City University of Hong Kong
Research Centre for Sustainable Hong Kong[1]

Policy Paper No. 27[2]

Advancing Green Finance Development in Hong Kong: Policy Recommendations Based on Estimation of Financed Emissions

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1. Introduction

Investment and financing activities of the financial sector drive the productive or consumer activities in different sectors by providing funds, thereby generating carbon emissions in the supply chain. Therefore, the financial sector plays a crucial role in the transition towards carbon neutrality. In particular, financial activities aimed at sustainable and low-carbon goals --- such as loans, investment portfolios and asset management portfolios for low-carbon industries --- provide an important impetus for promoting low-carbon businesses and decoupling them from economies with high carbon intensity.

Therefore, it is crucial to scrutinize closely the greenhouse gas (GHG) emissions of financial institutions. The lending and investment practices of the financial sector, as well as their related GHG emissions, should be evaluated to ensure that they meet the goals of climate related actions. From a regulatory perspective, improving the disclosure of carbon emission information by financial institutions can strengthen regulation and market guidance. In practice, however, the disclosure of carbon emission data and related information in the financial sector has faced abundant limitations, including data deficiency and ambiguous accounting boundaries.

The previous policy proposal reports our preliminary estimates of financed emissions in three types of financial activities in Hong Kong, namely mortgage, business loan, and asset management, was 464 million

[1] Established in June 2017 by a cross-disciplinary research team, the Research Centre for Sustainable Hong Kong (CSHK) is an Applied Strategic Development Centre of City University of Hong Kong (CityU). CSHK conducts impactful applied research with the mission to facilitate and enhance collaborations among the academic, industrial and professional service sectors, the community and the government for sustainable development in Hong Kong and the Region. Please email your comments of this policy paper to sushkhub@cityu.edu.hk.

[2] This policy paper is the second part of a 3-part series on Hong Kong's Financed Emission. For the first paper, 'Accelerating green finance development in Hong Kong: Improving the estimation on greenhouse gas emissions in the financial sector', please click here. For the second paper, 'Estimation of Financed Emissions in Hong Kong: From the Perspective of Bank Loans and Asset Management', please click here. This research project is funded by The Sunrise Project and The Research Matching Grant Scheme of the University Grants Committee, Hong Kong.

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tons. This amounts to 13 times the local carbon emissions of 34.7 million tons announced by the Environment and Ecology Bureau of Hong Kong. This is the first time that the Hong Kong academic community has comprehensively estimated Hong Kong's total financed emissions. This paper compares the estimates of Hong Kong with the estimates of financed emissions of other regions by overseas research institutions. We are aware that the estimates of overseas research institutions have also faced problems such as incomplete data.

Based on the process of estimating financed emissions in Hong Kong and the estimated results, this paper will put forward some suggestions to further advance the development of green finance in Hong Kong and contribute to decarbonization. Despite the many constraints, we are convinced that this estimation is of significant value as a starting point to identify steps and priorities for advancement of the decarbonization roadmap.

2. Comparison of GHG emissions in the financial sector across different regions

Table 1 compiles the GHG emissions from the financial sector in Hong Kong, the UK, the United States, Singapore and Canada. In terms of the total GHG emissions from the financial sector covering banks and asset management in various regions, Hong Kong emitted 464 million tons, involving an amount of USD 3.62 trillion; the UK emitted 805 million tons, involving an amount of USD 5.42 trillion; the United States emitted 1.968 billion tons, involving an amount of USD 11.03 trillion; and Canada emitted 1.907 billion tons, involving an amount of USD 4.33 trillion. By dividing GHG emissions by the amount involved, the approximate emission intensities for each region are 128.18 (Hong Kong), 148.5 (UK), 178.37 (United States) and 440.55 (Canada).

The above results need to be interpreted from multiple perspectives:

1) From the perspective of the emission estimation process itself, financed emissions related to asset management account for a relatively large proportion in the estimated results of Hong Kong. According to our previous paper[4] on emission estimation methods, we used the weighted average of the emission intensity of sample enterprises as the overall carbon emission intensity of overall asset management (128.18 tons of carbon/million USD). The small size and large variance of the samples disclosed or provided by enterprises (from more than 40 tons of carbon/million USD to more than 200 tons of carbon/million USD) may, in theory, lead to underestimation. For the cases of the UK and the US, a bottom-up method is used to calculate the financed emissions of several major financial institutions in detail. Due to the relatively more complete investment portfolio information, the investment and financing structure information can be better reflected.

