E-PAPER

Development of Green Bonds in Asia: Climate Contributions and Stakeholder Dynamics

Carbon Care Asia

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HONG KONG
Asia | Global Dialogue

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About Carbon Care Asia

Operating from Hong Kong and Singapore, Carbon Care Asia (CCA) is a missiondriven consultancy in corporate sustainability, carbon strategy, climate competence and sustainable finance. CCA offers integrated solutions to manage risks and capture business opportunities whilst tackling sustainability challenges and responding to the climate emergency. Since its establishment in 2008, CCA has served over 200 Asian companies in pursuit of its mission to accelerate the transition to a net-zero carbon economy benefitting all.

Acronyms

ASEAN	Association of Southeast Asian Nations
CBI	Climate Bonds Initiative
CBIRC	China Banking and Insurance Regulatory Commission
CBT	Climate Budget Tagging
CCAM-DDR	Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction
CCC	Climate Change Commission (Philippines)
CSO	civil-society organisation
CSRC	China Securities Regulatory Commission
DJPPI	Directorate General of Climate Change (Indonesia)
EU	European Union
GBP	Green Bond Principles
GFCS	Global Framework for Climate Services
GTFS	Green Technology Financing Scheme (Malaysia)
IFC	International Finance Corporation
ICMA	International Capital Market Association
KPI	Key Performance Indicator
MAS	Monetary Authority of Singapore
MEE	Ministry of Ecology and Environment (China)
MESTECC	The Ministry of Energy, Science, Technology, Environment & Climate Change
NAFMII	National Association of Financial Market Institutional Investor (China)
NCCS	National Climate Change Secretariat (Singapore)
NDC	Nationally Determined Contribution
NDRC	National Development and Reform Commission (China)
NGFS	Network for Greening the Financial System (Central Banks and Supervisors)
NGO	Non-Governmental Organisation
MoNRE	Ministry of Natural Resources and Environment (Thailand)
OJK	Financial Services Authority of Indonesia (Indonesian: Otoritas Jasa Keu-angan)
PBoC	People's Bank of China
SDG	Sustainable Development Goal
TCFD	Task Force on Climate-related Financial Disclosures
UNDP	United Nations Development Programme

1. Introduction

The Paris Climate Agreement lays a solid foundation for mobilising the capital market for climate mitigation and adaptation actions. This can include a wide variety of funding sources, instruments and channels. Green bonds, as debt securities that finance or refinance environmental projects, have been growing rapidly and are recognised as one of the primary instruments for tracking the finance flow and responding to the investment needs of programmes to address climate change.

This report assesses the extent to which green bonds help Asia meet the Paris Agreement, and delivers a mapping and analysis of the key green bond actors and stakeholders in Asia. Carbon Care Asia (CCA) is engaged in conducting desktop research, which covers Asian emerging markets, including China, Hong Kong, Indonesia, India, Malaysia, Philippines, Singapore and Thailand. CCA collects data for green bonds issued between January 2018 to June 2020 and undertakes an assessment of the range of actors and stakeholders involved in the green bond market and 373 green bond deals.

2. Climate governance and sustainable financial system development

The regulatory agencies in all countries play critical roles in laying the foundation for financing the decarbonisation activities in pursuit of climate action. Chart 1 presents an overview of key regulators responsible for climate strategy, green bond issuances and sustainable financial system development in the markets covered. Crossagency collaborations can promote the development of the sustainable financial system, in particular, by involving the agency responsible for climate change strategy. China has been the first country in the region to form a task force and published a series of policies and guidelines related to its sustainable financial system since 2015, including the first green bonds taxonomy in the region. In September of 2020, five Chinese government agencies released new guiding opinions[1] to promote the "climate investment and financing" and implementation of Nationally Determined Contribution (NDC), which will back China's ambition for carbon neutrality in 2060[2].

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[1] Available at: https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202010/t20201026_804792.html.

[2] Available at: http://www.gov.cn/gongbao/content/2020/content_5549875.htm.

