

Development of Green Finance in Macau, With Special Reference to the Experience of Luxembourg and Hong Kong¹

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1. Development of Green Finance

Green finance refers to capital raising and financial investments flowing into projects, products and companies that support the development of a more sustainable, low-carbon and climate-resilient economy.

Green finance covers a wide range of environmental and sustainability objectives, including clean energy; pollution control; green buildings, transportation and infrastructure; energy efficiency; sustainable resource management; and environmental services, such as waste management and sustainable forestry.

A turning point in the development of green finance is the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change hosted and chaired by France in 2015. The outcome of COP21 was the adoption of the Paris Agreement, signed by 195 countries, to address climate change and mitigate greenhouse gas emissions. The Paris Agreement presents a newly calibrated political ambition, requiring countries to implement their national climate plans as well as increase their ambitions over time. To achieve these goals, finance on a massive scale is required. In February 2016, finance ministers and central bank governors of the G20 major economies committed to exploring ways to raise the US\$90 trillion of investments required over the next 15 years to achieve global sustainable development and climate objectives.

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1.1 Green Finance Products

Green products have been promoted for decades. Emissions trading was first considered in the 1960s. Creation of the modern green finance sector began with issuance of the world's first green bonds in 2007.

Green finance products include green bonds, green loans, green funds, green insurance, green stock indices, etc.

Because of their relative liquidity, high profile and simple structuring, green bonds are by far the most important green finance product. According to Climate Bonds Initiative (CBI), issuance of green bonds has been growing rapidly over the past few years.

Adherents range from world-renowned corporates like Apple, Starbucks, to the World Bank, European Bank for Reconstruction and Development (EBRD), Deutsche Bank, and Allianz.

But green finance products go far beyond green bonds as they are increasingly sought by investors who once passively divested of high-carbon assets (e.g. oil and gas stocks) but now actively seek to invest in low-carbon products.

Momentum in the sector is likely to increase following COP21's commitment to a two-degree ceiling. Countries also submitted their climate action plans at Paris in 2015 and must begin to implement them. Green finance will be a key to their realisation.

1.2 Global Development of Green Finance

Developed by Z/Yen and first published in March 2018, Global Green Finance Index (GGFI) serves as a valuable reference for policy and investment decision-makers.

The fifth edition of the index (GGFI 5), which included 67 major financial centres around the world, was published in March 2020. The index provides evaluations of the depth and quality of the green finance offerings of these financial centres.

Table 1-1 shows that all of top 10 cities are western European cities. Luxembourg ranks 4th. In Asia, the highest ranked city is Singapore (22), followed by Beijing (23), Guangzhou (24), Shanghai (25=), and Tokyo (30). Macau was not included in the study.

Table 1-1 Top 30 Cities of Global Green Finance Index (GGFI 5)

| Rank | City | Rating |
|------|---------------|--------|
| 1 | Amsterdam | 1006 |
| 2 | Zurich | 990 |
| 3 | London | 986 |
| 4 | Luxembourg | 977 |
| 5 | Copenhagen | 975 |
| 6 | Stockholm | 970 |
| 7 | Paris | 947 |
| 8 | Hamburg | 933 |
| 9 | Geneva | 928 |
| 10 | Vienna | 924 |
| 11 | Oslo | 913 |
| 12 | Brussels | 912 |
| 13 | Munich | 910 |
| 14 | San Francisco | 908 |
| 15 | Montreal | 907 |
| 16 | Sydney | 901 |
| 17 | Toronto | 899 |
| 18 | Vancouver | 896 |
| 19 | Frankfurt | 888 |
| 20 | Edinburgh | 886 |
| 21 | Casablanca | 885 |
| 22 | Singapore | 881 |
| 23 | Beijing | 880 |
| 24 | Guangzhou | 873 |
| 25= | Tel Aviv | 867 |
| 25= | Shanghai | 867 |
| 27= | Los Angeles | 866 |
| 27= | Jersey | 866 |
| 29 | Melbourne | 865 |
| 30 | Tokyo | 859 |

Source : The Global Green Finance Index 5, official web.

2. Green Finance : Challenges and Theoretical Foundation

G20 Green Finance Study Group (2016) identified five types of challenges to green finance, which can be regarded as the theoretical foundation for green finance development.

2.1 Externalities

The most fundamental challenge is how to appropriately and cost-effectively internalize environmental externalities. Such externalities can be positive for green investments as their benefits accrue to third parties, and negative when polluting investments cause harm on third parties. Difficulties in internalizing these externalities result in under-investment in “green” activities and over-investment in “brown” activities.

2.2 Maturity Mismatch

Inadequate supply of long-term funding relative to the demand for funding by long-term projects have sometimes resulted in the lack of infrastructure investment, including green infrastructure projects. Financing of long-term green infrastructure projects relies heavily on bank lending, while banks are constrained in providing sufficient long-term loans due to relatively short tenor of liabilities.

2.3 Lack of Clarity in Green Finance

In many countries and markets, the lack of clarity as to what constitutes green finance activities and products can be an obstacle for investors, companies and banks seeking to identify opportunities for green investing. Without appropriate definitions of

green finance, which is the basis for internal budgeting, accounting and performance measurement for financial institutions, it is difficult to allocate financial resources for green projects and assets.