[4] Please refer to Dong, Mo, Li and Li (2023) Estimation of Financed Emissions in Hong Kong: From the Perspective of Bank Loans and Asset Management. Policy Paper No. 26 of CSHK.

Table 1. Comparison of GHG emissions in the financial sector across different regions

				UK (2019)	United States (2020)	Hong Kong (2021)	Singapore (2021)	Canada (2020)
Total		Emission intensity	tCO2e /million USD	148.50	178.37	128.18	260.87	440.55
		Emissions	tCO2e	805 million	1.968 billion	464 million	/	1.907 billion
		Amount involved	USD	5.42 trillion	11.03 trillion	3.62 trillion	/	4.33 trillion
Bank	Subtotal	Emission intensity	tCO2e /million USD	152.03	126.04	/	/	/
		Emissions	tCO2e	415 million	668 million	34.93 million	/	/
		Amount involved	USD	2.73 trillion	5.30 trillion	570 billion	/	/
	Credit Risk exposure	Emission intensity	tCO2e /million USD	/	/	/	/	/
		Emissions	tCO2e	/	/	/	/	/
		Amount involved	USD	2.73 trillion	5.30 trillion	/	/	/
	Business loans	Emission intensity	tCO2e /million USD	/	/	/	/	/
		Emissions	tCO2e	/	/	31.60 million	/	/
		Amount involved	USD	/	/	350 billion	/	1.34 trillion
	Mortgage	Emission intensity	tCO2e /million USD	/	/	/	0.01	/
		Emissions	tCO2e	/	/	2.96 million	50,000	/
		Amount involved	USD	/	795 billion	220 billion	5.99 trillion	/

	Operation	Emissions	tCO2e	/	/	370,000	/	/
Asset management	Asset management	Emission intensity	tCO2e/ million USD	144.93	226.76	140.92	/	/
		Emissions	tCO2e	390 million	1.30 billion	429 million	/	/
		Calculate AUM	USD	2.69 trillion	5.73 trillion	3.05 trillion	/	/
		Total AUM	USD	6.90 trillion	27.30 trillion	3.05 trillion	/	/
		Calculate the ratio	%	39%	21%	100%	/	/
	Operations	Emissions	tCO2e	/	/	1.25 million	/	/

Data sources: The Hong Kong figures are compiled and collated by the authors; the UK figures are sourced from WWF (2021) The Big Smoke Report; the US figures are from CAP (2021) Wall Street's Carbon Bubble: The Global Emissions of the US Financial Sector; the Singapore figures are from Zeng (2023), Master Thesis of City University of Hong Kong; the Canadian figures are from X. Hubert Rioux (2022), A Closer Look at the Carbon Footprint of Canadian Bank Portfolios.

2) Each region has its specific factors contributing to carbon emission intensity. The industrial structures of Canada (based on eight major banks) and Singapore (Singapore's calculation data only includes business loans) are relatively homogeneous, and high-carbon sectors such as mining and oil & gas (oil & gas for Singapore, and mining and oil & gas for Canada) are the leading sectors, resulting in significantly higher financed emission intensity. Compared with Canada and Singapore, the investment portfolios of large financial institutions in the UK and the United States comprise a more diverse range of industries. Although the traditional relatively high-carbon sectors still account for a larger proportion, their emission intensity is significantly lower than that of Canada and Singapore.

3) Specifically, for financial institutions in Hong Kong, many of their investment and financing activities are focused on the Greater Bay Area. Compared to the Beijing-Tianjin-Hebei region, the Greater Bay Area and the Yangtze River Delta have a higher proportion of light industries. Local loans, on the other hand, are more focused on the service industry. Taking the banking services in Hong Kong as an example, the loans from Hong Kong banks to the manufacturing sector, which is considered the largest source of pollution, are only USD 25.128 billion, accounting for less than 10% of its overall business loans. On the contrary, there are still many large manufacturing and energy enterprises in the UK and the United States, whose emission intensity is higher than our estimated data for Hong Kong.

4) When discussing the carbon emission intensity of investment and financing in each country and region, it is also necessary to consider the local conditions so as to fully assess whether the emission intensity is higher or lower than the ideal state. For example, compared with Singapore and Canada, where the resource extraction industry is dominant, financial institutions in the UK and the United States invest and finance in

a more comprehensive range of industries, resulting in relatively lower emission intensity. Although the dominant industry in Hong Kong is the service industry and the industrial structure in the Greater Bay Area, which is closely linked, is also dominated by light industry, the emission intensity is not significantly low, indicating that Hong Kong's investment and financing structure still has great low-carbon potential --- that is, investment and financing will/can shift to more high-tech and green industries, such as hydrogen energy and new energy power generation.

