



Financing Green Infrastructure in the Greater Bay Area

13 June 2018
Event Summary Report

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BACKGROUND

According to the MSCI 2018 report on climate change, when compared to all the other major economies, Southeast Asia has among the highest physical risk under both low-warming scenarios (+2 to +2.5 degrees Celsius) and the high-warming scenario of +6 degrees Celsius. Economic losses are projected to reach 14.37% of GDP and that figure excludes other equally significant climate change-related costs such as migration, diseases and social conflict.

These alarming facts put into stress-test the future of many financial institutions, insurance companies, businesses as well as regulators. It also raises questions and offers opportunities related to the Greater Bay Area's (GBA) ambitious plan to develop a world-class city cluster, by leveraging on technology, innovation, talent, high-tech manufacturing, tourism and sophisticated financial and professional services. The only viable solution to climate change lies with the ability of local governments to actively engage the private sector and investors in catalyzing private capital while providing a sound framework for attractive market returns.

Consequently, this seminar addressed the burning question on how the above risks and opportunities are or should be incorporated into the GBA plan and strategy.

PROGRAM

Time	Item	Speakers
8:00	Registration (with coffee/tea)	
8:30	Opening Remarks	<ul style="list-style-type: none">• Prof Kar Yan Tam [video]
8:40	Panel I: Impact of Climate Risk on Infrastructure Projects and Insurance (Moderator: Prof Christine Loh)	<ul style="list-style-type: none">• Prof Alexis Lau [ppt] [video]• Prof Charles Ng [ppt] [video]• Mr James A. Maguire [video]
9:00	Guest talk: Financing of the Green Infrastructure in Guangzhou	<ul style="list-style-type: none">• Prof Jingyan Fu [ppt] [video]
9:15	Panel II: Infrastructure Project Financing in China's Provinces (Moderator: by Prof Christine Loh)	<ul style="list-style-type: none">• Mr Robin How [ppt] [video]• Prof Alicia García Herrero [ppt] [video]• Panel Discussion [video]
9:40	Networking Break	
10:00	Panel III: Green Finance Developments (Green Bonds and Social Bonds) (Moderator: Prof Veronique A. Lafon-Vinays)	<ul style="list-style-type: none">• Dr Entela Benz [ppt] [video]• Dr Calvin Lee Kwan• Mr Benjamin Lamberg• Ms Hannah Routh• Panel Discussion [video]
10:55	Closing Remarks	<ul style="list-style-type: none">• Prof Christine Loh
11:00	Event Ends	

Please visit HKUST website to download post-event materials: <http://envr.ust.hk/GreenFinance.html>

SPEAKERS (by last name in alphabetic order)



Dr Entela Benz is an Adjunct Associate Professor at the HKUST Department of Finance. Since 2007, she has undertaken various academic and industry related projects on ESG Investing and Impact Measurement field. A quantitative analyst by training, she previously worked for UBS Investment Bank in Hong Kong.



Prof Jingyan Fu is a professor at the Department of International Economics and Trade and Deputy Director of Jinan University's Research Institute of Resources, Environment and Sustainable Development. She was a Fulbright research fellow in Applied Economics of Dyson School of Cornell University. Prof Fu's research interest lies in environmental regulation and competitiveness, embodied carbon emission of trade as well as evaluation of climate change policies.



Prof Alicia García Herrero is an Adjunct Professor at the HKUST Institute for Emerging Market Studies. Alicia is also the Chief Economist for Asia Pacific at Natixis. She serves as Senior Fellow at European think-tank BRUEGEL and Research Fellow at Real Instituto Elcano. Alicia is an advisor to the Hong Kong Institute for Monetary Research (HKIMR) and the Asian Development Bank (ADB) as well as a member of the board of the Hong Kong Forum.



Mr Robin How has over 30 years' experience of working in Asian banking and capital markets, in both listed and private equity. Since 2002, he has been working with family offices on a broad range of topics, with a specialty in research. He provides a weekly publication to clients on China, and he is currently writing a book on governance and development in China with a special focus on Ecological Civilisation and Green Finance.



Dr Calvin Lee Kwan is Adjunct Associate Professor at the HKUST Division of Environment and Sustainability and General Manager – Sustainability for The Link Management Company. He is an active committee member of several working groups including the United Nations Environment Programme Finance Initiative Property Working Group, the UN Global Compact – RICS Real Estate Sector Steering Committee and the Asia Pacific Real Estate Association Sustainability Committee.