2.4 Asymmetric Information

Many investors are interested in investing in green projects/assets but the lack of disclosure of environmental information by companies increases the search costs for green assets and thereby reduces their attractiveness. For example, if investors do not have information about their portfolio companies' environmental performance (such as emissions, and energy and water consumption), they cannot effectively identify and proactively finance green companies as well as assess and manage environmental risks.

2.5 Inadequate Analytical Capabilities

The understanding of financial implications of environmental risks by financial institutions is still immature. Many banks and institutional investors have yet to develop the capacity to identify and quantify the credit and market risks that may arise from their environmental exposure, and therefore often underestimate the risks of “brown” investments and overestimate the risk profile of green investment opportunities. This led to an overinvestment in polluting projects and an underinvestment in green projects.

3. Green Bonds

Green bonds are debt instruments used to finance green projects that deliver environmental benefits. The proceeds of green bonds are dedicated for “green projects”, the purposes of which should be transparent to investors.

3.1. Development of Green Bond Market

The green bond market kicked off in 2007 with the issuance from supranational organizations European Investment Bank (EIB) and World Bank. From 2007-2012, the market was mainly characterized by the issuance of green bonds by supranational organizations along with a few governmental entities and municipalities and national development banks. In 2013 and 2014, there were more active participation from private sector issuers, including corporates and banks. November 2014 was a turning point when the first corporate green bond issued by Vasakronan, a Swedish property company. Subsequently, large corporates like Apple, ICBC, Credit Agricole, Bank of China, Hong Kong Mass Transit Railway, SNCF, Berlin Hyp, and Engie became green bond issuers.

3.2. Benefits of Green Bond Markets

G20 Green Finance Study Group (2016) pointed out that the green bond market can offer several important benefits for green projects and investors:

(a) providing an additional source of green financing to bank lending and equity financing, and also a source of funding for bank lending;

(b) enabling more long-term financing for green projects, especially in countries where demand for green infrastructure investment is high but supply of long-term bank loans is limited;

(c) providing incentives for issuers to use bond proceeds on green projects for reputational gains;

(d) upgrading issuers' environmental risk management process due to their commitment to "green" disclosure; and

(e) providing a class of green assets for investors, especially long-term and responsible investors, and opportunities for bond investors to engage with issuers on sustainability issues related to the financed projects.

3.3 Current Developments of Green Bond Markets

Issuance of green bonds has been growing rapidly over the past few years. In 2014, USD37.0 billion of green bonds were issued globally. The figure jumped to USD257.5 billion in 2019 from issuance of 1,788 green bonds (Table 3-1), representing a 47.4% of average annual growth over the 2014-2019 period.

Table 3-1 Global Green Bond Issuance, 2014-Sep 2020

(Unit : USD billion)

| | |
|----------------|-------|
| 2014 | 37.0 |
| 2015 | 41.8 |
| 2016 | 87.2 |
| 2017 | 162.1 |
| 2018 | 167.3 |
| 2019 | 257.5 |
| 2020 (Jan-Sep) | 162.9 |

Source : Climate Bonds Initiative, official web

Of the USD257.5 billion green bonds issued in 2019, 45 % came from Europe, 25% from Asia Pacific, and 23% from North America.

The USA, China and France topped the country rankings in 2019. US issuers contributed USD51.3 billion (19.9% of global total), whereas their Chinese and French counterparts issued USD31.3 billion (12.1%) and USD30.1 billion (11.7%), respectively.

3.3.1 Use of Proceeds by Sectors

Table 3-2 Use of Proceeds by sectors in 2019

| | |
|---|-------------|
| Energy | 31% |
| Buildings | 30% |
| Transport | 20% |
| Water | 9% |
| Waste | 4% |
| Land Use | 3% |
| Industry | 1% |
| Information, and Communication Technologies (ICT) | 1% |
| Adaptation and Resilience | 1% |
| Total | 100% |

Source : Climate Bonds Initiative, 2019 Green Bond Market Summary, Feb 2020.

The Energy and Buildings sectors dominated green proceeds allocation, with both sectors having a similar share of some 30% (Table 3-2). Excluding Fannie Mae, which allocated USD18.7 billion to buildings, KfW tops both sectors. Noor Energy, MidAmerican Energy and Ørsted represented the top issuance in the energy sector, while the Republic of France, the European Investment Bank, the DSTA and Vasakronan were prominent issuers for “Low Carbon Buildings”.

Transport and Water followed with 20% and 9% market shares, respectively. SNCF (USD4.3 billion), Société du Grand Paris (USD3.6 billion) and the Republic of Chile (USD2.2 billion) represented top issuers in the transport sector. Fannie Mae (USD4 billion) ranked first in the water sector as both its “Green Rewards” and “Green Building Certifications” programmes target water efficiency improvements. After Fannie Mae, ICBC (USD2 billion), the DSTA (USD1.6 billion) and Engie (USD825 million) were the top issuers in the water sector.

Waste, land use, industry, information and communication technologies (ICT), and adaptation and resilience represented the remaining share of the market, accounting for around 10% of total 2019 issuance.

