseas, providing financing of €81 billion in 2016 alone. KfW refinances over 90% of its lending business in the international capital markets, mainly through bonds that are guaranteed by the German government. This government guarantee, together with KfW's own well regarded reputation, allows KfW bonds to be rated AAA by Moody's and S&P. In 2016, KfW issued bonds totalling €72.8 billion.⁵⁹

6

Multiple Benefits – Across Hong Kong's Economy and Society

The establishment of GreenBank would act as a catalyst for the development of a strong green finance industry in Hong Kong. The operations of GreenBank would create a positive demonstration effect of the potential for low carbon and climate resilient projects and the feasibility of financing them on acceptable terms. Crowding in of private sector funders grows the pool of capital available to green businesses and increases the number of projects that can be financed.

The resulting acceleration of investment in LCR infrastructure and green businesses could generate multiple benefits for Hong Kong's economy and wider society, creating significant positive impact - financially, socially and environmentally.

6.1 Economic benefits

Increased economic activity by Hong Kong companies would generate additional revenues, profits and returns to investors, in addition to potential multiplier effects on the wider economy created by additional spending and employment. The most immediate impact is likely to be on the financial services industry in Hong Kong.

• Financial services industry

For the financial services industry, GreenBank would represent the commitment of the public and private sectors to working together on the development of a green finance industry in Hong Kong. The creation of GreenBank would also send a powerful signal to the region that Hong Kong's financial services industry is evolving. As China's financial markets open up, Hong Kong would seek to maintain its status as an offshore renminbi centre, but must also increase its focus on promoting innovation and harnessing opportunities in other major growth sectors.

In addition to creating a powerful reputational impact for the market as a whole, GreenBank could bring practical benefits to Hong Kong financial services businesses:

- Through working with GreenBank, Hong Kong firms would earn additional revenues (returns on investment and lending, fee income etc.) and would gain skills and experience in new areas. Additional business would generate the need for new headcount, including in middle and back office activities.
- As local banks, in particular, become more comfortable with LCR infrastructure projects, and as the costs of these transactions fall, they would be able to develop their own pipelines of customers and generate profitable business lines. The potential to securitise loans through

GreenBank would give Hong Kong banks the ability to recycle capital and expand their loan coverage in these sectors.

- Much of GreenBank's activity is likely to involve fixed income transactions, which could assist in developing the maturity of the local bond market. Issuance of infrastructure related bonds with longer tenors would contribute to building out the yield curve in Hong Kong. This would support the Hong Kong government's stated objective "to increase the breadth and depth of the local bond market".⁶⁰

London Stock Exchange – Green Bond Listings

As of April 2017, there are 42 green bonds listed on the London Stock Exchange that have raised around US\$11.2 billion in seven different currencies. Issuers include Agricultural Bank of China, Bank of China, NTPC Limited (India's largest energy conglomerate) and National Bank of Abu Dhabi.⁶¹

Institutional investors, such as pension funds and insurance companies, are increasingly seeking to invest in low risk, long term assets. A strong pipeline of long dated instruments related to GreenBank transactions could expand the number and broaden the profile of institutional investors active in the local market.

- GreenBank's focus on risk allocation and credit enhancement may provide impetus to the insurance and reinsurance sectors, which are also looking to create new products and services to meet the demands of investors and companies facing technology and environmental risks. Financing of LCR infrastructure is also likely to generate significant opportunities, including public private insurance partnership structures.
- The evidence of greater expertise in funding LCR infrastructure, and of green finance more generally, in Hong Kong could encourage companies in these sectors to consider primary or secondary listings on HKEx. For example, Hong Kong could become an attractive venue for listing Asian renewable energy yieldcos (listed vehicles supported by a portfolio of operating assets). In addition to IPO revenues, listing of a company in Hong Kong creates potential for further cash flows from trading and follow on capital raising activity.

Yieldcos

Like Real Estate Investment Trusts, yieldcos are pass through stock entities designed to allow for generous generate attractive dividend yields. Yieldcos first emerged in 2013, when the largest American independent power producer, NRG Energy, launched NRG Yield to hold operating wind and solar farms that it had built or acquired. Revenues from those assets funded dividends for investors in the yieldco. Since then, yieldcos in the United States (US) and Europe have raised around US\$10 billion in public equity.⁶²

- The operations of GreenBank, and heightened engagement of financial institutions with it, may encourage growth in related products and services across the local capital markets. Greater awareness of the risks and opportunities of low carbon sectors may increase demand for green investment products in Hong Kong, for example, which would create incremental fee income for fund managers and may encourage the establishment of new investment funds.

• **Construction and green technology sectors**

The availability of additional capital for LCR infrastructure and green businesses would enable more projects to be executed and would create more business for companies providing technology, construction and related services. This in turn would create incremental revenue and profits for these companies.

- GreenBank funded projects taking place in Hong Kong would create jobs for local technology and construction companies, subcontractors and supply chain businesses.

Global GIBs – Job Creation

- In its first two years of operations, Connecticut Green Bank (CT Green Bank) made investments that generated nearly 3,100 direct jobs and over 5,200 indirect and induced jobs⁶³
- Projects supported by GreenTech Malaysia have led to the creation of over 4,200 jobs⁶⁴

- The provision of technical information and training by GreenBank to local construction firms and contractors, especially small and medium sized companies (SMEs) with limited internal resources, would raise awareness of opportunities in green sectors and enable them to enter new business lines.
- Hong Kong based developers, infrastructure companies and suppliers are also likely to participate in GreenBank funded projects across the region. The availability of funding on reasonable terms could provide Hong Kong companies with a competitive edge when bidding for projects overseas.
- The presence of GreenBank may encourage green technology firms to be located in Hong Kong. Growing familiarity with green finance may enable them more easily to raise debt or equity capital to fund future growth.
- GreenBank coordination with other government programmes and incentives, such as the Building Energy Efficiency Funding Scheme and the Pilot Green Transport Fund, as well as

incentives for research and development (R&D), may help to channel public funding more efficiently to companies carrying out green projects.

6.2 Social and environmental impacts

The growth of LCR infrastructure and green businesses in Hong Kong and the region may help to generate a range of societal benefits. These include potentially lower energy costs in some markets, as well as a positive impact on pollution levels and carbon emissions.

• Reduced energy costs

- Costs of some renewable energy technology, such as solar photovoltaics, are equal to or cheaper than grid electricity in many markets. The cost of funding is a significant driver of the price of renewable electricity, so by providing affordable financing for the installation of this technology, GreenBank could help to lower electricity prices for businesses and consumers.
- Considerable cost savings can be achieved by improving the energy efficiency of buildings and industrial processes. Upfront costs of installing the technology are typically outweighed by the energy cost savings in a few years. By making financing available for the necessary energy audit and technology installation, GreenBank could again help to lower electricity prices for businesses and consumers.

• Improved public infrastructure

- GreenBank financing for advanced waste to energy plants in Hong Kong could help to tackle the city's current waste management challenge. Hong Kong's three landfills are expected to reach full capacity in two years.
- GreenBank may play a role in financing development of climate resilient construction or upgrading public infrastructure in Hong Kong, which is vulnerable to the impacts of violent weather events, such as high winds, flooding and storm surge. Improvements to public infrastructure, such as roads, railways, ports and Hong Kong International Airport could increase Hong Kong's ability to withstand climate impacts and minimise consequent disruption and financial loss.