Prof Alexis Lau is Associate Director for the HKUST Institute for the Environment and Director of the Atmospheric Research Center. His research has been regularly used by local and regional governments, including the Clean Air Plan for Hong Kong in 2013. He is also a member of the Scientific Advisory Group of the WHO Panel on the development of a Global Platform on Air Quality and Health, and an expert member of the Environmental Sustainable Transport Program of the United Nations (UN) Center for Regional Development.



Mr Benjamin Lamberg is Managing Director and Head of Global Debt Markets Asia and Japan at Credit Agricole CIB (CACIB). He brought his leadership and expertise to transform CACIB into a global player in MTNs. Mr. Lamberg was instrumental in building CACIB into a global RMB bond powerhouse and bringing the bank's expertise in Green Bonds, Bank Capital and Covered Bonds to Asia. He was awarded Top Uridashi Green Bond Dealer in 2014 by MTN-i and the Best Dealer for Green Bonds in 2015 by CMD for bonds mainly placed in Asia.



Mr James A. Maguire is a founding partner at Sustainable Development Capital LLP (SDCL). He has substantive experience leading risk advisory and syndication teams in cross-border infrastructure project financings in or originating from Asia, and direct experience leading initiatives on risk issues and insurance products addressing Climate Change, Energy Efficiency and Renewable Energy. He also has global scale experience in insurance issues pertaining to direct foreign investment involving commercial banks, export credit agencies and multi-lateral lenders.



Prof Charles W.W. Ng is CLP Holdings Professor of Sustainability and Chair Professor at the HKUST Department of Civil and Environmental Engineering. He is also the President of International Society for Soil Mechanics and Geotechnical Engineering. Currently he leads an interdisciplinary theme-based project entitled "Understanding debris flow mechanisms and mitigating risks for a sustainable Hong Kong".



Ms Hannah Routh is a partner at Deloitte China and leads the Sustainability and Climate Change advisory practice. She is a green finance and climate change specialist with over 20 years of experience in the field, of which the last ten are in China. Hannah advises governments, organisations and companies across all sectors on environmental, social and governance (ESG) risk within investments and business operations.



Prof Kar Yan Tam is Dean of Business and Management and Chair Professor of Information Systems, Business Statistics and Operations Management at HKUST. He was the Deputy Head of the Department of Information & Systems Management from 1992 to 1998 and Head of the Department from 2002 to 2005. Prof Tam is currently a member of the UGC Research Grants Council, the Curriculum Development Council, and the Committee on Self-financing Post-secondary Education of the Education Bureau. He was also appointed a member of the Steering Group on Financial Technologies in 2015 to advise the Government on how to develop Hong Kong into a Fintech hub.

MODERATORS (by last name in alphabetic order)



Prof Veronique A. Lafon-Vinai is an Associate Professor of Business Education at HKUST Department of Finance. She is a seasoned market professional with over 20 years of banking and capital markets experience. She has worked in all the major financial markets and has extensive experience in all the major debt markets including loan syndications and assets sales, money markets, debt capital markets and structured, trade and project finance. A seasoned loans and syndications specialist, Veronique developed the secondary market for loans at First Chicago in London and was involved in the development of the EMTN market at its inception.



Prof Christine Loh, SBS, JP, OBE, Chevalier de l'Ordre National du Mérite, is Chief Development Strategist at HKUST Institute for the Environment. She was Under Secretary for the Environment in the HKSAR Government (2012-17) and a Member of the Hong Kong Legislative Council (1992-97 and 1998-2000). Loh has been active in public policy and politics since the 1980s. She founded and was the CEO of the non-profit think tank, Civic Exchange (2000-12), and helped to established several non-profit organizations in Hong Kong related to the environment, equal opportunity, arts and culture, as well as human rights.

EVENT HIGHLIGHTS

The Greater Bay Area (GBA) encompasses the cities of Hong Kong, Macau, Guangzhou, Shenzhen, Zhuhai, Foshan, Zhongshan, Dongguan, Huizhou, Jiangmen and Zhaoqing. These cities collectively account for 5% of China's entire population and 20% of national GDP. While each jurisdiction may be at different stages of economic development, and may be pursuing their own respective environmental policies, geography means the region shares the same climate change-related risks and must bear the same costs. However, the GBA scheme also provides huge opportunities for cooperation.

Future infrastructure projects will not only have to be built to withstand the inevitabilities of more extreme and variable weather patterns, they will also have to, going forward, generate positive environmental and social benefits to the communities they are built in. Ma Jun, former chief economist of the People's Bank of China (PBOC) has previously estimated that the total investment needed to clean up the country's environment to enable it reach its target of peak carbon emissions by 2030 to be about 3 trillion yuan per annum, or roughly 4% of nominal GDP every year. At least 85% of that financing is expected to come from non-government sources.