Market	National Agency - climate strategy	Green Bond Regulatory Agency	Leading Agency - Sustainable Financial System	Remarks
China	Department of Climate Change (under Ministry of Ecology and Environment (MEE))	National Development and Reform Commission (NDRC), People's Bank of China (PBoC), China Securities Regulatory Commission (CSRC) and National Association of Financial Market In-stitutional Investor (NAFMII)	PBoC, Ministry of Finance, NDRC, CSRC, China Banking and Insurance Regulatory Commission (CBIRC) and MEE	PBoC – The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) Member
Hong Kong	Environment Bureau (EB)	The Hong Kong Monetary Authority (HKMA) and the Securities and Futures Commission (SFC)	HKMA, SFC, EB, the Financial Services and the Treasury Bureau (FSTB), Hong Kong Exchanges and Clearing Limited (HKEX), the Insurance Authority (IA) and the Mandatory Provident Fund Schemes Authority (MPFA)	HKMA – NGFS Member
India	Prime Minister's Council on Climate Change	Securities and Exchange Board of India	N/A	N/A
Indonesia	Directorate General of Climate Change (DJPPI), Ministry of Environment and Forestry and National Development Planning Agency	Financial Services Authority (Otoritas Jasa Keuangan, OJK)	OJK	Bank Indonesia – NGFS Member
Malaysia	The Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC)	Security Commission Malaysia	Central Bank of Malaysia	Central Bank of Malaysia – NGFS Member

Philippines	Climate Change Commission (CCC) and Cabinet Clus-ter on Climate Change Adaptation, Mitigation and Disaster Risk Reduction (CCAM-DR)	Securities and Exchange Commission	Monetary Board of the Central Bank of the Philippines (Bangko Sentral ng Pilipinas)	N/A
Singapore	NCCS (Under the Strategy Group Prime Minister's office)	Monetary Authority of Singapore (MAS)	MAS	MAS - NGFS Member
Thailand	Ministry of Natural Resources and Environment (MoN-RE)	Securities and Exchange Commission	Bank of Thailand	Bank of Thailand - NGFS Member

Chart 1 Overview of the key regulators

The capital allocation process for climate actions is illustrated in Chart 2, which covers funding sources, instruments and channels in public and private sectors. Within the ecosystem, green bonds serve as one of debt instruments to attract funds from the private sector, and are seen as the key sustainable financial product.