Typhoon Hato

A category 10 tropical storm which hit Hong Kong in August 2017, Typhoon Hato caused mass business closures, flight cancellations, widespread flooding and the suspension of public transport. Economic loss to the city has been estimated at up to HK\$8 billion (US\$1 billion).⁶⁵ In neighbouring Macau, Hato left 10 people dead, over 150 injured and knocked out over half of water and electricity supplies. Two days of lost business for its powerful casino industry alone may have cost nearly US\$160 million.⁶⁶

- **Air quality and carbon emissions**

- Deployment of renewable energy or energy efficiency technology in Hong Kong would have a positive impact on air pollution levels in the city. Hong Kong's power plants currently run almost entirely on fossil fuels, with coal supplying 52% of the city's energy.⁶⁷ Deployment of such technology throughout China's Greater Bay Area would also make a major contribution to improving Hong Kong's air quality. The Environmental Protection Department estimates that 60-70% of particulate matter affecting Hong Kong comes from China.⁶⁸
- Deployment of renewable energy and energy efficiency technology locally would reduce Hong Kong's carbon emissions. The major source of carbon emissions currently is the building sector, which accounts for about 90% of the city's electricity usage and 60% of total emissions.⁶⁹ There is substantial potential for energy savings by retrofitting existing buildings.
- There would be a reputational benefit for Hong Kong in being seen to be playing a role in supporting China's obligations under the Paris Agreement. Although Hong Kong, as a Special Administrative Region, is not a party to the agreement, it has undertaken to review its own climate change efforts every five years and commit to more ambitious climate reduction targets over time.

China's NDCs

China's national commitments under the Paris Agreement⁷⁰, which it aims to achieve by 2030, include:

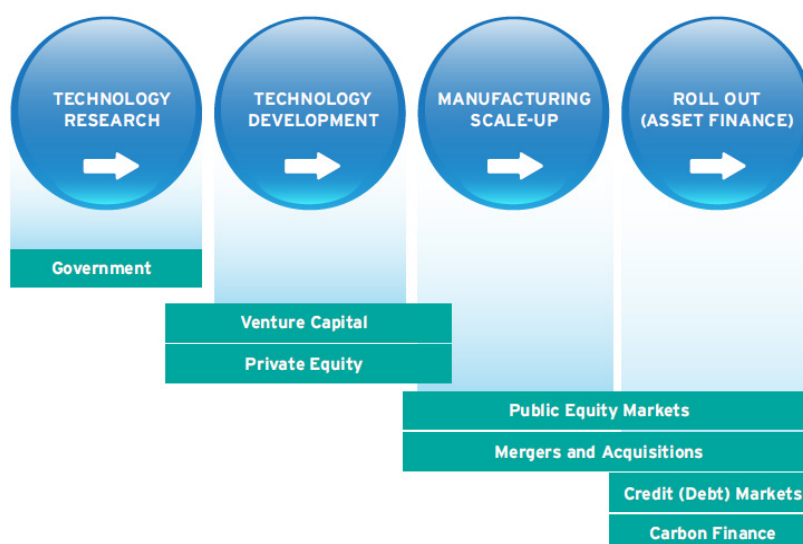
- Ensure that carbon dioxide emissions peak and start to fall (and make best efforts to peak early)
- Lower carbon dioxide emissions per unit of GDP by 60-65% from the 2005 level
- Defend against climate risks in key sectors such as agriculture, forestry and water resources, as well as in cities and coastal areas

C. GreenBank's Role in Hong Kong's Financial Markets

7

Financing – Generating Large Scale Funding for LCR Infrastructure

GreenBank's role would be to facilitate large scale funding for LCR infrastructure by making projects more attractive to institutional investors and lenders. Projects funded by GreenBank may include renewable energy and energy efficiency improvements, water and waste management and clean city development (including transportation and municipal construction).



Source: Bloomberg New Energy Finance

LCR infrastructure, and its underlying technologies, requires financial support along the various phases of its development, from research funding and venture capital for early stage companies, through to asset finance of utility scale projects and operating facilities. Following the model of other GIBs, and given its mandate to maximise private funding, GreenBank would focus on supporting investment in deploying proven commercial technologies, which offer the greatest opportunities for development at scale across new markets. (GreenBank will, however, retain flexibility to consider projects at different phases of maturity on a case by case basis).

GreenBank's investment activity would utilise the techniques of so-called "blended finance", which has been successfully employed by multilateral and bilateral development finance institu-

tions for some years to catalyse private investment in emerging markets. In addition to investing its own capital in LCR infrastructure projects, GreenBank would use a range of financial tools to address structural features of projects related to size or risk that currently deter potential investors.

Blended Finance

Blended finance is the strategic use of public or private funds, including concessional tools, to mobilise additional capital flows (public and/or private) to emerging and frontier markets, and represents one approach that has the potential to attract new sources of funding to the biggest global challenges.⁷¹

GreenBank would be informed by the experiences of other GIBs, institutional investors, development and financial institutions in building its investment strategy and structuring bankable transactions that maximise private capital. Building on precedents and models that have been successfully executed in a number of markets around the world, GreenBank could consider participating in a range of potential financing activities, such as those described in the following sections:

7.1 Coinvestment

GreenBank would directly invest in LCR infrastructure in Hong Kong and across Asia – through equity, senior or subordinated debt – in partnership with private investors. If a project is only able to secure financing for a portion of the costs, GreenBank would provide the remaining funds needed to close the deal.

• Project investment

GreenBank may coinvest directly in individual transactions to support development of LCR infrastructure.

Birmingham Bio Power Ltd.

UK GIB formed a consortium with private partners, including Balfour Beatty and several private investment funds, to invest £48 million in a plant that converts recovered wood into electricity using gasification technology. Over its expected 20 year lifetime, the plant is forecast to supply enough renewable energy to power 17,000 homes each year and to save around 1.3 million tonnes of wood from landfill. UK GIB directly invested £12 million through preferred loan stock and a further £6.2 million in indirect investment through its cornerstone stake in the UK Waste Resources and Energy Investments Fund, one of the coinvestors in the project.⁷²

GreenBank may also invest in alongside public and private sector partners in wider development initiatives, such as urban renewal.

Investing in Clean Cities in Australia

Australia's Clean Energy Finance Corporation (CEFC) has developed programmes to help city councils manage their energy costs and lower their emissions, through renewable energy, energy efficiency and low emissions technology. For example, CEFC is providing finance to help the city of Melbourne undertake an AUS\$30 million programme of clean energy initiatives to help it reduce its energy use and reach a goal of zero net emissions by 2020. The programme will support:

- installation of rooftop solar panels on council and community facilities
- replacement of public lighting with more than 16,000 energy efficient LEDs
- environmental upgrade of commercial properties through the Sustainable Melbourne Fund⁷³

• Fund investment

GreenBank would inject capital into third party funds set up by development institutions or fund managers focusing on LCR infrastructure. GreenBank may act as a cornerstone or anchor investor in a fund early in the investment process so as to play a demonstration role and attract other institutional investors, such as pension and insurance funds.

IFC Climate Catalyst Fund LP

IFC Climate Catalyst Fund, operated by IFC, invests in climate change and resource efficiency projects in emerging markets. Reaching a final fund size of US\$418 million in 2014, it is one of the biggest private equity fund of funds focusing on climate businesses in these markets. The UK government was a US\$80 million anchor investor. Public sector commitments also came from the governments of Canada and Norway and the Japan Bank for International Cooperation, alongside private institutional investors including Azerbaijan's sovereign wealth fund and pension funds in Germany and Australia.⁷⁴

In order to address specific funding gaps in the market, GreenBank may itself establish a fund vehicle that meets the needs of a particular industry or geography.