On Wednesday June 13th, experts from the fields of business, finance, insurance, accounting and the environment met for the second Green Finance Seminar jointly organized by the HKUST's business and environment schools to discuss the current and prospective developments of green infrastructure financing in the GBA.

The scope was comprehensive. The first panel looked at the possible climate risks to GBA cities and the potential impact on infrastructure, plus an additional perspective on the risk implications for insurers and reinsurers. This panel was followed by presentation by guest speaker Professor Jingyan Fu from Jinan University, who provided an assessment of green infrastructure financing in Guangzhou and the importance of "internalizing externalities" in further promoting green financial products in the market.

In the second panel, speakers shared their thoughts on developing green finance in the GBA based on the experience of Europe, insights into the accounting of green finance in China and discussed the development of China's pilot carbon emissions trading schemes as well as the role GBA cities, particularly Hong Kong, in facilitating new green-oriented financial accounting systems.

The third panel looked at the state of green finance development in Hong Kong, China, Asia and beyond, particularly in the field of green bonds and loans. Experts, including one from Hong Kong's second corporate issuer, discussed the performance and challenges of green bond issuances and what investors were increasingly demanding: impact. Moderators Prof Christine Loh and Prof Veronique A. Lafon-Vinai agreed that more events were needed to bring together people of different disciplines to analyze the opportunities and risks to green finance in the GBA, and advance the subject.

Managing Climate and Infrastructure Risks

The seminar kicked off with a sobering assessment by veteran atmospheric scientist Prof Alexis Lau of the impacts of climate change and the management risks posed. He broke them down into primary risks -- easy to conceptualize events such as heavy rain and flooding; secondary risks -- a result of primary risks such as more diseases in a warmer and wetter world; and tertiary risks, -- risks that occur further down the road that people do not think about and systems are ill-prepared against such as one in 500 year storm, or a freak heat wave like the one that hit Europe in the summer of 2003, killing tens of thousands of people.

The heavily populated and urbanized GBA and Pearl River Delta region, Lau remarked, is fraught with threats from climate change, with multiple studies suggesting that the region may be the highest in the world in terms of flood risk. Because of the non-linear interactions between cities in the GBA, Hong Kong will not be spared.



Building on the subject of climate-related risk was Prof Charles Ng who shared his perspectives from that of a civil and geotechnical engineer. Ng pointed out that in terms of civil engineering projects, the “largest enemy of financial and geotechnical risk lies in the ground”. To illustrate his point, he provided video examples of several disastrous and costly climate-associated landslides that wreaked havoc on prosperous economies such as South Korea, Taiwan and Hong Kong, some as recently as 2013.





James Maguire gave his presentation on how extreme weather patterns were making it increasingly difficult for insurers and reinsurers to manage their exposure to risk. Severe weather events could cause severe delays to projects and cause work schedules to be pushed back significantly. As a result of these additional layers of volatility, insurance companies were

increasingly demanding the best information and data analytics available and were scrutinizing the quality and experience of project sponsors more closely.

Internalizing the Externalities

Next in line was guest speaker Prof Jingyan Fu who furnished attendees with a comprehensive overview of green finance development on Guangzhou. Green finance, she said, was a “new approach to governance” which helped internalize externalities and boost the supply of green products in the market.



She pointed out that green finance, like traditional finance, involved risks that had to be controlled. However, the concern was not profit maximization but environmental protection. For that reason, the government tended to play a much larger role in development. She cited the example of China’s seven carbon emissions trading pilot programs.

Prof Fu stated that cross-border pollution was becoming a big challenge for GBA cities and that Hong Kong and Guangdong could build atop the strong cooperation frameworks that they had developed over a decade. Moreover, green finance was something that Hong Kong could capitalize on. While it was difficult for Hong Kong to move funds in and out of the country, Fu hoped deeper GBA integration would make it easier for Hong Kong stakeholders to access green financial instruments or participate in China’s carbon trading market.

As for the future, the growth of green finance would hinge on new innovations (green mortgages, carbon currencies, etc). that would spur more public participation. In China, standards between green industry development and financial regulation also tended to clash and would have to be better harmonized, Fu said.

Infrastructure Project Financing in China's Provinces



In the second section, Prof Alicia García Herrero presented the European experience with green finance, cross-border cooperation on projects and how they could apply to the GBA. Herrero said the GBA could look at developing a regional-level investment bank of sorts that could supply capital beyond borders, similar to the European Union's European Investment Bank, the world's largest

multilateral provider of climate finance.