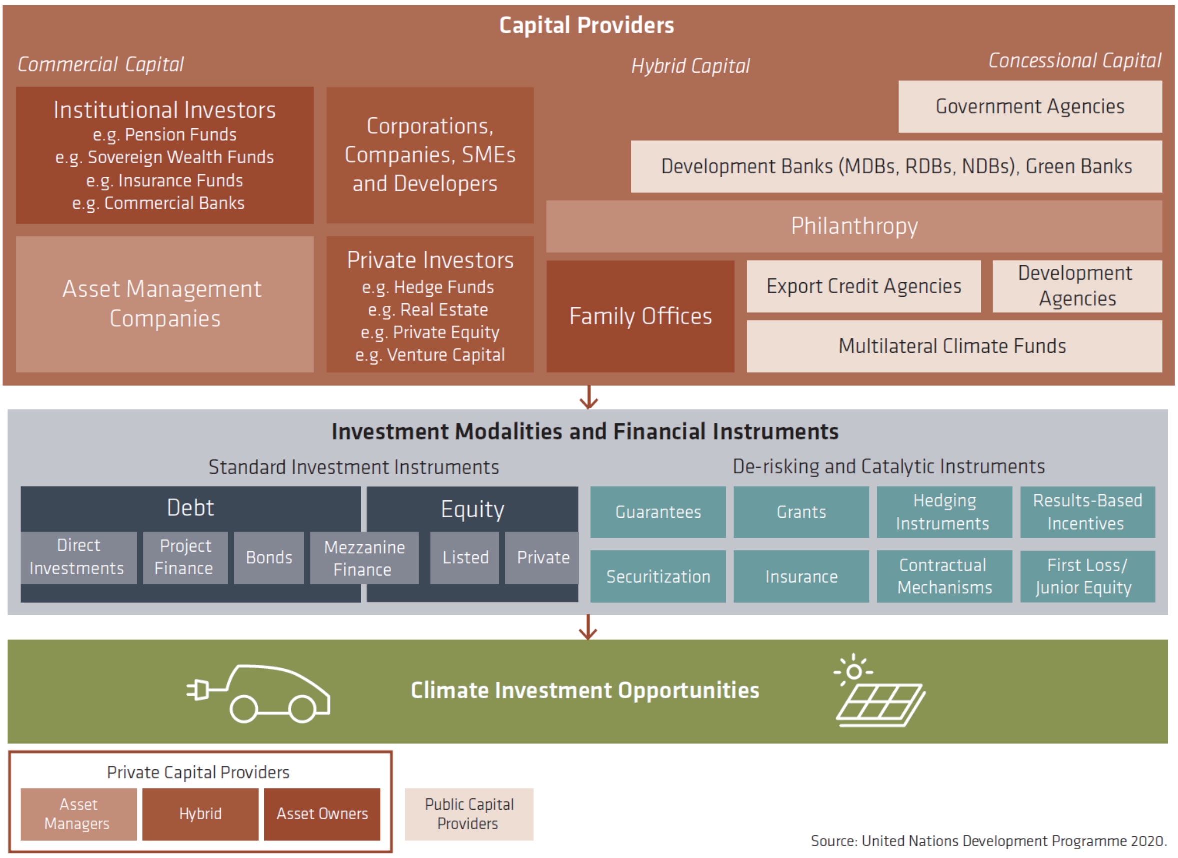

Chart 2 Ecosystem of investment in climate action

The United Nations Development Programme (UNDP) has developed a guidance note[3] (shown in Chart 3) for Governments to track climate finance in their budgets, and created a Climate Budget Tagging (CBT) tool which enables countries to monitor and track the climate-relevant spending and alignment with the NDCs. Although the tool is designed for a country's public financial system, it has been applied in Indonesia's sovereign green bond. The details will be introduced in Section 4 and the discussion on how the private sector can apply it will be covered in Section 5.

Government Bodies and Processes that Constitute a Climate Change Financing Framework