UK GIB Offshore Wind Fund

UK GIB created the world's first offshore wind fund to create new capital for an under-funded renewable energy technology which it believed had enormous potential. The fund makes equity investments in operating UK offshore wind power generation assets, and has been instrumental in bringing down the long term cost of finance for offshore wind, as well as enabling the original developers to free up their capital to develop new projects. The fund now has assets under management of over £1 billion. Private investors in the fund include one of the world's largest sovereign wealth funds, several UK pension funds and a leading Swedish insurance company. Many of them had never invested in wind power previously.⁷⁵

GreenBank may also work with a commercial financial institution jointly to establish and operate investment fund vehicles.

DB Masdar Clean Tech Fund

DB Masdar Clean Tech Fund was developed by Masdar Capital (part of Abu Dhabi's GIB) in conjunction with Deutsche Bank. It invests in expansion and later stage companies operating in renewable energy, environmental resources and energy and material efficiency sectors. The fund has attracted a range of public and private investors, including Japan Bank for International Cooperation, Development Bank of Japan, Siemens, Inpex Corporation, Nippon Oil Corporation and GE.⁷⁶

7.2 Credit Enhancement

GreenBank would attract more private capital for LCR infrastructure at affordable rates through providing credit enhancement for project investments and debt finance. If a private investor is hesitant to enter a new market, or is only willing to offer unnecessarily high interest rates, credit enhancement – or derisking investments for private investors – can provide security and improve deal economics for the project developer. Risk mitigation allows investors to participate in projects on reasonable terms and thereby become more familiar with viable LCR infrastructure markets.

Credit enhancement can be provided via a range of structures, such as loan loss reserves, first loss equity tranches, guarantees or insurance, which GreenBank would tailor to fit the needs of a specific project. In addition, GreenBank may provide support to a transaction which enables investors to offer better financing terms to the project developer, such as more competitive funding rates or longer repayment periods.

- GreenBank's presence as a lender or investor may itself give confidence to other international funders to participate in a transaction.

Burgos Wind Power Corporation

ADB participated in the financing of the largest wind farm in the Philippines in 2015. ADB's loan of US\$20 million helped to facilitate the total funding package of around \$450 million, including participation by a syndicate of international commercial banks. ADB's credit report on the project stated: "ADB's involvement and strong relationship with the government will provide comfort to international investors, increase commercial bank participation, and help ensure the government's long term commitment to the sector".⁷⁷

- GreenBank would use financial tools to reduce investors' exposure to one or more risks involved in a project, which would otherwise prevent them from providing funding. These risks could be project specific, such as technology without a long operating track record or local companies with limited experience, or could be related to cross border issues, such as currency risk.

Hedging Currency Risk in India

Inability to take currency risk often deters foreign investment in low carbon projects, and costs of hedging products can be high. Foreign currency denominated investments are one option, but may limit borrowers' ability to service their debts. Targeted hedging facilities, such as the Indian Currency Hedging Facility proposed by the Climate Policy Initiative, can potentially offer lower cost and longer term hedging solutions specifically targeting low carbon infrastructure.⁷⁸

- GreenBank could use targeted insurance products to crowd in private investment and demonstrate the attractiveness of investments to lenders in new sectors. Insurance products, such as those offered by the US' Overseas Private Investment Corporation⁷⁹ to facilitate cross border investment and financing for projects in emerging economies, are well established in international markets. GreenBank could work with public or private sector insurance partners to develop products that target low carbon and climate resilient sectors.

Energy Savings Insurance

The Energy Savings Insurance (ESI) tool, developed by the Inter American Development Bank, works with local banks to offer insurance products to boost SME energy efficiency lending in Latin American countries. Cover is provided for projected energy savings for specifically defined and verifiable actions agreed upon in a standard contract between SMEs and energy efficiency services and technology providers. The ESI programme also includes targeted training for banks, borrowers and contractors in their local markets.⁸⁰

- GreenBank could offer guarantees, which are another well known risk enhancement product used to facilitate cross border investment. Development banks and multilateral agencies such as the Multilateral Investment Guarantee Agency (part of the World Bank⁸¹), as well as national level entities, are active in providing guarantees to cover particular risks of transactions in emerging markets.

Private investors often have high perceptions of the policy and regulatory risks in infrastructure projects combined with serious concerns about the technology risk of low carbon sectors. GreenBank would design guarantees to target these specific classes of risk and encourage their participation. As more low carbon projects are completed, a growing track record will generate new data, shape perceptions of risk and help to build investor comfort with the sector.

China Utility Based Energy Efficiency Finance Programme (CHUEE)

IFC established its CHUEE programme to support energy efficiency and clean energy lending by Chinese banks. The key financial mechanism under the programme was a risk sharing facility whereby IFC guaranteed a part of any losses on loans made by the banks. IFC also provided technical expertise and support for financing, marketing, engineering and project development. Since inception in 2006, the CHUEE programme has supported nearly US\$800 million of local lending.⁸²

- GreenBank's support for a transaction or new financial product may enable the end user to access better financing terms, such as more competitive funding rates or longer repayment periods. This would reduce costs or increase the return on an investment, which creates a greater incentive for the project to proceed.

Green Loans, Netherlands

Three Dutch banks, ING Groenbank, ASN Groenprojectenfonds and Triodos Groenfond, agreed a €100 million loan to Eneco, a Dutch energy company, in order to finance around 50 renewable energy projects. The loan was covered by the the Regeling Groenprojecten scheme, a public private arrangement created in 1995 by the Dutch government, under which certified "green loans" are provided at a lower interest rate.⁸³

CT Green Bank's Smart E-Loan

CT Green Bank's "Smart E-Loan" is a second loss loan reserve standard offer made available to any bank or private lender in the state, whereby CT Green Bank guarantees a portion of any potential loan defaults. In exchange, the lenders make capital available at better rates for residential home energy upgrade loans, which can be used for renewable energy and energy efficiency. The availability of financing with lower rates and longer terms enables borrowers to make more substantial improvements to their energy infrastructure.⁸⁴

- Bonds are often issued to refinance the up front development costs of LCR infrastructure assets, after the typically more risky construction phase is completed. If a project or market is still perceived as high risk by international investors, a GreenBank risk "wrapper" could be provided to achieve a successful financing on reasonable terms in Hong Kong or other international capital markets. (Companies with a strong credit rating that can access the bond markets on attractive terms do not need GreenBank support).

Tiwi-MakBan Geothermal

ADB provided credit enhancement in 2016 to AP Renewables Inc for the issuance of a US\$225 million project bond to finance its Tiwi-MakBan geothermal energy facilities in the Philippines. ADB will guarantee 75% of principal and interest on the bond, which is denominated in local currency. The transaction was Asia's first certified climate bond.⁸⁵

7.3 Aggregation and Securitisation

Small and geographically dispersed projects, such as off grid power or residential energy efficiency projects, often struggle to raise financing because, by their nature, the projects are relatively low cost and may differ in terms of credit, technology and location. High transaction costs and time required to analyse the projects often deters investors and lenders.