The main challenge is to assess just how much state aid would be needed. In Europe, strong limits on state aid limited the role of such banks and anything involving large amounts of government subsidies such as in green was problematic, not least because of high public debt levels among EU states. Herrero pointed out that apart from public issuances, corporates were also starting to use green finance instruments to target specific groups of long-term buyers. Pension funds, for example, were an ideal market to be tapped, especially in ageing economies such as Japan, Korea and China.

Robin How, outlined the scope and scale of China's development in green finance by bringing up three significant published reports - the PBOC's 2015 report on a green financial system, a 2016 G20 document and the PBOC's second report on a green financial system. How said 85% of annual capital needed by China to meet its 2030 goals would have to come from non-government sources and figuring out how to



mobilize and direct such large sums of capital would lie in the green accounting principles adopted. This involved rewarding good environmental performance and penalizing sub-performance. Again, How cited China's seven pilot ETs, announced in December 2017, which essentially create a new class of property rights -- emissions -- that have never been distributed. Capital value will be created for these emissions rights and they will be included in company balance sheets as assets.

How explained that Beijing was trying to unify the price of carbon at 30 yuan/ton by 2020 and 100 yuan/ton by 2030. Allowances were to be set every year compared to the European scheme which is set every five years. He stressed that China was now seeking to enforce "environmental discipline over financial discipline". This gave companies more impetus to use non-government capital to reduce their emissions. Within this new audit framework, this would generate huge demand for professionals such as measurers and validators, thus carving out a niche for Hong Kong. How believed the city could act

as an intermediary for overseas investors who want to invest in green finance in China, especially in the GBA.

Panel Discussion I



In response to a question from the floor about how firms in China were adjusting to the new paradigm shift in accounting measures under the new carbon trading market, How explained China was targeting to achieve “green accounting” by 2020. The government was preparing for this by creating a whole new “army” of environmental inspectors to keep the country moving toward the goal. As of 2014, there were already 2.1 million environmental

inspectors in China, surpassing the number of soldiers in the People’s Liberation Army (PLA).

Prof Jingyan Fu added that a main obstacle for firms was the undecided allowance and allocations. Setting a unified carbon price would also prove tricky as the proposed level is 30 yuan per ton but in Guangdong, the biggest pilot market, the level was still at 10 yuan. Environmental risks and policy uncertainty are on the back of company managers’ minds. According to current proposals, allowances are changed annually unlike in Europe where they are set every four or five years. Alas, Fu underscored the fact that carbon market in Guangdong was still not “real market” but very much government - oriented and “artificial”.

Unlike traditional commodities or stock trading, Fu pointed out that prices in carbon markets were supposed to reflect marginal abatement costs in the long-term. The problem was that there was a lack of institutional agents taking part. Low prices and lack of liquidity was thus making true price discovery difficult.

Her concerns were shared by Prof Herrero. With 85% private financing needed by 2030, a large share will have to come from foreign sources. With still so much uncertainty, questions linger as to how much can be secured.

Moderator Prof Christine Loh opined that China had always been a policy-drive country -- with an outsized role for the state to play -- and had a track record of proving doubters wrong over time. She cited green GDP as one example. Going forward, China would adjust and fine-tune its strategy as necessary to get the emissions trading market up and running. The challenge would be how to turn emissions into new property rights and if these newfound rights will be enough spur the private sector into action.

Prof Loh said it was unclear what role Hong Kong would play in all this but the city will want to “ride the boat” by serving the GBA in the academic, intellectual and professional realms.

Key takeaways:

- China is creating an army of new environmental inspectors to address the national security issue of environmental protection
- Environmental risks and policy uncertainty, including allowances and allocations, are a challenge for those wanting to take part in China's carbon trading market
- Lack of liquidity and participation is making it hard to come up with a unified carbon price
- China will have to attract more private foreign capital into its green financial markets
- China will have to find out how to turn emissions into new property rights and figure out out to spur the private sector.



Green Finance Developments



HKUST's Dr Entela Benz began her presentation by underscoring the economic risks to the GBA against the backdrop of climate change. According to her calculations, the most likely and costly were climate-related environmental risks such as water scarcity, sea level rises, flooding and pollution, followed by geographical and social risks

such as urbanization, an increased dependency ratio and healthcare costs as a result of ageing populations. In Guangzhou alone, flood-related economic costs are expected to amount to 1.46% in annual average loss in GDP.

Benz pointed out that China already presided over a huge green bond market -- US\$32 billion, or one third of the global green bond market -- of which 75% of issuances were coming from AAA companies with low probability of default and mostly state-owned enterprises. Performance, however, has been a mixed bag and the general opinion was that there was little premium coming out of green bonds.