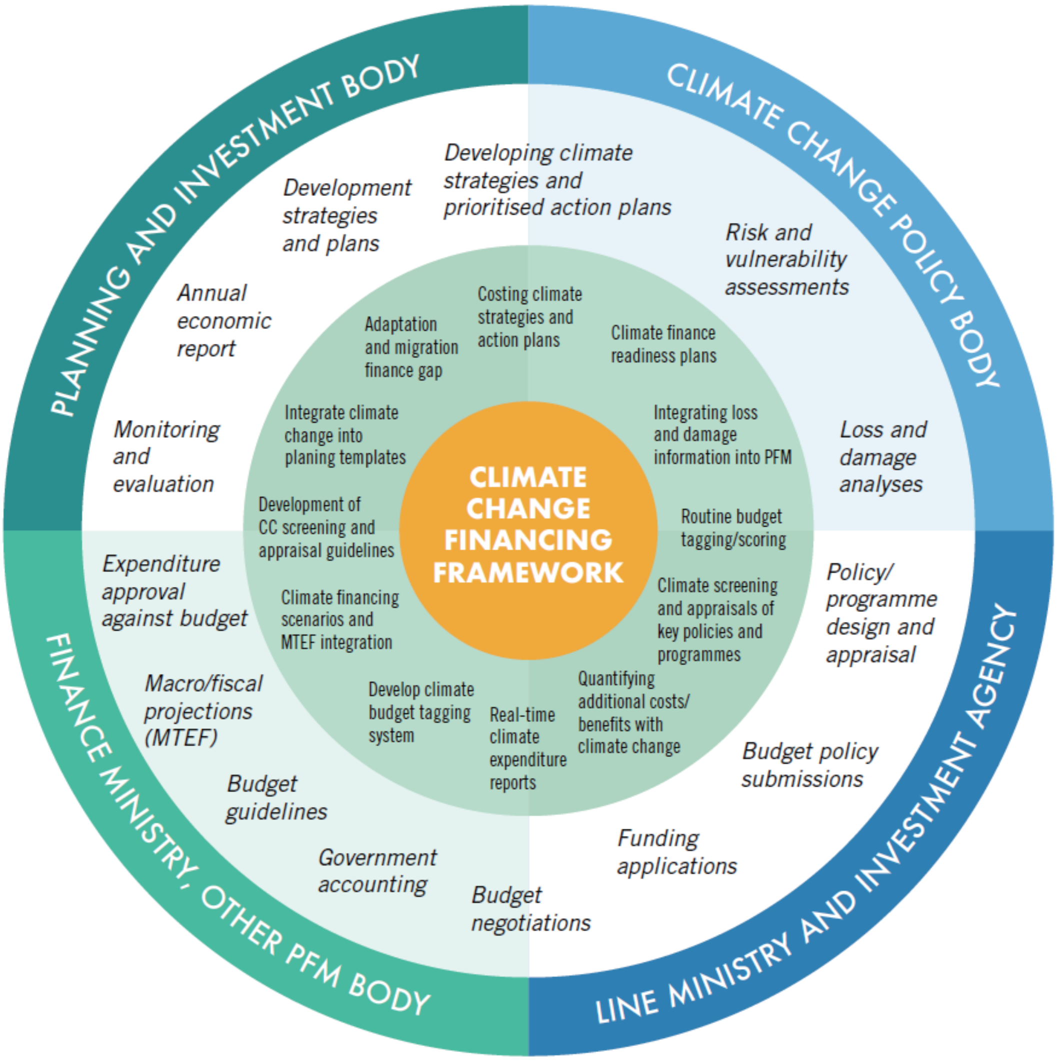

Chart 3 Integrated Approaches: A guidance note for Governments to track climate finance in their budgets, UNDP, 2019

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[3] Source: Climate Change Knowing What You Spend (UNDP, 2019)

3. Analysis of green bonds' contribution to the Paris Agreement

3.1. NDCs do not equal the achievement of Paris Agreement

Measuring the contribution of issued green bonds to a country's NDC and the Paris Agreement is not a straightforward task. First, it is important to note that a country's NDC is not necessarily aligned with the Paris Agreement goal to limit global warming to well below 2°C or 1.5°C. NDCs are commitments that are the base for national climate action plans and are expected to be enhanced every five years. When the Paris Agreement was signed, it was already known that the NDCs worldwide were not enough to meet its goals and in aggregate were expected to lead to global warming of around 3°C[4]. In addition, NDCs were submitted with varying disclosures on the investment required from public and private sectors, which creates difficulty in identifying the fair share of green bond issuances to align with the commitment.

3.2. Green bonds issuances in the markets covered

Chart 4[5] presents an overview of green bond and loan issuances between 2013 and 2019, in which the Asia-Pacific region contributes the steady growth. China[6] is the leading market in the region since 2016, and the significant increase of other markets can also be observed in Chart 5[7]. Green bond issuances have been affected by the social and economic impacts of the COVID-19 pandemic in the first half-year of 2020. This could be explained by a recent shift in priorities: the global COVID pandemic has led to an increase in social and sustainability bonds which can raise capital for healthcare issues.

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[5] Source: ASEAN Green Finance State of Market 2019 (CBI, 2020)

[6] Due to the discrepancies of the Chinese green bond standards, which allow "less than 50% proceeds to be used as working capital" and "clean coal" projects, more than 20% of onshore Chinese green bond issuances are not included in China's figures.