GreenBank would play a role in aggregating these smaller projects into a single entity. By vetting the projects to diversify risk and achieve scale, GreenBank would create a vehicle that is more likely to be attractive to private funders. The bundled assets can then be refinanced by sale to new banks or investors or through securitisation in the capital markets. By increasing the ability of LCR infrastructure projects to access finance, GreenBank would not only lower their cost of capital, but also increase the liquidity of project developers, allowing them to put capital back into developing new projects.

CT Green Bank's C-Pace Programme

Connecticut has implemented one of the most successful commercial building energy efficiency programmes in the US, using the Property Assessed Clean Energy (PACE) structure, which allows building owners to receive long term financing to perform energy upgrades on buildings and pay the loan back as a new tax lien on the property. CT Green Bank's C-PACE programme provides a standardised approach for all commercial PACE deals in the state, allowing for greater scale. The programme was launched in early 2013 and in its first two years CT Green Bank financed nearly US\$65 million in energy upgrades for more than 90 buildings.⁸⁶

Creation of asset backed securities (ABS) is already a familiar process in the Hong Kong capital markets, where transactions are backed, for example, by residential and commercial mortgages and by toll facilities.

Bauhinia Mortgage Backed Securitisation Programme

The Bauhinia Mortgage Backed Securitisation Programme was established by HKMC to promote the development of the mortgage backed securities market in Hong Kong. Under the programme, HKMC sells mortgage loan portfolios to a special purpose vehicle, which then issues ABS for sale to investors. Bonds can be issued under the programme in multiple currencies via both public issues and private placements.⁸⁷

In China, asset securitisation has also expanded rapidly as the government looks to increase liquidity without expanding the money supply. China's banking regulator, China Banking Regulatory Commission, has been recently considering the launch of ABS based on loans to "green industries".⁸⁸

GreenBank could facilitate the development of a green ABS market in Hong Kong on the same basis. This would allow for securitisation of loans to LCR infrastructure or green businesses which are currently on the balance sheets of local banks. These sectors typically form a very small part of a bank's loan book, and its ability to extend capital is therefore limited.

Selling these assets to a GreenBank vehicle would free up the bank's balance sheet and allow it to recycle its capital – to lend to more projects in green sectors. It would also remove the requirement for the bank to make provision against long term loans on its books and mean it is less likely to hit its prudential limits on single borrowers and sectors. The reduction of these constraints creates greater liquidity for banks and may encourage them to increase portfolio lending allocations to LCR infrastructure and green businesses.

SolarCity Asset Backed Securities

Solar energy company SolarCity issued the first solar ABS in the US in 2013. SolarCity is the largest installer of residential solar in the country, and the US\$54 million deal was underpinned by lease payments mostly from its residential customers. Since then, it has issued another two rounds of ABS backed by power purchase agreements from its customers. All have received an investment grade rating of BBB+. ⁸⁹

FlexiGroup Solar Securitisation

In 2016, Australian FlexiGroup Ltd issued a green ABS deal of AUS\$50 million with proceeds allocated to refinancing of residential rooftop solar PV systems. The green bond is certified against the Climate Bonds Standard, providing third party verification of the deal's green credentials. ⁹⁰ A second certified solar securitisation followed in February 2017. Both issuances received a AUS\$20 million cornerstone investment from CEFC.

GreenBank could also provide credit enhancement to a pool of securitised assets underlying a bond issue, in order to enable it to gain an investment grade credit, which is the minimum requirement for many institutional investors to consider buying the bonds.

New York State Energy Research and Development Authority (NYSERDA)

NYSERDA issued a US\$26 million bond in 2013 to securitise a portfolio of residential and small commercial sector energy efficiency loans. Because the underlying loans were all relatively new, there was limited data on the payment performance of the portfolio to be rated. Credit enhancement was needed to earn an investment grade rating that would allow institutional investors to purchase the bond. NYSEDA was able to secure federal tax benefits and worked with New York State's Environmental Facilities Corporation, an AAA issuer, to structure the transaction in a way that met the needs of investors. ⁹¹

7.4 Warehousing

In the event that no private lender is willing to make loans to a certain market, GreenBank could originate and finance its own clean energy projects. This situation may arise if a given clean energy technology itself is perceived as too risky, if the market segment is viewed as having high credit risk or if the investments themselves are too small or not cost effective to underwrite.

In addition to acting as an intermediary to identify, vet and aggregate smaller projects, GreenBank would underwrite loans to a pool of projects directly and "warehouse" them (hold them on its own balance sheet) until sufficient scale is reached to make the portfolio attractive to institutional investors. GreenBank would later sell the loans to private investors through private placement or securitisation, replacing its own capital with private funding.

Warehouse for Energy Efficiency Lending (WHEEL)

WHEEL is a cross state energy efficiency financing platform launched in the US to attract institutional investors by achieving scale through aggregation of projects and consistency through project standardisation. WHEEL utilises a pool of capital provided by Citibank, made available to any state that provides a credit enhancing mechanism into the warehouse. Citibank and its downstream partners provide funding through a contractor network for home energy upgrades. New York Green Bank (NY Green Bank) entered the scheme by making a US\$20m subordinated investment, which has unlocked US\$100m of loan capital for New York state residents.⁹²

C-PACE Refinancing

CT Green Bank initially acted itself as the originator and underwriter of loans under its PACE programme as no commercial bank was willing to be the first to invest under the untested structure. CT Green Bank sourced deals for aggregation into a portfolio until loan performance had been demonstrated at sufficient scale. CT Green Bank later sold 80% of the loan portfolio through an auction to a specialty finance company, Clean Fund.⁹³ This initial success proved the viability of the market to private investors, and in December 2015 Hannon Armstrong, a private investment trust, committed US\$100 million to finance further C-PACE projects in Connecticut.⁹⁴

8

Market Development – Fostering a Green Finance Industry in Hong Kong

GreenBank would play an important role in developing the market for green finance in Hong Kong, by building capacity for investment in LCR infrastructure among local banks, institutional asset owners and fund managers and coordinating activities of government agencies, HKEx and industry associations.

GreenBank would accelerate the development of a market ecosystem around green finance, leading to higher levels of expertise within financial institutions and innovation in design of tools and financial products to support LCR infrastructure investment.

Given its status as a public institution, GreenBank would also have direct access to policy makers in Hong Kong and would be well positioned to understand government goals and priorities for infrastructure development, including with regard to Belt and Road and the Greater Bay Area, which could highlight opportunities for its own project pipeline. GreenBank would also be able

to discuss structural issues that potentially constrain investment in LCR infrastructure, including regulatory barriers such as ratings hurdles or liquidity requirements for institutional investors.

8.1 Hub for Information, Training and Capacity Building

GreenBank would provide a central hub for information on the value, risks and processes involved in deploying and funding LCR infrastructure. It would provide a platform for companies and financial institutions to increase their competencies in these sectors, share experiences and understand international best practice.

• Information

- GreenBank would hold information on companies providing goods and services for deployment and financing of LCR infrastructure, including technical specialists, such as energy service companies (ESCOs) and consultants: for example, monitoring and verification experts.
- GreenBank would gather data from developers, contractors, rating agencies and financial institutions on opportunities and barriers to investing in LCR infrastructure. It would share information with local industry associations such as the Hong Kong Association of Banks and the Hong Kong Investment Funds Association, as well as the IFFO and AIIB.
- GreenBank would convene local market participants and international regulators, institutional investors and funders to discuss best practice and develop processes for collaboration. GreenBank would invite participation of global networks such as the International Forum of Sovereign Wealth Funds, the Long Term Infrastructure Investors Association and the Association of Development Financing Institutions in Asia and the Pacific, as well as other global GIBs.
- GreenBank would centralise information on government programmes supporting LCR infrastructure development in Asia. Incentives include subsidies, rebates, loans, technical assistance and green procurement programmes, but support and information tends to be located in multiple agencies and utilities, making it difficult for companies to access them and constraining consumer demand.