3. Recommendations to advance the development of green finance in Hong Kong

Based on the above analysis and findings on the estimation of financed emissions in Hong Kong, details described in our Policy Paper No. 26, we put forward the following recommendations:

3.1 Strengthening disclosure requirements on GHG emissions by financial institutions to cover all licensed financial institutions

According to the basic principle of GHG emissions accounting in the financial sector, it is necessary to master the activity data and emission factor of financial institutions in order to accurately calculate financed emissions. However, in our estimation process, it is not easy to collect the above two sets of figures.

In terms of activity data of financial institutions, the Hong Kong Monetary Authority provides relatively complete figures on bank mortgages and business loans, including the total amount and sectoral breakdowns. As for asset management, the Securities and Futures Commission of Hong Kong also invites licensed institutions to fill out a questionnaire every year to prepare the *Asset and Wealth Management Activities Survey*. However, this questionnaire only covers the types of investment products and investment regions, and does not specify the investment amounts by sector. In view of this, we can only calculate the emission intensity based on the GHG emissions disclosed by asset management institutions, and then estimate the overall emissions. Besides, in terms of emission factor, Hong Kong does not have a complete set of carbon emission factors by sector nor a complete asset turnover ratio parameter. We can only refer to the figures of EXIOBASE or replace them with the averages of the Chinese mainland, the United States and Japan.

The above limitations are due to the fact that the Hong Kong Monetary Authority and the Securities and Futures Commission of Hong Kong, as regulators, do not strictly require licensed institutions to disclose complete information on their financial activities. The current enterprise environmental, social and governance (ESG) reporting system in Hong Kong is mainly promoted by the Hong Kong Stock Exchange. Since 2012, the Hong Kong Stock Exchange has encouraged enterprises listed on its main board and GEM to voluntarily disclose ESG reports. Starting from 2020, ESG reporting has become mandatory and gradually extended to cover Scope 1, Scope 2 and Scope 3 in an orderly manner.

We believe that apart from the Hong Kong Stock Exchange, the Hong Kong Monetary Authority and the Securities and Futures Commission can also refer to similar practices and require all licensed financial institutions to submit ESG reports covering overall GHG emission data. The Hong Kong Monetary Authority and the Securities and Futures Commission jointly led the establishment of the Green and Sustainable Finance Cross-Agency Steering Group in 2020, but many measures of the Group are aimed at listed companies. We understand that most large financial institutions are listed for trading in Hong Kong, so requiring listed companies to submit ESG reports can cover a considerable number of financial institutions. However, many multinational and local financial institutions are operating in Hong Kong, an international financial center, without being listed in Hong Kong, and the financial activities of these

institutions also contribute to the financed emissions in Hong Kong. For example, the majority of the 18 asset management companies surveyed in our Policy Paper No. 26 are not listed in Hong Kong.

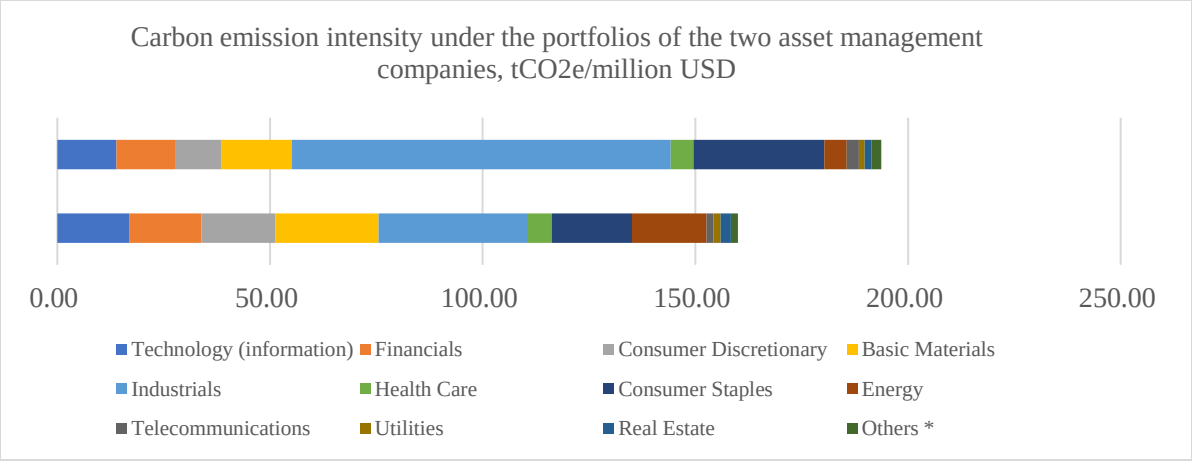
We believe that plugging the data deficiency gap as suggested above will not only enable more accurate estimation of carbon emissions, but is also an important first step to formulate further policies to guide capital flow to low-carbon enterprises and investment projects. It will also be conducive to third-party monitoring – and recognition - of Hong Kong's achievements in controlling GHG emissions. With the increasing popularity of impact investment, such development will add weight to Hong Kong's reputation as a green international financial center.