[7] Source: CCA sustainability bond database

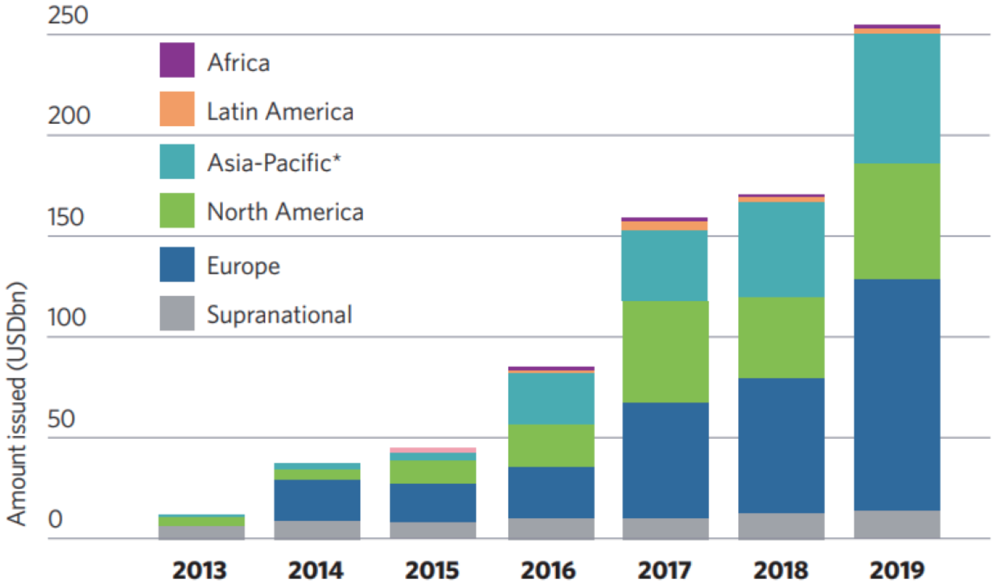

Chart 4 Green Bond and Loan Issuance in 2013-2019

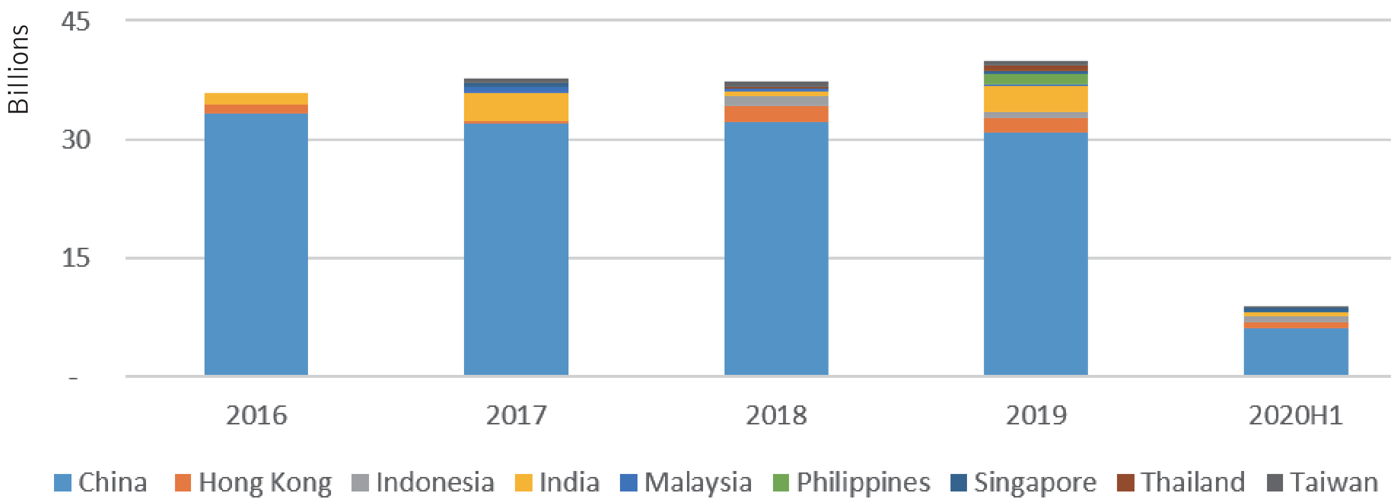

Chart 5 Green Bond Issuances in 2015-2020H1

3.3. Green bonds and NDCs in Asia

NDCs will require comprehensive financing strategies, drawing on a diversity of financial instru-ments and sources including domestic public finance, domestic and international private invest-ments and international public support.