4. Development of Green Finance in Hong Kong

As Macau is planning to develop its green finance sector, the closest model it can study is probably Hong Kong, the other Special Administrative Region of China. Both Hong Kong and Macau are free ports without capital control. There are free flow of goods and capital, and relatively free flow of labor between these two city economies.

The development of green finance in Hong Kong is a few years ahead of Macau. Therefore, a study on development of Macau's green finance should begin with an examination of development experience of Hong Kong.

4.1 Market Development

In June 2015, the first labelled green bond by a Chinese company – wind energy firm Xinjiang Goldwind Science & Technology – was issued in Hong Kong. The US\$300 million green bond, with a three-year tenor, was nearly five times over-subscribed.

Hang Seng Corporate Sustainability Index Series

Launched in 2010, the Hang Seng Corporate Sustainability Index Series is the first index series to focus exclusively on Environmental, Social and Corporate Governance (ESG) performance of Hong Kong and Mainland China stocks.

Investor network

For more than a decade, Hong Kong has been home to the Association for Sustainable & Responsible Investment in Asia (ASrIA) and the Asia Investor Group on Climate Change, an initiative set up and run by ASrIA. In 2015, ASrIA joined forces with the United Nations-supported Principles for Responsible Investment (PRI), making Hong Kong the Asian headquarters of the PRI.

Green Reviewers

Many internationally renowned green reviewers have a presence in Hong Kong to provide coverage of onshore or offshore green bonds issued by Mainland issuers.

By setting up an operation in Hong Kong, these reviewers can combine on-the-ground knowledge of the Mainland market with their robust and internationally recognised green assessment approach, thereby facilitating a more efficient assessment process while giving confidence to international green bond investors.

4.2 Regulatory Developments

Hong Kong Exchange – ESG reporting

In January 2016, following consultation with the industry, Hong Kong Exchanges and Clearing Limited (HKEX) strengthened its ESG Guide in the listing rules. It requires issuers to state in their annual or ESG reports whether they have complied with the ‘comply or explain’ provisions set out in the ESG Guide. Listed companies are required to report, on a ‘comply or explain’ basis, general disclosures and a series of defined key performance indicators (KPIs) in the environmental category.

Securities and Futures Commission – Principles of Responsible Ownership consultation

In March 2015, the Securities and Futures Commission (SFC) launched a consultation on proposed Principles of Responsible Ownership, the purpose of which are to provide guidance to investors on how they should fulfil their ownership responsibilities in relation to their investment in a listed company. In March 2016, the SFC issued its findings from the consultation, specifically highlighting the responsibilities of investors to engage on ESG issues.

4.3 Policy Developments

The Hong Kong government has over the years introduced green finance-related policies, for example, the Cleaner Production Partnership Programme, and the Carbon Footprint Repository which was launched by the Environment Bureau in 2014. The Financial Secretary’s Budget Speech 2016-17 made reference to green finance and stated

that the government will strengthen efforts to publicise its competitive capital markets and highlight Hong Kong's edge in developing green financial products. Two subsequent developments have further reinforced Hong Kong's bond and green bond markets:

(a) Bond Connect

In July 2017, Hong Kong launched the Bond Connect, which quickly became international investors' default channel for investing in the China Interbank Bond Market, as it allows them to use the Hong Kong trading and clearing platform, and to continue their existing legal framework, counterparty arrangements and internal practices.

(b) Offshore bonds by Mainland issuer

In 2017, Mainland issuers issued more than USD220 billion foreign currency bonds, a majority of which were issued in Hong Kong. In addition, many Mainland issuers have issued RMB "dim sum" bonds in Hong Kong. Mainland issuers have been attracted to Hong Kong due to its deep market and familiar regulatory and operating environment. The number of issuance in Hong Kong is expected to grow further, given the increasing offshore funding needs of Mainland enterprises seeking to expand abroad under, for example, the Belt and Road Initiative.

The Financial Secretary announced in the 2018-19 Budget a series of supportive measures including:

- Pilot Bond Grant Scheme, to subsidise bond issuance in Hong Kong, including green bonds.
- Green Bond Grant Scheme, to subsidise the use of the Hong Kong Quality Assurance Agency (HKQAA) Green Certification Scheme.
- The HKD100 billion Government Green Bond Programme, to create demonstrative effect to attract Mainland and international green issuers and investors to Hong Kong.
- Enhancement of the Qualifying Debt Instrument scheme, to provide tax concession for bond investment in Hong Kong.

4.4 Certification by HKQAA

Supported by the Hong Kong Government, HKQAA has developed the Green Certification Scheme, with reference to a number of widely recognised international standards.

4.5 Green Bond Issuance

According to “Hong Kong Green Bond Market Briefing 2019” compiled by CBI, USD2.6 billion of green bonds were issued in Hong Kong in 2019, and the cumulative issuance has reached USD7.7 billion overall.

4.6 Government Issuance

To reinforce its commitment to promote sustainable development and to develop Hong Kong into a leading hub for green finance, the Hong Kong SAR Government issued its inaugural green bond in May 2019, amounting to USD1 billion and a tenor of 5 years. The Green Bond has been assigned credit ratings of AA+ by S&P Global Ratings and AA+ by Fitch.