3.2 Channeling, through government policy, the investment & financing activities of financial institutions towards low-carbon enterprises based on financed emission data

According to our estimation of GHG emissions in the financial sector in Policy Paper No. 26, the investment & financing activities of the financial sector generate carbon emissions not only in the financial sector but also in the supply chain of the economic system by providing funds to different sectors. Therefore, the investment & financing orientation of the financial sector plays a key role in the transition to carbon neutrality. According to the estimation method, the key factors affecting the financed emissions are the carbon emission factor of the target sectors, and whether they are high-carbon or low-carbon sectors. Therefore, if financial institutions can finance more low-carbon sectors, they can drive these sectors to develop, mature and grow in the initial stage. The growth, maturity and expansion of low-carbon business hence help to realize the decarbonization of the current economic system in the long run.

Figure 1 below shows our analysis in Policy Paper No. 26. We use a 'bottom-up' approach to estimate financed emissions for two large-scale asset management companies with listed asset allocations based on asset allocation data and the corresponding carbon emission factor of different departments. The two companies mainly focus on investment in information technology, financials, consumer discretionary, industrials, health care, staples and so on. According to the estimated results, the average emission intensity is 159.98 tons and 193.69 tons of carbon dioxide equivalent/million USD, respectively. From the analysis by sector in Figure 1, if the investment is concentrated in high-carbon traditional sectors such as industrials and mining, emission intensity will significantly increase, causing a higher level of financed emissions. ***Such financed emission intensity data can be used as a basis to help us simulate and analyze to what extent the investment and financing structure can reduce the overall emission intensity, providing basic data for policies and planning relating to sustainable investment and financing.***

Figure 1: Carbon emission intensity of the two sample companies obtained by weighted estimation according to asset management allocations



Source: Annual reports of asset management companies and collation by the authors

Beyond the data, there are additional factors that warrant deeper consideration. Based on the data compiled and collected by us from different departments of bank loans and investment & financing, the traditional high-carbon sector continues to dominate in terms of bank loans and investment & financing. As mature high-carbon sectors usually have high and stable returns, banks are more willing to finance them. This is consistent with the economic logic behind it, and it needs to be gradually guided and improved through policies and supervision in the future.

If we want to encourage banks to offer subsidized low-interest loans to low-carbon sectors, we need to show them that in the long run, these low-interest loans are more beneficial than granting market-interest loans to high-carbon sectors. At the initial stage, offering these low-interest loans need to be supported by corresponding government policies. For example, if regulators improve the current ESG disclosure standards and put more emphasis on climate disclosure, granting bank loans to low-carbon enterprises can effectively increase banks' ESG ratings, and the upgrading of ESG ratings can bring more deposits to banks and attract investors' investment, which can compensate for the interest loss of low-interest loans to low-carbon enterprises in the long run. Low-interest loans can help low-carbon business better commercialized and scaled up in the early stage, thereby improving their competitiveness compared to high-carbon sectors. In the long run, this approach can gradually achieve low carbonization. Specifically, because the current economic system is still in a high-carbon lock-in state, which cannot fully reflect the negative externalities of the environment, low-carbon enterprises are often at a disadvantage in market competition. ***Low-interest loans and investments from financial institutions can help low-carbon enterprises overcome the initial difficulties. At the same time, regulation policies that with strengthened climate-related disclosures can enable banks to see that the benefits brought by investment and loans to low-carbon sectors can make up for short-term profit losses.*** Once a virtuous circle is formed, the yield rate of low-carbon causes will gradually increase, and banks will be more willing to finance them.