• Training and capacity building

- GreenBank would support the provision of technical assistance, capacity building and training for financial institutions, building contractors and supply chain companies to increase the levels of skills with green finance across the market.
- GreenBank would support project preparation activities, particularly in emerging markets where developers (including host governments) may lack expertise and have limited development financing. In the early preparation phases of projects, expert input and technical

assistance can be critical to producing the necessary feasibility studies, research on new sectors or project types and strategic plans.

- Where appropriate, GreenBank would identify third parties to provide capacity building and skills development. GreenBank would also encourage professional organisations to include green finance in their own training activities in Hong Kong and to incorporate it into “continuing professional development” for market participants.

Professional Qualifications

Analysis of environmental risk is being integrated into the syllabuses of several professional financial qualification organisations in the UK, including the Institute of Chartered Accountants in England and Wales, the Chartered Banker Institute, the Association of Chartered Certified Accountants and the Chartered Institute for Securities and Investment.⁹⁵

- GreenBank would encourage greater understanding among government departments of the opportunities for developing and funding LCR infrastructure, and seek to encourage government agencies to collaborate on finding solutions to constraints on investment, including the need for clearer, consistent policy signals, revising legal frameworks and removing negative incentives (such as fossil fuel subsidies).

8.2 Channel for Global Collaboration

GreenBank would provide a central contact point for international providers of capital, both public and private sector.

• International capital providers

- GreenBank would encourage participation by multilateral and national development banks and other sources of public climate finance⁹⁶ in its financing and risk enhancement activities. These institutions control a large pool of public capital, contributing nearly US\$150 billion in annual climate finance flows alone.⁹⁷

European Investment Bank (EIB)

The EIB is the European Union’s development bank and the largest supranational borrower and lender in the world. EIB financing in Asia has reached €7.1 billion, two thirds of which is deployed in China and India. EIB has supported a broad range of projects in the region, including climate change mitigation, renewable energy and energy efficiency, water and wastewater and support to SMEs.⁹⁸

Many of these public institutions have a high level of experience with LCR infrastructure investment in Asia and, in particular, blended finance techniques. They offer a wide variety of support mechanisms. However, identifying specific programmes and understanding

which institutions may be the most appropriate partners can be extremely onerous for private actors. GreenBank would act as a conduit for structuring suitable projects with multiple participants and bringing together offshore and local funders.

Climate Finance Funds

The OECD's Climate Fund Inventory database lists 99 bilateral and multilateral public climate funds existing to support countries with their climate change mitigation and adaptation actions. These funds target different fields of activities and different geographies and they enable support via multiple financing mechanisms.⁹⁹

• Global financial market development

- GreenBank would participate in relevant international efforts by financial centres to align green standards and exchange ideas and expertise. The establishment of guidelines (both technical and financial) across markets which create greater consistency and transparency is likely to help to increase private sector appetite for LCR infrastructure.

A number of initiatives are well established, such as the Sustainable Stock Exchange project, of which HKEx is a member¹⁰⁰, and the Sustainable Banking Network. Several of the global GIBs are members of the Green Bank Network.¹⁰¹

Sustainable Banking Network (SBN)

SBN is a community of financial sector regulatory agencies and banking associations from ten emerging markets committed to advancing sustainable finance in line with international good practice. SBN supports them in policy development and related initiatives to create drivers for sustainable finance locally. To date, 15 countries have launched national policies, guidelines, principles or roadmaps focused on sustainable banking, including China, Bangladesh, Indonesia and Vietnam.¹⁰²

8.3 Promoting Standardisation and Transparency

GreenBank would emphasise the importance of replicability and standardisation. It would seek to focus on projects which (once the project model has been designed and proven) can be repeated relatively easily so that funding can be scaled up rapidly. It would also encourage greater conformity of processes, contracts and data collection, in order to lower transaction costs and help to encourage private sector participation in LCR infrastructure projects.

• Standardisation

- Substantial liquid markets have been created for financing industry sectors, such as home mortgages and auto loans, that have broadly standardised their contract language and underwriting processes, thus reducing cost and uncertainty in the lending process. Green-

Bank would seek to initiate and develop industry standards for LCR infrastructure sectors that deliver similar benefits.

Standardisation would make it easier and cheaper for securitisation to occur, for banks to underwrite and for credit agencies to rate a securitisation. In addition to loan documentation, standardisation of project contracts such as offtake agreements, energy savings contracts and lease agreements would ease the complexity of executing projects, as would standardised data collection on loan and project performance.

National Renewable Energy Laboratory (NREL)

NREL, a government laboratory in the US focusing on development and deployment of renewable energy and energy efficiency technologies, hosted the Solar Access to Public Capital working group of industry participants for several years. The group working on development of standardised power purchase agreements and related documentation for distributed solar projects, in order to increase the flow of private capital to this market.¹⁰³

- GreenBank would aim to emulate successful market led efforts to establish common standards such as the IFC's Equator Principles and the Green Bond Principles coordinated by the International Capital Market Association.¹⁰⁴ It would collaborate with HKEx, ratings agencies and other market participants to develop appropriate methodologies.

Equator Principles

The Equator Principles is a risk management framework, adopted by commercial financial institutions, defining roles and responsibilities of lenders and borrowers in determining, assessing and managing environmental and social risk in project finance. As of August 2016, 84 financial institutions in 36 countries have officially adopted the principles, representing over 70% of international project finance debt in emerging markets.¹⁰⁵

Luxembourg Green Exchange (LGX)

LGX was launched in 2016 to be a dedicated platform for green, social and sustainable securities, where they can market their instruments and publish information relating to the use of proceeds, both at the start and during the lifetime of a security. Only issuers that commit to entry requirements and provide full transparency on their projects can be displayed on LGX. Over 130 green, social and sustainable bonds are displayed on LGX currently, representing a total volume of €57 billion.¹⁰⁶

- **Transparency**

- GreenBank would work with regulators and market participants to push for consistent labelling of green financial products through the development of industry guidelines covering information to be provided in product prospectuses and marketing documents, as well as common performance metrics for green impacts and established methodologies, approaches and verification procedures for their calculation.
- GreenBank would collaborate with market participants, academic institutions and NGOs to study the investment performance and risk profile of green finance instruments and disseminate the findings publicly.

Institute for Market Transformation (IMT)

IMT, a think tank based in the US, in 2013 published a study on financing of energy efficiency measures in homes. A review of over 70,000 home mortgages found that default risks were 32% lower on average in energy efficient homes, controlling for other loan determinants, and that the owner was 25% less likely to prepay the mortgage. IMT suggested that the lower risks associated with energy efficiency should be taken into consideration by banks when underwriting mortgages.¹⁰⁷

- GreenBank would disclose the financial and non financial impacts of its own investments, together with the principles and methodologies it employs for assessing them. This could provide a template for private investors looking to evaluate LCR infrastructure.