Following a global roadshow covering Hong Kong, London, Paris, Frankfurt, Amsterdam, Boston, New York and Singapore, the Green Bond attracted orders exceeding USD4 billion, which was more than 4 times the issuance size. The Green Bond is subsequently listed on the Hong Kong Stock Exchange and the London Stock Exchange.

The bond proceeds will be credited to the capital works reserve fund to finance or refinance public works’ projects that provide environmental benefits and support the sustainable development of Hong Kong. These projects are related to water and waste water management, waste management and resource recovery, green buildings, and energy efficiency and conservation.

4.7 Sustainable and Green Exchange

In June 2020, HKEX announced its plan to launch the HKEX Sustainable and Green Exchange (STAGE). STAGE will provide investors with access to a comprehensive database of sustainable and green investment options that are available on Hong Kong's securities markets. It will also act as an education and advocacy platform, promoting knowledge sharing and stakeholder engagement in sustainable finance.

5. Development of Green Finance in Luxembourg

5.1 Luxembourg as an International Financial Centre

United Nations Environment Programme (UNEP) Finance Initiative (2018) outlined the key features of Luxembourg's financial centre:

- Luxembourg is the second largest fund centre in the world and the most popular domicile for Undertakings for Collective Investment in Transferable Securities (UCITS).

- Luxembourg is the leading hub for global fund distribution and international investors. It handles 65% of distribution of cross-border funds worldwide and funds are registered in more than 70 countries.

- Around 27% of all investment funds in the EU are domiciled in Luxembourg – roughly 4,000 umbrella funds with 14,700 sub-funds, and net assets of €4.2 trillion as of April 2018.

- Luxembourg has a performing securitization framework, allowing transformation of predictable cash flows into a vast range of investable securities.

- The Luxembourg Stock Exchange (LuxSE) lists more than 35,000 securities in 59 currencies from approximately 2,300 issuers. 26% of all bonds listed in the EU are listed at LuxSE including sovereign bonds from 17 EU Member States.

- Luxembourg has €360 billion in assets under management (AUM) in private banking, with 60% of clients from the EU, and 40% from the rest of the world.

- Luxembourg is a hub for European life insurance assets, with large national and international insurance and reinsurance companies managing €21 billion of written premiums.

- 75% of the Luxembourg financial centre's income comes from international customers.

- Of the 46,000 people working in Luxembourg's financial sector, 81% are of non-Luxembourg origin.

- Luxembourg is home to the European Investment Bank and the European Investment Fund, investing roughly €80 billion per year in the European and global economy.

- Luxembourg increasingly plays the role of a gateway from and to China. Chinese banks present in Luxembourg not only serve China-based clients (enabling them to invest in Europe), but also provide European clients with the expertise and opportunity to invest in China. The Luxembourg Stock Exchange's Chinese domestic Green Bond Channel bridges the information gap between Chinese issuers and international investors.

5.2 Luxembourg Stock Exchange (LuxSE)

LuxSE specialises primarily in the listing of international bonds, in which it ranks first in Europe. Luxembourg has maintained a dominant position in European bond issues with approximately 40% of all cross-border securities in Europe listed in Luxembourg.

Over 70 countries list at least some of their sovereign debt in Luxembourg. Luxembourg is also a preferred debt market for supranational entities such as the European Bank for Reconstruction and Development, European

Commission, European Investment Bank (EIB), and World Bank.

In 2007, the LuxSE was the first stock exchange in the world to list a bond labelled green, i.e. a “climate awareness bond” issued by EIB.

5.3 Luxembourg Green Exchange (LGX)

Luxembourg is building a global reputation as a green finance centre. According to the latest Global Green Finance Index (GGFI 5) released in March 2020 (Table 1-1), Luxembourg ranked fourth globally, after Amsterdam, Zurich, and London.

In September 2016, LuxSE became the first stock exchange globally to introduce a platform for green financial instruments – the Luxembourg Green Exchange (LGX). LGX gathers issuers that dedicate 100% of the raised funding to green investments. It requires green securities to adhere to strict eligibility criteria, including:

- (a) Declaring the security green, based on ICMA’s Green Bond Principles (GBP) or CBI taxonomy, or equivalent.**
- (b) Clear disclosure that the proceeds are exclusively used for financing or refinancing projects that are 100% green, according to the GBP or CBI eligibility taxonomy.**
- (c) Issuer’s commitment to provide both independent ex-ante external review and ex-post reporting.**

As of January 2018, LGX accounted for 50% of the world’s green bond market, which represents 1% of the global debt market.

5.4 LuxSE’s Growing Connections with China

The first contact between LuxSE and the Chinese financial industry dated back to 1986, when the Bank of China listed its first international bond on the LuxSE. China subsequently listed its international bonds on the LuxSE in 1994.

The next major development happened in 2011 when China decided to open up its currency market, which meant RMB could be used for international financial deals outside of China. That same year the LuxSE listed the first so-called Dim Sum bond outside greater China. This led to frequent interactions which developed over the following years, especially in the green bond market.