Furthermore, energy efficiency was an area that lacked funding as most projects were owned by small investors with limited access to the bond market. Green bank loans were often the default option but this was hindered by the fact that banks often required from borrowers a clear pipeline of green assets. Benz said the definition of green assets was still narrow and this would have to be broadened. Climate risks would have to be priced into bonds.

On the issuing side, Dr Calvin Lee Kwan shared Link REIT's experience as the first Hong Kong corporate to issue a green bond in the city. Kwan said the move was made to tie its ESG performance to financial performance and to mainstream it and integrate it into its corporate DNA. He talked about how it was important to reach out to investors to try and make them understand ESG and to train internally within a company to ensure staffers knew how a green bond worked.





Credit Agricole's Benjamin Namberg provided a few points on a bank's perspective on green finance. His first point was that green finance was experiencing positive growth the world over. From its current level of just 1 to 2% of the global bond market, green bonds were expected to grow to at least 10% of the pie over the next five years.

Secondly, he noted that there was a virtuous cycle at play in which more demand for green bonds was creating more green assets in the market, and thus more available collateral, and thus providing more incentive for bankers to look for more green assets to finance. Namberg said green loans were also taking off, and were being used for financing green projects.

This was also leading to new products such as ESF indexed-loans, which are linked to a company's ESG rating. Loan servicing fees and runmerations are decreased as their ESG ratings increase. From a bank's perspective, Lamberg said this made economic sense because the better a corporate manages their sustainability, the better their long-term credit risk.

Deloitte's Hannah Routh further stressed that success of green finance in the GBA hinged on scale and liquidity. Each city alone would be unable to provide the critical mass needed to tackle environmental issues -- which essentially did not recognize borders. She cited the example of Hong Kong's upcoming renewable energy and feed-in tariff scheme, which was "miniscule on its own", but would benefit greatly if somehow linked to the mainland's massive trading systems. As the de facto international financial center of the GBA, Routh said Hong Kong would have to capitalize on its crucial role in providing liquidity.



She cited pleasing results on the home front with HK\$300 million worth of green bonds issued in Hong Kong last year and about HK\$39 billion already this year.

Panel Discussion II

For this discussion, the focus was turned to the issue of measuring impact of green investments and mainstreaming the concept internally.

Dr Calvin Kwan said attitudes had changed since Link REIT became an issuer two years ago. First, more European investors were expressing interest in Asian green bond markets. Second, more investors were also calling him to query about investment performance and use of proceeds. They were wanting proof of projects being completed and their social and environmental impacts. Some even pointed out to him that if these were not up to standard, they were obliged to divest and while doing that, issue a public statement explaining why, as a green company with a green investment mandate, they were doing so.

Lamberg echoed that, claiming that credit metrics were now “not good enough”. ESG metrics and green investment criteria were now just as important. Investors were increasingly looking at sustainability performance to make credit decisions. Even internally, Lamberg pointed out that future issuers would have to consider how to galvanize the entire company around a product to forge a corporate culture around it. Asset selection was key and he suggested companies set up a sustainability council involving people of different departments to decide on whether a project was green and feasible.

Entela Benz explained that there were some tools available to measure impact, mostly along ESG lines internally or the UN Sustainable Development Goals (SDG) externally, that could be used to communicate to the market and investors what a company’s environmental or social impact was. The former was a more solid impact measurement. The catch was that different markets had their own KPI yardsticks for ESG impact, including China.

Hannah Routh said that while impact from tangible investments such as wind farms or energy efficiency projects were more straightforward and measurable, it was more difficult to measure that of green finance products. She pointed out that measuring such impacts would be expensive and onerous for issuers in the absence of any harmonization of benchmarks.



To that, Lamberg said there were indeed some actions being taken in parts of the world to ensure such KPIs were more standardized and quantifiable. In France for example, the Article 173 climate reporting law, now required institutional investors to disclose their physical risks and 'transition' risks caused by climate change on their business activities and assets.

Key takeaways:

- Investors of green bonds want to know more about performance, use of proceeds and the ESG impacts of their investments.
- No real standardized or practical way to measure impact at the moment, though KPIs such as ESG and SDG can be referenced
- Green bonds are a great way to foster a green corporate culture in an issuers' organization

Closing Remarks

Prof Christine Loh wrapped up the seminar by pledging to take the ideas floated that morning back to the universities and academics for further crunching so as to advance the subject a little more.



The views expressed in this summary report are those of the speakers and moderators, and do not necessarily represent the opinions of the event organizers.