Green Investment Handbook, UK GIB

The Green Investment Handbook is a manual that explains how UK GIB quantifies and reports on the environmental benefits of its investments. It provides guidance on how it measures green performance, manages risk, conducts due diligence and engages consultants. It sets out a consistent means of assessing, monitoring and reporting performance, and suggests practical tools and best practice methodologies to support the large scale mobilisation of climate finance. The handbook has been translated into several languages.¹⁰⁸

8.4 Product Design

GreenBank would be a centre for designing, piloting and demonstrating innovative financing approaches and new business models to address specific challenges of LCR infrastructure investment.

- GreenBank would encourage local market participants, together with foundations, NGOs, academia and think tanks, to develop new market solutions, for example:
 - specialised ratings for low carbon and climate resilient projects
 - commercial credit enhancement such as monoline insurance
 - flexible public private guarantee structures or hedging mechanisms.
- If necessary, GreenBank would itself develop solutions to fill gaps in the market where financial tools for financing LCR infrastructure do not currently exist on a commercial basis. GreenBank would be well positioned to coordinate multiple industry partners (such as utility companies), financial institutions (banks and insurers) and government departments to deliver turnkey solutions to businesses and consumers. New financing structures may need a significant amount of upfront political support and administrative effort, but once they are established the role of GreenBank could be scaled back.
- GreenBank would also collaborate with global initiatives seeking to develop innovative financing approaches for LCR infrastructure. Tools that have been proposed or are under development elsewhere could be tested, implemented and potentially scaled up by GreenBank.

Global Innovation Lab for Climate Finance and Financing for Resilient Investment (the Lab)

The Lab is a global forum charged with taking G7 endorsed green finance projects “from talk to action”. It convenes international experts to design, stress test and pilot instruments and approaches that might catalyse private investment in climate friendly, low carbon projects and infrastructure in developing countries. The Lab’s first call for proposals attracted 80 submissions worldwide.¹⁰⁹

- GreenBank might experiment with offering “challenge prizes”, which are offered as a reward to whoever can first or most effectively meet a defined challenge associated with scaling up private financing for LCR infrastructure.

Virgin Earth Challenge

The Virgin Earth Challenge was launched in 2007 to find sustainable and scalable ways of removing greenhouse gases from the atmosphere. It offers a reward of US\$25 million for the most successful solution. The project received over 10,000 applications and 2,600 formal proposals, which have been reduced to 11 finalists.¹¹⁰

8.5 Support for Early Stage Green Innovation

Although GIBs typically invest in deploying proven commercial technologies, GreenBank would retain the flexibility to invest in new technologies or innovative financing techniques that have potential to encourage appetite for LCR infrastructure development or future investment.

- GreenBank could selectively invest in early stage companies or technological development or could selectively support R&D in Hong Kong universities. Investments may be made in collaboration with Hong Kong government programmes supporting innovation, such as the Innovation and Technology Bureau.

Clean Energy Innovation Fund

Australia's CEFC works with the Australian Renewable Energy Agency (ARENA), which facilitates technologies progressing from early stage research through to commercialisation by supporting the research, development and demonstration stages. In 2016, the government launched the AUS\$1 billion Clean Energy Innovation Fund, jointly managed by CEFC and ARENA, which will provide early stage and growth capital for clean energy companies and projects.¹¹¹

- GreenBank could identify opportunities to introduce technology that has a track record elsewhere to new markets in Asia, which might create significant potential for deployment at scale.

Archimedes Screw Turbine Technology

CT Green Bank financed the first installation of a new hydropower technology, the Archimedes screw generator, which turns slowly to allow fish to pass through. The technology had been deployed in Europe for several years, but not yet introduced to the United States. The project was financed together with three commercial banks as coinvestors in a green bond.¹¹²

- GreenBank could collaborate with relevant experts to explore emerging and alternative sources of financing for LCR infrastructure, including potential linkages between green finance and financial technology.

ANT Financial's Green Energy App

In 2016, ANT Financial launched a "green energy" app that rewards users for reduced carbon use, revealed through a set of algorithms that translate an individual's financial transaction data into an estimate of his carbon footprint.¹¹³ Purchases made through its Alipay payment platform are tracked to earn "green energy points" in the Ant Forest Programme. In the first nine months after introduction, some 200 million subscribers are using the app.¹¹⁴

- GreenBank could also collaborate with relevant experts to explore methods of scaling up retail investment in LCR infrastructure: for example, by partnering with crowdfunding investment platforms.

Abundance

Abundance in the UK is a green crowdfunding platform, allowing small investors to put money into UK renewable energy schemes. Established in 2012, the platform has raised almost £54 million to help fund 27 projects. In 2016, Abundance supported the UK's first local authority solar bond, raising £1.8 million for a partnership between Swindon Borough Council and the local community.¹¹⁵

D. Setting Up and Operating Greenbank

9

Strategy for Success

GreenBank's effectiveness would be largely driven by its dedicated mission – scaling up private financing for LCR infrastructure in Asia. This clear focus would ensure that GreenBank would not be distracted by competing investment agendas (unlike a typical development bank, which has to tackle broader poverty alleviation and societal improvements). It would also insulate GreenBank from pressure to support alternative economic targets or to dilute its resources across multiple industry sectors.

GreenBank's specific mandate would also allow it rapidly to establish its presence and reputation in the LCR infrastructure financing arena, and to attract specialised expertise, both by hiring an appropriately qualified team and by establishing relationships with its peers across the region and internationally.

9.1 Structure and Governance

GIBs have been created in a number of ways, including through government directive, administrative action or the passage of new legislation. For GreenBank to be able to operate, it would require¹¹⁶:

- A legal presence as a defined organisation
- Capital to invest or lend and to cover operating expenses
- Strategic focus and authority to perform a specific set of financing activities
- **Legal presence**

GreenBank may be established as a new entity or created out of an existing institution.

Global GIBs - Organisational Structures

In some cases, GIBs have been newly formed institutions. In others, they have consolidated existing programmes under one entity or converted an existing entity into a GIB. For example, UK GIB, CEFC and Japan's GFO were created as new entities, but CT Green Bank was created by transferring existing programmes into a new entity, while GreenTech Malaysia and NY Green Bank were created as divisions or subsidiaries of existing institutions.¹¹⁷

There are a number of arguments for GreenBank having the status of an independent entity:

- Creation of a new entity would maximise its GreenBank's global impact. A dedicated entity provides a clear point of contact for financing for certain types of activities, which is easily understood by market participants.
- Operating GreenBank as a stand alone entity would highlight its commitment to its mandate and allow it to be more organisationally focused on its targeted objectives than if it were a programme area of an institution already focused on other activities.
- Establishing GreenBank as a separate institution would emphasise to the market that it is independent and will not be influenced by political pressure or interference.

The creation of GreenBank as a separate entity, however, may incur costs, complexities and political delays. In order to implement the policy in the shortest possible time scale, it may be appropriate to consider establishing GreenBank as a division of the HKMA or another Hong Kong government agency.

• Organisational independence

Even if GreenBank were set up as a division of a government agency or department, it would be essential that it have organisational independence, which allows it to maintain its operating focus, regardless of potential political shifts, budget changes and administrative priorities.

It must be clear to the markets that there would be no government interference in the investment decision making of GreenBank. (Approval of individual investments by politicians may create the perception that GreenBank is merely supporting pet projects, rather than focusing on market needs). In order to attract private sector actors as partners in its projects, committing long term capital, GreenBank would need to demonstrate that its strategy and policy direction is consistent and reliable.