In 2017, LuxSE established its first Green Bond Channel in partnership with the Shanghai Stock Exchange. Since then, opportunities were created for investors outside China. The cooperation between the two exchanges focuses on providing important information in English about Chinese green bonds to international investors, bridging the gap between the Chinese bond market and potential international investors.

Subsequently, LuxSE also signed an agreement to extend the Channel to green bonds listed on the Shenzhen Exchange. This further enabled international investors to diversify their sustainable investment portfolios getting access to securities denominated in RMB.

5.5 LuxSE's Growing Connections with Macau

On 13 January 2020 LuxSE signed a Memorandum of Understanding with Chongwa (Macao) Financial Asset Exchange Co., Ltd. (MOX) in Macau. The agreement marks the beginning of a cooperation between the two exchanges, with a specific focus on promoting cross-border investment and liquidity for offshore RMB-denominated financial products, as well as a move to the increasing importance of the financial developments in the Greater Bay Area. Mex Zhang, Executive Chairman and President of MOX, remarked, “this is not only a step forward for MOX’s internationalization, but also a key step for MOX, as a financial infrastructure in Macau, to actively cooperate with an important European partner to promote the development of the Macao bond market and push forward Macau’s diversified economy.”

A week later, on 21 Jan 2020, MOX visited LuxSE to discuss further cooperation of the two exchanges. A possible move is cross listing of bonds.

6. Development of Green Finance in Macau

6.1 Development of Bond Market in Macau.

Bond market was not active in Macau. Financial institutions in Macau have occasionally issued bonds to raise capital. The first “lotus bond”, or RMB-denominated bond issued in Macau came in February 2018 with the issuance of RMB4 billion by Bank of China Macau Branch.

However, listing and trading of these bonds are not possible before the establishment of MOX. Established in 2018, MOX is the first entity authorised in Macau to perform debt securities registration, custody, settlement and clearing services. The first financial products listed were a HKD-denominated bond of Luso Bank and a MOP-denominated bond of Bank of China Macau Branch. As of end of 2019, 18 bonds were listed, in which 5 were issued in Macau (Table 6-1).

The first time the Macau general public was exposed to bond issuance was when China issued RMB2 billion of treasury bonds in July 2019, which was the first offshore issuance of treasury bonds in Macau. China’s Ministry of Finance and Macau’s government said in a joint statement that the issuance “supports Macau’s financial development, ... and push forward the diversification of Macau’s economy, and represents a milestone in the development of Macau’s RMB market More RMB bonds will be issued in Macau which would strengthen financial cooperation between the mainland and Macau.”

Table 6-1. Bonds Issued/Listed by MOX, 2018-2019

| | Issuer | Maturity | Issue/List | Date | Principal Amount | Coupon Rate |
|----|---|-----------------|-------------------|-------------|-------------------------|--------------------|
| 1 | Luso Bank (Macau) | Perpetual | Issue & list | 7 Dec 2018 | HKD 1.668 bn | 8.00% |
| 2 | Luso Bank (Macau) | Perpetual | Issue & list | 21 Dec 2018 | HKD 356 mn | 8.00% |
| 3 | Bank of China (Macau Branch) | 2 years | List | 12 Dec 2018 | MOP 3 bn | 3.00% |
| 4 | Greenland Holding | 364 days | List | 12 Apr 2019 | USD 200 mn | 6.375% |
| 5 | China Agricultural Development Bank | 3 years | List | 22 May 2019 | RMB 1 bn | 3.23% |
| 6 | TUS Holdings | 1 year | List | 19 Jun 2019 | USD 550 mn | 6.95% |
| 7 | Ministry of Finance, PRC | 3 years | Issue & list | 4 Jul 2019 | RMB 1.7 bn | 3.05% |
| 8 | Ministry of Finance, PRC | 2 years | Issue & list | 26 Jul 2019 | RMB 300 mn | 3.30% |
| 9 | Industrial & Commercial Bank (Macau) | 10 years | List | 18 Oct 2019 | USD 500 mn | 2.875% |
| 10 | China Agricultural Development Bank | 5 years | List | 7 Nov 2019 | RMB 3 bn | 3.40% |
| 11 | China Agricultural Development Bank | 3 years | List | 7 Nov 2019 | RMB 2.5 bn | 3.14% |
| 12 | Hong Kong International (Qingdao) Company Ltd | 3 years | List | 12 Nov 2019 | RMB 300 mn | 3.9% |
| 13 | Eastern Creation II Investment | 3 years | List | 27 Nov 2019 | RMB 1 bn | 3.4% |
| 14 | Zhuhai Da Heng Qin | 3 years | List | 28 Nov 2019 | USD 450 mn | 3.8% |
| 15 | Zhuhai Da Heng Qin | 2 years | List | 28 Nov 2019 | RMB 800 mn | 4.6% |
| 16 | Huafa Group | 364 days | Issue & list | 4 Dec 2019 | USD 200 mn | 3.7% |
| 17 | China State Construction Finance (Cayman) III Ltd | Perpetual | List | 6 Dec 2019 | USD 500 mn | 4.00% |
| 18 | Tianfeng Securities | 3 years | List | 10 Dec 2019 | USD 200 mn | 4.30% |

Source : Chongwa (Macao) Financial Asset Exchange Co Ltd, official web

6.2 First and Award-winning Green Bond Issuance in Macau

The starting point of Macau's green finance development at the business level was October 2019 when Bank of China (BOC), Macau Branch issued US\$959.9 million equivalent multi-tranche and multi-currency bonds. This transaction involves three tranches of bonds denominated in RMB, USD and Euro with tenors of two to three years. The three tranches are certified as green by CBI.