One way to look at the contribution of green bonds to the achievement of the Paris Agreement is to compare them to the amount of investment needed by each country to achieve their NDCs or longer-term targets to transition to a low carbon economy. The desktop research reviews the NDCs for the Paris Agreement released by markets included in this review. The amount of green bond issuances since 2016 has been summarised to reflect market development and identify its contributions to the relevant NDCs in Chart 6.

Market	Range of investment needed	Green bonds issued between January 2016 and June 2020[8]
China	Investments needed to meet the 2060 carbon-neutral target could total 100 trillion yuan (USD 15 trillion) over the next 30 years.[9]	1. Onshore and offshore Mainland China: USD 135.4 billion 2. Hong Kong: USD 6.1 billion 3. Taiwan: USD 2.2 billion
India	To fully meet its NDC, India would need USD 3.1 trillion between 2015 and 2030.[10]	USD 10.6 billion
Indonesia	Indonesia needs USD 4.4 trillion to reach climate change targets.[11]	USD 2.8 billion
ASEAN	A green investment opportunity in ASEAN of USD 200 billion per year until 2030.[12]	USD 7.7 billion (including In-donesia)

Chart 6 Comparison between the investment needed to achieve NDCs and the green bonds issued

[8] Source: CCA's own sustainability bonds database.

[9] Available at https://www.bloomberg.com/news/articles/2020-09-28/china-s-top-climate-scientists-lay-out-road-map-to-hit-2060-goal?sref=u54rlV6D

[10] Available at https://dea.gov.in/sites/default/files/FINAL%2017%20SEPT%20VERSION%20Climate%20Summit%20for%20Enahnce%20Action%20A4%20size.pdf

[11] Available at https://fiskal.kemenkeu.go.id/nda_gcf/en/news/indonesia-needs-ususd4-4t-to-reach-climate-change-targets

[12] Source: Green Finance Opportunities in ASEAN (UNEP and DBS, 2017)

Although green bonds represent only one instrument for green financing (shown in Chart 6), the differences between the scales of issuances and the investment needed are clear. The number of green bond issuances per year is growing steadily, but the green bond market is still marginal, representing less than 1% of the total global bond market[13]. Green bonds' potential is yet to be fully utilized.

3.4. NDCs comprise two main aspects: mitigation and adaptation

Another way of measuring green bonds' contribution to NDCs is to assess the amount of proceeds dedicated to adaptation and resilience. When appraising NDCs, people most usually focus on mitigation outcomes in terms of greenhouse gases emissions reduction. However, by signing the Paris Agreement, countries also agreed to the goal of adaptation; to prepare for the impacts of climate change and foster climate resilience. Investments in adaptation and resilience are particularly important in developing countries. According to the Climate Bonds Initiative (shown in Chart 7), green bonds issued in ASEAN allocated 8% of proceeds to adaptation activities in 2018, which declined to 5% in 2019. This could be explained by the lack of awareness and incentives for corporate issuers to invest in adaptation activities. Far from being restricted to the public sector, adaptation and resilience activities are vital to corporations since their assets and business activities are at risk of being affected by the impacts of climate change.