The Hong Kong Government can also collaborate with large financial institutions to promote green finance certification and guide funds to low-carbon enterprises. Green finance certification is conducted by independent third-party certification agencies to assess whether enterprises and investment projects are qualified to issue green bonds, obtain green loans and make green equity financing. Certified enterprises can obtain financing at lower costs. For example, since its launch in 2018, the Green and Sustainable Finance Certification Scheme of Hong Kong Quality Assurance Agency (HKQAA) has facilitated hundreds of green bonds and loan projects traded in Hong Kong. The certified enterprises include large enterprises

(such as New World China Land and Shenzhou International), government agencies (Hong Kong SAR Government, People's Government of Guangdong Province and Shenzhen Government) and city investment companies (Weifang Urban Construction and Development Investment Group Co., Ltd. and Wuhan Urban Construction and Development Investment Group Co., Ltd.)

However, Hong Kong's green finance certification is facilitated through negotiations between third-party institutions and financial institutions. We believe that the government and relevant regulatory agencies can collaborate with large financial institutions to promote green finance certification, and the government can even provide certain loan guarantees to cover more loans and financing projects. We believe that green finance certification can enable participating enterprises to obtain funds at lower costs, and empower financial institutions to contribute to net zero emissions across society. Additionally, green finance certification institutions will have more opportunities to engage in GHG emission accounting. After accumulating sufficient experience, Hong Kong can also export its advanced experience to neighboring regions and create new opportunities.

3.3 The government and regulators formulate a clearer and science-based target (SBT) emission reduction roadmap

In the process of developing green finance, government leadership is indispensable until financial institutions have worked out a profitable business model. Since 2019, the Hong Kong Government has issued four rounds of green bonds; together with private institutions, the total amount of green bonds and loans in Hong Kong has reached USD 80.5 billion, and the assets under management with ESG as the investment criterion have reached USD 142 billion. However, in terms of the role of regulators, Hong Kong may focus more on the spontaneous actions of market participants. In August 2023, the Green and Sustainable Finance Cross-Agency Steering Group also proposed ways to consolidate Hong Kong's sustainable financial ecosystem, and mentioned the following priorities:

- We should maintain consistency with global standards and establish a world-class regulatory system. We should appropriately adopt IFRS while taking into account local regulatory expectations and circumstances, to develop a comprehensive roadmap. Relevant authorities and stakeholders should form a working group to consider the elements that should be included in the roadmap and make recommendations to the steering group.
- We should advance the transition to a net zero economy through skills training, data enhancement, and technological innovation in the financial ecosystem. We should support non-listed companies and small and medium-sized enterprises in sustainable planning and reporting, and collect data through climate and environmental risk questionnaires from non-listed companies and small and medium-sized enterprises. At the same time, we will better formulate Hong Kong's green fintech blueprint through public-private cooperation.
- We should develop dynamic and reliable markets and diversified products to lead more capital to net zero transition. We should strive to build Hong Kong into an international carbon market, connecting opportunities in the Chinese mainland, Asia, and around the world.

It can be seen that Hong Kong regulators often prioritize the role of facilitators when formulating policies, and major regulatory reforms. They hope to seek and consolidate consensus among different stakeholders, so as to promote industry development from a business perspective, rather than being solely driven by regulators. This is also a continuation of Hong Kong's long-standing principle of 'disclosure-based approach', rather than 'merit-based approach'.

Across various jurisdictions, one may summarize two different major approaches to regulating the financial sector: 'disclosure-based' and 'merit-based'. The disclosure-based system focuses on the role of the market. As long as financial institutions have disclosed their operational and risk data as required, the remaining actions are left to the market and investors to decide. The merit-based system believes that regulators need to take another step to guide and prevent market risks.

Singapore adopts, by and large, a merit-based system. In 2022, the Singapore government issued a total of USD 22.5 billion in perpetual bonds to stimulate Singapore's perpetual debt market, and prepared to allocate an additional USD 11.25 million as an allowance to support other institutions in issuing perpetual bonds. The Monetary Authority of Singapore, responsible for financial sector regulation, launched the *Finance for Net Zero Action Plan* in 2023 and set four goals:

- Develop stricter definitions and disclosure guidelines for carbon emission data;
- Improve the environmental risk management capabilities of financial institutions, and determine climate-related financial risks through climate scenario analysis and stress testing;
- Consult with industry experts and collaborate with institutions such as the International Energy Agency to formulate a credible transition plan, so that financial institutions can refer to these plans to formulate their own roadmap and take actions in decarbonization;
- Promote green solutions and market expansion, including expanding the issuance scope of sustainable bonds and loans, continuing to encourage issuers to adopt sustainable disclosure, raising funds for carbon-intensive sectors, and supporting the development of carbon credit markets.