This launch was the first bonds in Asia to adopt the Secured Overnight Financing Rate (SOFR), a key milestone for issuers in the region looking to replace London Interbank Offered Rate (LIBOR). In the "Asiamoney China Green Finance Awards 2020" announced on 30 June 2020, Asiamoney awarded "Green Deal of the Year" to this deal. Asiamoney remarked:

"SOFR is one of the top candidates to replace LIBOR after the end of 2021. but so far, there has been little issuance. Until Bank of China's deal, not a single Asian issuer had linked a bond to the rate. It was a sign of the growing maturity of the green-bond market that the issuer did not opt to sell a conventional deal to test demand for SOFR-linked notes. Instead, it pushed ahead with a deal that advanced the green-bond and the wider market. Bank of China scored another first: this was the first green bond sold in Macau. The proceeds will be used to provide green loans to Chinese domestic corporations in areas of green transportation, green energy and sewage handling systems."

6.3 Government Positions

According to the "Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area" released in February 2019, the Central Government of the People's Republic of China stated that:

“.... To support Macao in developing special financial products and services such as leasing, explore Macao’s development taking account of complementarity with nearby regions, and study the feasibility of establishing in Macao a securities market denominated and cleared in RMB, *a green finance platform* and a Sino-Lusophone countries financial services platform.”

To study the feasibility of establishing a green finance platform in Macao, Chau and Lei of the Monetary Authority of Macau (AMCM) published a study on “Green Finance and Its Implications for Macao” in July 2019. They put forward seven remarks and/or suggestions for future development of green finance in Macau:

a. Increase green elements in traditional intermediary services

Macao banks could be encouraged to develop green loans as a starting point to mainstream green finance. Through education and training, ESG factors could gradually be integrated into the operational and management framework of the local financial industry to improve its environmental-related risk management, thus enhancing environmental-friendly investments and reducing polluting investments.

b. Develop green project finance along the “Belt and Road” and the “Guangdong-Hong Kong-Macao Greater Bay Area (GBA)”

Green infrastructure, ecological and watershed management, high-end green technology will bring about huge financing needs for green projects. Therefore, through engaging in cross-border green credit business, local banks can actively support the construction of the green “Belt and Road” and develop green project financing in the GBA.

c. Develop green financial leasing for Portuguese Speaking Countries in the medium term.

This strategy not only avoids fierce competition with neighbouring jurisdictions, but also adds special features to green finance and appropriately market-positioning financial leasing in Macao. It leads Macao to its unique advantage and a differentiated

development from neighbouring jurisdictions.

d. Enrich the contents of wealth management business by providing green financial products and services

Local banks and insurance companies could introduce overseas green investment products, making green financial products an important element in Macao's wealth management business.

e. Cultivate local supply of green financial products.

In the medium to long term, based on established green bond principles, the authorities would further study the desirability of issuing green bonds in Macao while evaluating feasible solutions. With a view to developing into a World Centre of Tourism and Leisure, Macao could issue green bonds, raising long-term funding for local environmental projects like low-carbon transport, new green buildings, existing building retrofits and marine environmental protection.

f. Promote capacity building in green finance

This includes the follow-ups of the green project certification and assessment mechanism, the disclosure of environmental information, relevant policies of countries across the world to incentivise green investment and the development of voluntary principles so as to enhance the capacity of the local financial system to mainstream green finance.

g. Professional training

To train local financial practitioners to increase their abilities to assess environmental cost/benefit, and to carry out relevant risk analysis and performance reporting of green projects.

7. What Macau Can Learn from Luxembourg?

People like to draw comparisons between Macau and Luxembourg because both are small in size, with small yet similar populations, and their per capita incomes rank

among the highest in the world (Table 7-1). Based on Human Development Index compiled by United Nations Development Programme, both rank in the “very high” category. And both of them practice continental law.

Table 7-1 Comparisons Between Macau and Luxembourg

| | Macau | Luxembourg |
|--|------------------------------|-------------------------------|
| Land Area (sq. km) | 33 | 2570 |
| Population (2019) | 676,100 | 628,000 |
| Per capita (nominal) GDP, 2018 (in US\$) | 86,365 (2 nd) | 114,341 (1 st) |
| Human Development Index | 0.914 (2017) (very high) | 0.909 (2018) (very high) |
| Legal system | Continental Law | Continental Law |

To develop its bond and green bond markets, there are a few things Macau can learn from Luxembourg:

(a) To Specialize in some Financial Sectors, like Bonds

Luxembourg has successfully developed its financial sector in past 30-40 years, in which investment funds and bonds (including green bonds) stand out, as described in Section 5.1.