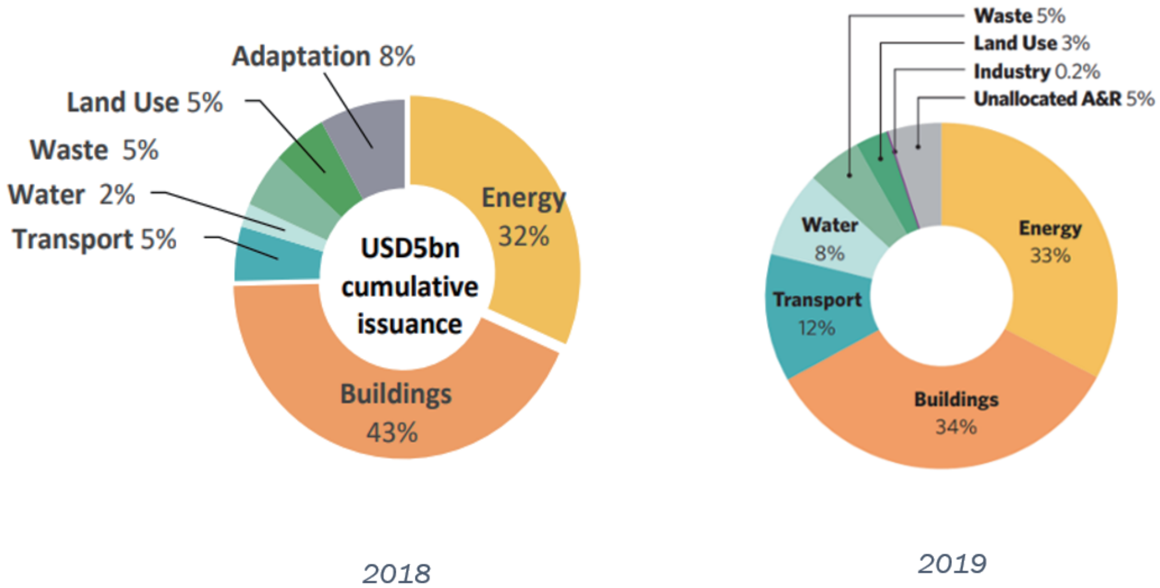

Chart 7 Breakdown of Use of Proceeds in ASEAN Countries

13 Available at: https://www.mdpi.com/1911-8074/13/3/61

3.5. The potential of sovereign green bonds

Multilateral and regional development banks, such as the European Investment Bank and the World Bank pioneered green bond issuances since 2007, which demonstrated the business case for potential Asian issuers. The financial institutions and corporates have entered the green bond space in 2014 as the boost of the market, and there has been growing momentum for sovereign and municipal green bonds.

There is a huge potential in tapping the sovereign debt market as they represent more than 40% of global debt securities[14]. So far only two markets (Hong Kong and Indonesia) have issued a sovereign green bonds and one country (Thailand) has issued a sustainability bond (financing a combination of green and social projects). In addition, adaptation projects have been covered in Hong Kong and Indonesia's sovereign green bonds which can help to fill the gap in adaptation financing. More issuances of sovereign green bonds would be a game-changer as they provide an opportunity for countries to link their budgets with their NDCs.

3.6. The measurement and disclosure of Asian green bonds' impacts not aligned

Not all green bonds are created equal. Some self-labelled green bonds do not align with the Green Bond Principles, and some are not issued with a green bond framework and an external review, let alone an annual impact report. It is therefore challenging to fully grasp the impact of these green bonds if they do not disclose such details. That said, some other green bonds to demonstrate best practices and are transparent. Thus there exists a wide spectrum of practices and levels of disclosure within the green bond universe. It is still not a widespread practice for issuers to publish an annual impact report and reveal the estimated quantitative impact of each of the projects financed by their green bond. The quantitative measures (such as carbon emissions avoided) are not easily comparable with other issuances due to a lack of disclosure of the methodology behind these measures or the use of different baselines and calculation methods.

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[14] Available at https://theasset.com/article-esg/41805/asia-pacific-sees-strong-momentum-towards-green-finance-despite-pandemic

To assess the aggregate impact of green bonds, it would be crucial to know if the proceeds went to financing new projects or for refinancing existing projects. The Green Bond Principles (GBP) only recommend that issuers provide an estimate of the share of financing versus refinancing and also clarify which project portfolios may be refinanced; but they don't make this a requirement. While refinancing has its benefits, this application makes it difficult to assess a bond's impact and contribution to the low-carbon economy. Indeed, the green label does not oblige an issuer to use the freed-up capital in a green project and money could still be funneled to brown projects. In October 2020, one asset manager warned that only around 85% of global green bonds deserve the green label. The remaining 15% are issued "by companies that may use the proceeds for environment-friendly projects but which are involved in activities that incur negative impacts elsewhere"[15].