GreenBank's governance would depend on its legal form, but would at a minimum include a board of directors or an investment review committee that is not appointed directly by government or subject to political influence. The size, composition, terms, selection process and responsibilities of the board or committee would be publicly disclosed in order to provide reassurance to the market of its independence and the competencies of its members.

UK GIB – Governance

UK GIB was created as an entity owned by the British government, but operating as a separate institutional unit at arm's length and with full operational independence. UK GIB's corporate board and its committees were expected to operate in line with best practice private sector corporate governance guidelines. The board's main task was to help set strategic priorities and ensure UK GIB was operating in line with its mission, operating principles and strategy.¹¹⁸

9.2 Capitalisation

GIBs have primarily been capitalised with government funds, either through raising new capital or reallocating existing funds. Unlike typical government programmatic expenditure, funds allocated to a GIB will not be fully used up, leading to a need for replenishment in the next financial year. Instead, public funds are recycled and preserved, so that they can be applied to build up a capital base in the GIB. During the GIB start up period, however, operating losses may be expected and additional funding could be allocated for this purpose.

Global GIBs – Funding Sources

Governments have capitalised GIBs using a variety of funding sources, in addition to general public funds:

- Carbon tax revenue (Japan)
- Emissions trading scheme revenue (Connecticut)
- Utility bill surcharges (New York)
- Appropriations (Australia)¹¹⁹

• Hong Kong Government funding

GreenBank would be initially capitalised with government funds. This could take the form of a single, upfront injection of public funds, or GreenBank could receive government capital over a set number of years, with no more funding after that period.

Rather than capitalising GreenBank fully out of the general public budget, it might be possible to derive part of the funding from alternative government revenue sources. For example, GreenBank might receive funding from Hong Kong building tax revenues or environmental levies. In the future, it might be funded out of potential emissions trading or carbon tax revenues.

A number of governments around the world have implemented creative one off or ongoing revenue raising measures to fund major policy initiatives, in particular the establishment of sovereign wealth and public pension funds.

Australian Future Fund

The Australian Future Fund was created in 2006 by the Australian government as a sovereign wealth fund to meet its future liabilities for the payment of pensions to retired civil servants. In addition to funding out of the general government budget, income from the partial privatisation of Telstra Corporation, a publicly owned telecommunications company, was deposited into the fund. The government also transferred its remaining 17% stake in Telstra into the fund.¹²⁰

• **International Public Funding**

It may be possible to explore additional funding for GreenBank from multilateral and bilateral development finance institutions and climate funds. The mandates of these institutions include targets to scale up green investment in emerging markets, and GreenBank could be a valuable partner for them in developing Asia. The largest global climate funds, such as the Global Environment Facility and Green Climate Fund, have the capacity to support and capitalise GIBs.¹²¹

Green Climate Fund (GCF)

The GCF is a global fund established by the UN following the Copenhagen climate negotiations to help developing countries limit or reduce their greenhouse gas emissions and adapt to climate change. Funding of at least US\$100 billion per year has been agreed to be channelled through the GCF to promote low emission and climate resilient development. The GCF works directly with public and private financial institutions funding sustainable development in emerging markets.¹²²

• **Capital Markets**

Several GIBs, such as CT Green Bank, have issued bonds in the capital markets. These have typically been used to refinance bank loans once project or portfolios have an operating track record and to sell assets through securitisation.

Hawaiian Green Energy Market Securitisation (GEMS) Programme

Hawaii's GEMS programme issued US\$150 million in bonds to fund part of its initial capitalisation. The bond will be repaid using funds from an existing consumer surcharge on electricity bills in the state. Issued in 2014, the AAA rated GEMS bond was able to access low cost capital that is off balance sheet and therefore does not impact the state's budget.¹²³

GreenBank is likely to issue project bonds and potentially to issue general obligation bonds to raise capital for itself. GreenBank's status as a government linked entity, and its consequently strong credit rating, would allow it to be partially recapitalised via bond issuance. Capital raised could be used to invest in further projects or returned to the government.

9.3 Strategic Focus

Within its mandate to scale up private financing for LCR infrastructure in Asia, GreenBank would define its strategic focus in terms of industries and technologies it seeks to support and the specific set of financing activities it will perform.

- **Financing and investment strategy**

- GreenBank would require the authority needed to operate as a financing mechanism in the market, with the ability to invest, lend, guarantee and otherwise structure funding into projects. GreenBank would require a high degree of flexibility with regard to the financing activities it is authorised to carry out. For example, market development activities might require it to supply limited grant or concessional financing.
- Like all financial institutions, GreenBank would be governed by appropriate liquidity and capital standards to enable it to meet its financing obligations, adequately withstand losses and ensure the viability of its operations. Within the parameters of acceptable risk, GreenBank would not be constrained in terms of projects, markets and technologies it could support.

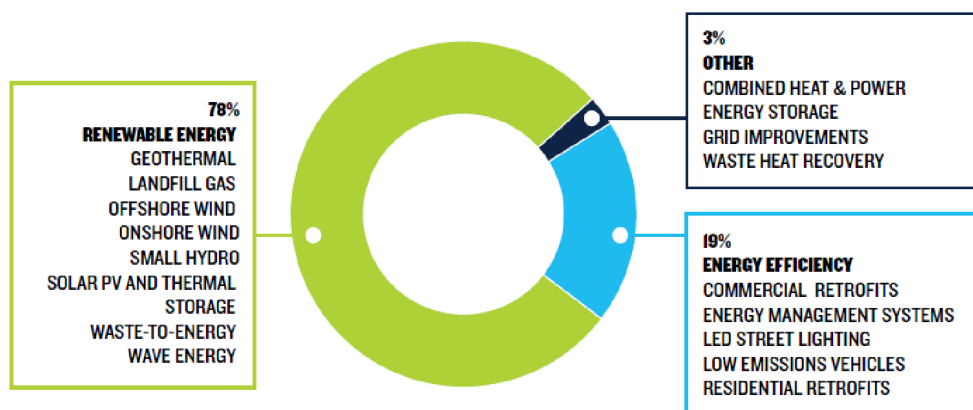
“An investment strategy that is too risk averse would not allow the CEFC to fulfil its mandate, statutory objective and public policy purpose. On the other hand, an approach which is too tolerant of investment risk could lead to higher than acceptable capital losses.”

Clean Energy Finance Corporation, CEFC Investment Policies 2016¹²⁴

- **Identification of target technologies and industries**

- The definition of “green” can vary among GIBs, but most have initially focused on renewable energy and energy efficiency, and have sought to send a signal to the markets that their funding seeks out investments that are climate friendly. GreenBank would make its own definition of LCR infrastructure and identify specific technologies that are eligible.

Areas of Investment by Green Bank Network Members¹²⁵ (end of first quarter 2017)



Source: Natural Resources Defense Council, National Development Banks and Green Investment Banks, 2017

- GreenBank may also support selected climate resilience or adaptation projects that are particularly relevant for Hong Kong's circumstances as coastal city, housing valuable property and business assets and vulnerable to violent weather events.

Energy Resilience Bank (ERB)

The state of New Jersey created the Energy Resilience Bank (ERB) in response to Hurricane Sandy, which caused long lasting power outages throughout the state. The ERB has limited its target market to key infrastructure such as hospitals and water facilities, and made only resilient technologies eligible for investment (for example, energy storage and fuel cells). The ERB offers a blend of low cost capital and grants, while still seeking to leverage private investment. Grid resiliency is an urgent need in New Jersey, so the ERB is flexible with regard to return on its capital in order to attract investment more rapidly.¹²⁶

• Geographical diversification

- GreenBank would provide financing for LCR infrastructure both locally and throughout Asia. Its ability to invest across the region would be balanced by appropriate concentration limits and portfolio diversification standards.