In Macau, in the fourth quarter of 2019, there has been heated discussions that Macau should build a new securities exchange, which should modelled after NASDAQ, and specializes in RMB-denominated securities. However, Macau’s new Chief Executive, Mr. HO Iat Seng, who assumed office on 20 December 2019, wasted no time to point out that Macau is not ready for a new securities exchange as, among other things, its legal infrastructure (like tax law, securities law, and trust law) is not ready.

While it may take a number of years to start the stock market, Macau’s bond market has already started in 2018, as described in Section 6.1. As China has been rapidly expanding its bond (including green bond) market, and this trend is expected to

continue, Macau can specialise itself as an new bond channel between China and the international market, in particular the Portuguese-speaking countries.

To have a closer look at the experience of Luxembourg, a team of top economic officials from Macau visited Luxembourg in June 2019. Top MOX executives also visited LuxSE in January 2020. The two exchanges agreed to study the possibility of cross listing of their listed bonds, the implementation of which can significantly expand the size of Macau’s bond market and at the same time broaden its international dimensions.

(b) Green Exchange

LuxSE established a green exchange (LGX) to capitalize the growing global trend of green bond issuance. It turned out to be a big success.

In Macau, MOX can also consider establishing a green exchange within the exchange to capture the rapidly growing green bond markets of China and elsewhere. With good cooperation with LGX, like cross listing and information exchange, the new green exchange can establish itself as “Green Exchange of China, Belt-and-Road Countries, and Portuguese Speaking Countries”.

(c) Regulation and Supervision

To promote healthy growth of Macau security markets, Macau needs to establish an authority as a regulator and supervisor, like The Commission de Surveillance du Secteur Financier (CSSF) in Luxembourg.

In Luxembourg, CSSF is a public institution that supervises professionals and products in its financial sector. CSSF supervises, regulates, authorises, informs, carries out checks and issues sanctions, where necessary. It is also responsible for promoting transparency, simplicity and fairness on the financial products and services markets and ensures the application of legislation relating to financial consumer protection and the fight against money laundering and terrorist financing.

(d) Foreign and Cross-border Workers

Of the 46,000 people working in Luxembourg’s financial sector, 81% are of non-

Luxembourg origin. If Macau intends to establish itself as an international financial hub, it needs to allow more foreign financial professionals to work in Macau.

Luxembourg is surrounded by three much bigger economies – France, Germany, and Belgium. Luxembourg Chamber of Commerce (2017) pointed out that as of 2015, 45% of Luxembourg’s employment were cross-border workers from its three neighbors.

In Macau, with the opening of Hong Kong-Zhuhai-Macau Bridge in 2018, Hong Kong people can work in Macau and return to Hong Kong in evening. Similarly, people from Zhuhai can also work in Macau yet live in Zhuhai. By allowing more cross-border workers from Hong Kong and Zhuhai, as well as open its door to foreign financial professionals, Macau can meet the demand for financial professionals and experienced managers for further development of its financial sector.

8. Development of Green Finance in Macau – the Road Ahead

Green finance markets have to be built on traditional financial markets. In the bond sector, green bond market has to be built on traditional bond market. The establishment of MOX in 2018 started the first bond exchange in Macau, in which issuance, listing and trading of bonds can be done under the same roof. Cooperation of MOX with LuxSE, with possible cross listing, can significantly increase MOX’s business volume, and extend the exchange’s international dimensions.

To further develop Macau’s markets in finance and green finance, the following areas have to be strengthened.

8.1 Legal infrastructure

As pointed out by new Chief Executive, Mr. HO Iat Seng, Macau has to update and upgrade its legal infrastructure (like tax law, securities law, and trust law) to help future development of its financial sector. On 25 May 2020, AMCM stated its intention to

refine Macau's legal infrastructure for financial business, and the process will take 2 to 3 years.

8.2 Regulation and Supervision

To promote healthy growth of Macau security markets, Macau has to establish an authority as a regulator and supervisor of its securities markets, like The Securities and Future Commission (SFC) in Hong Kong or The Commission de Surveillance du Secteur Financier (CSSF) in Luxembourg, as discussed in Section 7. Consider the relatively small size of Macau's securities market, the regulator can be housed in AMCM, at least in the early stage.

8.3 Market infrastructure

In order to activate the secondary market for bonds, computerized clearing and settlement facilities, Central Securities Depositories (CSD), are needed. Macau's CSD can also connect with CSDs of other economies, as well as International Central Securities Depositories (ICSDs) so that international investors can participate in Macau's debt market. ICSDs include Euroclear and Clearstream, the two largest ICSDs in the world, connections to which will allow international investors to hold and settle Macau debt securities.

Toward this end, on 27 April 2020, Secretary for Economy and Finance Mr. LEI Wai-nong announced that AMCM will establish a CSD platform, which will resemble Central Moneymarkets Unit (CMU) in Hong Kong. Subsequently, AMCM pointed out that it will take 2 to 3 years to build the new international-grade CSD platform.

8.4 Certification

A key to development of green finance is certification, which means the project has to be certified “green” by a professional third party. In Hong Kong, a large number of green projects are certified by Hong Kong Quality Assurance Agency (HKQAA), which was established by the Hong Kong Government in 1989. In the international community, a well-known certifier is Climate Bonds Initiative (CBI). Consider the relatively small size of Macau’s securities market, it may not be economical to establish a new institution for certification. Macau can use services of HKQAA, CBI, or other well-recognized certifiers.