Among them, the consultation document of *Transition Planning Guidelines* for banks clearly puts forward clear and quantifiable sustainable investment and financing structure optimization goals that support transition to carbon neutrality and are based on scientific goals. Banks need to plan the sustainability of their business models based on multi-year risks, and apply and continuously improve forward-looking risk management tools such as scenario analysis and stress testing, among which detailed financial emission accounting provides a strong data support for the entire transition plan.

At present, it is difficult to determine which regulatory model is better. However, regardless of the model, ***we suggest that Hong Kong regulators can set more ambitious timelines and performance indicators, such as clearly pointing out when a comprehensive roadmap for climate disclosure and supervision can be established, clarifying the scope of the green fintech blueprint, and the specific amount and proportion targets for leading the net zero transition of capital flows.***

3.4 Strengthening the training of green-related talents

In a survey of green jobs in Hong Kong, we interviewed a number of audit professionals, ESG consultants and business executives, all of whom suggested that the green training (including GHG accounting) and professional qualification framework in Hong Kong were rather scattered.[5]

We suggest that the government collaborate with academic institutions to introduce a qualification certification framework, allowing individuals interested in entering the industry to acquire sufficient knowledge and skills. The institutions that provide relevant training can also adapt and increase resources

[5] Linda Chelan Li, Kin On Li, and Bo Wen. 2023. Green Jobs in Hong Kong: Utilizing Environmental, Social and Governance (ESG) Reporting and Certification Services as an Example. A Research Report prepared for the APEC Project on 'Promoting Resilient Economic Recovery after the Epidemic through Green Jobs', Chinese Academy of Personnel Science. Hong Kong: Research Centre for Sustainable Hong Kong, City University of Hong Kong.

to design more appropriate courses. In the long run, ESG consultants, auditors and green finance certification practitioners related to climate and social affairs should all pursue a more professional path, including considering a licensing system to ensure the quality of relevant practitioners.

4. Summary

Our study estimates that the financed emissions in Hong Kong amount to 464 million tons, which is 13 times of the 34.7 million tons of domestic emissions announced by the Environment and Ecology Bureau of Hong Kong. Despite various limitations in the process of collecting financial data from Hong Kong in this study, we have developed a set of methods to overcome them. We have also compared our estimation results to those of foreign research institutions on other international financial centers. Our analysis concludes that the estimation of financed emissions in Hong Kong is reasonable.

As financial institutions control the dominant flow of funds (investment scope and projects), the financial sector plays a crucial role in the global net zero transition. Hong Kong, as an international financial center, ranks among the top in the world in terms of stock market value, business loans and mortgages, bond issuance amounts and asset management business scale, indicating that Hong Kong's financial sector has a great influence on the global net zero transition.

Based on the estimation results of financed emissions in Hong Kong's financial sector and its important role in the process of carbon emission reduction, we propose that the Hong Kong Government and regulatory agencies should strengthen the disclosure requirements for GHG emissions, covering all licensed financial institutions. When all sectors of society have more accurate data on financed emissions, policies should be developed to guide financial institutions to finance more low-carbon enterprises, thereby promoting the decoupling of overall economic activities from high carbon. We also look forward to the Hong Kong Government and regulators outlining a clearer financial sector emission reduction roadmap, setting more specific timelines and performance indicators, so as to promote Hong Kong's green transformation.

This article is the last of our three policy proposals on financed emissions in the financial sector. We reiterate that to enable financial institutions to play a key role in emission reduction, it is necessary to take appropriate steps to measure and disclose the operational emissions of financial institutions as well as the financed emissions. Only in this way can objective measurement criteria be established to judge the effectiveness of measures taken by financial institutions in advancing net zero emission. This will provide a basis for stakeholders from various sectors and policymakers to discuss and formulate emission reduction policies tailored to different industries and sectors.

We welcome comments from all sectors on the three policy papers in this series to advance the development of green finance in Hong Kong and help Hong Kong and the world achieve net zero emissions at an early date.