UK Climate Investments LLP

UK Climate Investments is a joint venture announced in 2015 by UK GIB and the UK Department of Energy and Climate Change. The £200 million fund will target East Africa, South Africa and India and will make minority equity investments in renewable energy and energy efficiency projects.¹²⁷

• Continuously evolving strategy

- As markets for particular technologies become more liquid and investment conditions in individual emerging countries strengthen, GreenBank's strategic priorities would shift focus into new technologies and markets.

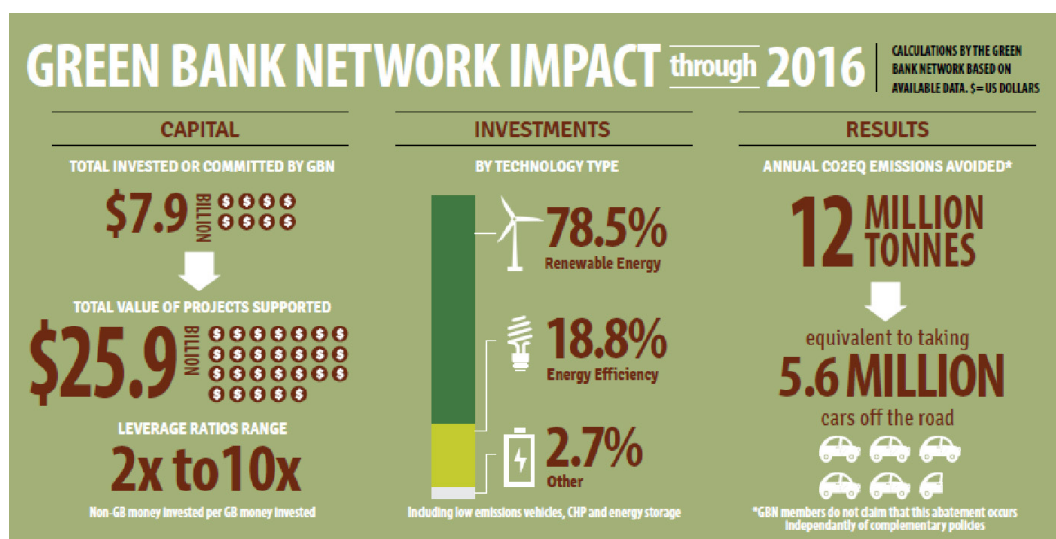
"NY Green Bank focuses on opportunities that create attractive precedents, standardised practices and roadmaps that capital providers can willingly replicate and scale. As funders "crowd in" to a particular area within the clean energy landscape, NY Green Bank moves on to other areas that have attracted less investor interest."

New York Green Bank Business Plan 2016¹²⁸

9.4 Measuring Performance

GIBs typically measure their performance using a range of metrics which generally focus on investment and economic results, together with environmental outcomes. Common metrics include:

- Investment: total public capital invested, private capital invested, private to public leverage ratio, return on capital
- Social: clean energy deployed, jobs created
- Environmental: energy generated or saved, emission reductions



Source: Green Bank Network

• Investment metrics

- A primary motivation for the establishment of GreenBank would be to stimulate innovation in Hong Kong's financial industry and to generate additional activity and revenues for finan-

cial institutions and businesses in the city. Measurement of the numbers of local financial institutions participating in transactions and the volume of private sector investment catalysed by GreenBank would demonstrate its role in market development.

Global GIBs – Private Sector Participation

- In its first two years of operation, UK GIB worked with over 70 coinvestors.¹²⁹
- As of April 2017, GreenTech Malaysia has supported 272 projects valued at US\$700 million and has brought 28 new domestic lenders into the low carbon sector.¹³⁰

- GreenBank's "leverage ratio" (the amount of private capital that is deployed for each dollar of public investment) would be a key metric for gauging the efficiency and cost effectiveness of the activities it undertakes.
- GreenBank would be expected to break even and eventually to make a return on its investments. Transparency on its financial performance would demonstrate its success and help to maintain political support for its operations. It would be important that any return target is set at a reasonable level that allows GreenBank the flexibility to fulfil its mandate – to fill private financing gaps and achieve overall market development (which may require limited activities to be carried out on a non commercial basis).

Global GIBs – Return Targets

Some GIBs have agreed mandated target returns with their sponsoring governments:

- UK GIB must meet a minimum target return of 3.5% (annual nominal return on total investments after operating costs but before tax)¹³¹
- CEFC must target an average return of 3-4% over the five year Australian Government bond rate over the medium to long term¹³²

• Social and environmental metrics

- GreenBank would provide information on its LCR infrastructure projects by sub sector and will measure the outcomes generated by each project: for example, renewable energy capacity installed, energy intensity reductions achieved, volume of waste materials processed etc.
- GreenBank would track the numbers of jobs created as a result of its financing of LCR infrastructure in the region.
- GreenBank would collaborate with technical or academic experts to measure the impact on air or water pollution or carbon emissions of its LCR infrastructure projects.

9.5 Long Term Success

GreenBank would be judged to be a valuable policy instrument if it:

- Increases the competitiveness of Hong Kong's capital markets and financial services industry by creating expertise in green finance, encouraging participation and fostering innovation
- Crowds in significant private capital to fund LCR infrastructure, thereby generating incremental business and profits for Hong Kong companies and financial institutions
- Generates positive social and environmental impacts associated with its projects
- Uses public money responsibly and cost effectively to achieve its goals

The ultimate measure of success for GreenBank would be the creation of mature and efficient markets for financing LCR infrastructure which can operate without its direct intervention. Through the activities of GreenBank, financial institutions in Hong Kong would develop greater expertise in these sectors, which would enable them to compete in new and growing markets on commercial terms.

While GreenBank's market development activities will be ongoing, it is intended that its financial support for any specific infrastructure sector or investment products should be relatively short term in nature. As each sector matures, GreenBank's project focus would evolve to reflect new circumstances and it would concentrate on technologies with more challenging risk and return profiles.

Over the longer term, once GreenBank has developed a track record of successful projects and is widely recognised as a highly specialised entity, operating largely on a commercial basis, the Hong Kong government may be in a position to review its investment in GreenBank and consider exit strategies.

UK GIB Privatisation

Five years after its establishment, the UK government in 2017 agreed to sell UK GIB to investment firm Macquarie Group in a £2.3 billion deal. UK GIB has stakes in 85 projects varying from windfarms and energy efficient street lighting to biomass and waste to energy plants. The government has provided £1.5 billion in funding to UK GIB since 2012, and for every £1 it has invested, it has attracted another £3 of third party capital. Macquarie, a global leader in financing infrastructure projects, has committed to UK GIB's target of leading £3 billion of investment in green energy projects over the next three years.¹³³

Refinancing GreenBank in future years through the capital markets would allow the government to regain part or all of its capital. Alternatively, the government could seek to privatise GreenBank and allow it to continue to operate on a stand alone basis as an entirely commercial entity. In addition to capital, private investors in GreenBank could contribute incremental experience in new technologies or financing techniques that would enable GreenBank to broaden and refine its product offering. Its role as a catalyst of Hong Kong market development would remain unchanged.

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