8.5 Professional Talents

The lack of professional talents is generally regarded as a major obstacle to development of Macau’s financial business. A few moves may help to solve the problem:

- (i) Professional Accreditation – AMCM can learn from Hong Kong to establish a system of accreditation for professional programs generally taken by practitioners in the financial sector. With such a system in place, Macau can import internationally recognized professional programs from Hong Kong and elsewhere. With a clear accreditation system and hence a ladder for professional development, financial institutions will be more willing to support their employees to enroll in accredited programs, and practitioners will be more willing to enroll in these programs to help to climb up the professional ladder.
- (ii) Academic-Business Cooperation – Local universities and financial institutions can work together to build degree or professional programs with strong academic foundation plus good real world financial knowledge and/or experience. A good example is a program jointly offered by Macau

University of Science and Technology (MUST) and Bank of China.

- (iii) Guangdong-Hong Kong-Macau Greater Bay Area (GBA) Cooperation – Consider its small size and limited resources and experience, Macau can work with universities and training institutes in GBA in providing training programs.

8.6 Government Green Bond Program

In Hong Kong, the government announced in the 2018 to launch the Government Green Bond Program with a borrowing ceiling of HK\$100 billion. Proceeds raised would be used for financing public work projects with environmental benefits. In 2019, the Hong Kong government issued the first batch of US\$1 billion (= HK\$7.8 billion) of green bonds.

Learn from Hong Kong's experience, the Macau government should consider issue green bonds in Macau, then list the bonds in MOX, and use proceeds raised for financing local public work projects with environmental benefits.

Green bond issuance by Macau government can

- demonstrate the Government's support for sustainable development
- set a benchmark for green bond products in the market
- provide a good example for other potential green issuers
- promote awareness of and Macau's international profile in green finance

8.7 Green Banking in the Guangdong-Hong Kong-Macau Greater Bay Area (GBA)

Hong Kong Monetary Authority (HKMA) has formulated a 3-stage approach to Green Banking in Hong Kong.

Stage 1 – raise banking industry's awareness of green finance, strengthen banks'

management of climate change risks in their loans and other businesses, and develop an assessment framework and baseline in line with international standards.

Stage 2 – consult the industry to set tangible deliverables on green and sustainable finance, and promote green finance reform in the Hong Kong banking industry.

Stage 3 – implement relevant measures, and continuously monitor and evaluate the green progress of banks.

In Macau, AMCM can draft a similar road-map to green banking in cooperation with Hong Kong and other cities in GBA.

Toward the goal of reducing carbon emissions in GBA, a new advisory alliance combining governments and regulators from Guangdong, Hong Kong, and Macau was formed in 2019 - The Greater Bay Area Green Finance Alliance. The alliance consists of the Hong Kong Green Finance Association, the Guangdong Green Finance Committee, the Shenzhen Green Finance Committee, and the Macau Banking Association.

8.8 Green Finance Development: Beyond Green Bonds, Beyond Macau

To date, the main green financial products in Macau are green bonds. However, Macau should learn from other economies' experience to prepare to develop other green products (like green loans, green funds, green insurance, green stock indices, etc.) in the future.

In addition, Macau's vision of green finance development should go beyond Macau, to extend to the Portuguese-speaking Countries as well as countries related to the Belt-Road Initiative.

9. Conclusions

Signed by 195 countries in 2015, the Paris Agreement requires signatories to implement their national sustainable development and climate plans. To achieve these

plans, G20 planned in 2016 to raise US\$90 trillion of investments required over the next 15 years. This jump-started global development of green finance.

Green bonds are by far the most important green finance product. Global green bond issuance has been growing at an staggering annual average of 47.4% over the 2014-2019 period, reached an annual issuance of US\$257.5 billion in 2019.

Luxembourg, a small yet very rich economy like Macau, is among the global leaders in green finance development. Hong Kong, Macau's good neighbor and the other Special Administrative Region of China, has lagged behind in green finance development. But in recent years, Hong Kong has determined to develop this lucrative financial business. China, determined to develop its green finance, is already among the global leaders in the business. As a result, Macau is a well-positioned bridge between China and the international community in development of green finance. This is particularly true with the Portuguese-speaking countries. Towards this goal, Macau can learn from Luxembourg in the followings : to specialize in bonds and green bonds, to establish a green exchange, regulation and supervision, to further welcome foreign and cross-border financial professionals.

In addition, Macau should update and upgrade its legal infrastructure, train and import necessary financial professionals, establish a regulatory and supervisory authority for its securities business, to establish an internationally recognised certification scheme. Externally, Macau can seek business opportunities in the Greater Bay Area, Portuguese-speaking countries, and along the Belt-and-Road. Inside Macau, after green bonds, other green finance business, like green loans, green funds and green insurance, can be developed. Finally, to set a benchmark for the local green bond market, the Macau government should consider issuing green bonds and channel capital raised to local projects which help to further transform Macau into a more sustainable, low-carbon and climate-resilient city.

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