Secondly, many green bonds issued by financial institutions allocate proceeds to fund (or refinance) large-scale projects that may also be funded by other banks, thus creating the chance of double counting. In addition, green bonds do not necessarily fund projects located in their country of issuance. Therefore, it cannot be assumed that a green bond contributes to achieving the NDC of the issuer's country.

Finally, one further challenge is that even if a green bond's documentation discloses the projects funded and estimates impact in an annual report, the potential negative environmental impacts are not fully disclosed. Because of a lack of harmonisation between the various international green bond standards, green bond definitions and investments allowed are not the same everywhere. Some green bonds allocate proceeds to activities involving fossil fuel (either in the form of "clean coal" natural gas or hybrid cars) or large hydropower dams which have been shown on occasion to cause emissions of methane, a greenhouse gas more potent than carbon.

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[15] Available at: https://www.theasset.com/article-esg/41949/theasset.com

3.7. Market participants facing challenges

Market participants, including issuers, investors and intermediaries, have reached a consensus that green bond issuances can enhance their sustainability reputation, which may bring more opportunities. However, many issuers are still unclear about the direct financial benefits and express concerns about the additional cost and resources required for pre- and post- issuance processes. The intermediaries are expected to support the issuers to identify the eligible project pipelines and ensure the green credentials. Fear of ‵‵green washing′′, lack of diversity in the green bond market and the liquidity of these bonds are the top challenges for investors[16].

[16] Available at https://www.mdpi.com/1911-8074/13/3/61

4. Analysis of key stakeholder groups' contributions

Various actors are identified in the 373 green bond issuances in the markets covered. In this section, observations are made on these actors' roles and relationships.

4.1. Regulators

The issuing platforms, mainly stock exchanges, can play a vital role in the development of the green bond market by providing greater transparency and enabling market access. Many steps have been taken to integrate ESG assessment and reporting among listed companies and stock exchanges can be differentiated based on their ESG policies. Green finance, however, is still in its infancy on the floor of stock exchanges. The Monetary Authority of Singapore (MAS) and the Hong Kong Monetary Authority (HKMA) have introduced grant schemes to subsidise the external review cost of green bond which will be listed in SGX and HKEX. This study examines which stock exchanges showcase a specific green or sustainability listing segment and which don't. Chart 8 shows the policies and listing requirements related to green bonds of different platforms.

Exchange	Sustainability/Green listing segment	Remarks
Hong Kong Stock Exchange	Y	Link Additional Listing requirements • Submit bond framework, annual reports and the external review
Shanghai Stock Exchange	Y	Link Green bonds are labelled as "G" in the bond code.
Shenzhen Stock Exchange	Y	Link Green bonds are labelled as "G" in the bond code.
China Interbank Bond Market	Y	Link Green bonds are labelled as "GN" in the bond code.
National Stock Exchange of India	N	
Bombay Stock Exchange	Y	Link
Bursa Malaysia	N	
Philippine Stock Exchange	N	
Thailand Stock Exchange	N	
Singapore Stock Exchange	Y	Link
Taiwan Stock Exchange	Y	Link
Luxembourg Stock Exchange (LuxSE)	Y	Link • Provide information of proceeds allocation • Indicate which framework is applied to classify their bond • Submit external review

Chart 8 Green Bond listing information in different stock exchanges

4.2. Issuers

As mentioned in Section 2, UNDP's suggestion of Climate Budget Tagging (CBT) has been adopted in Indonesia's sovereign green bond and the flow is demonstrated in Chart 9, which can showcase how Asian governments can tie their fiscal budget to their climate pledge by issuing a sovereign green bond in alignment with their NDCs.

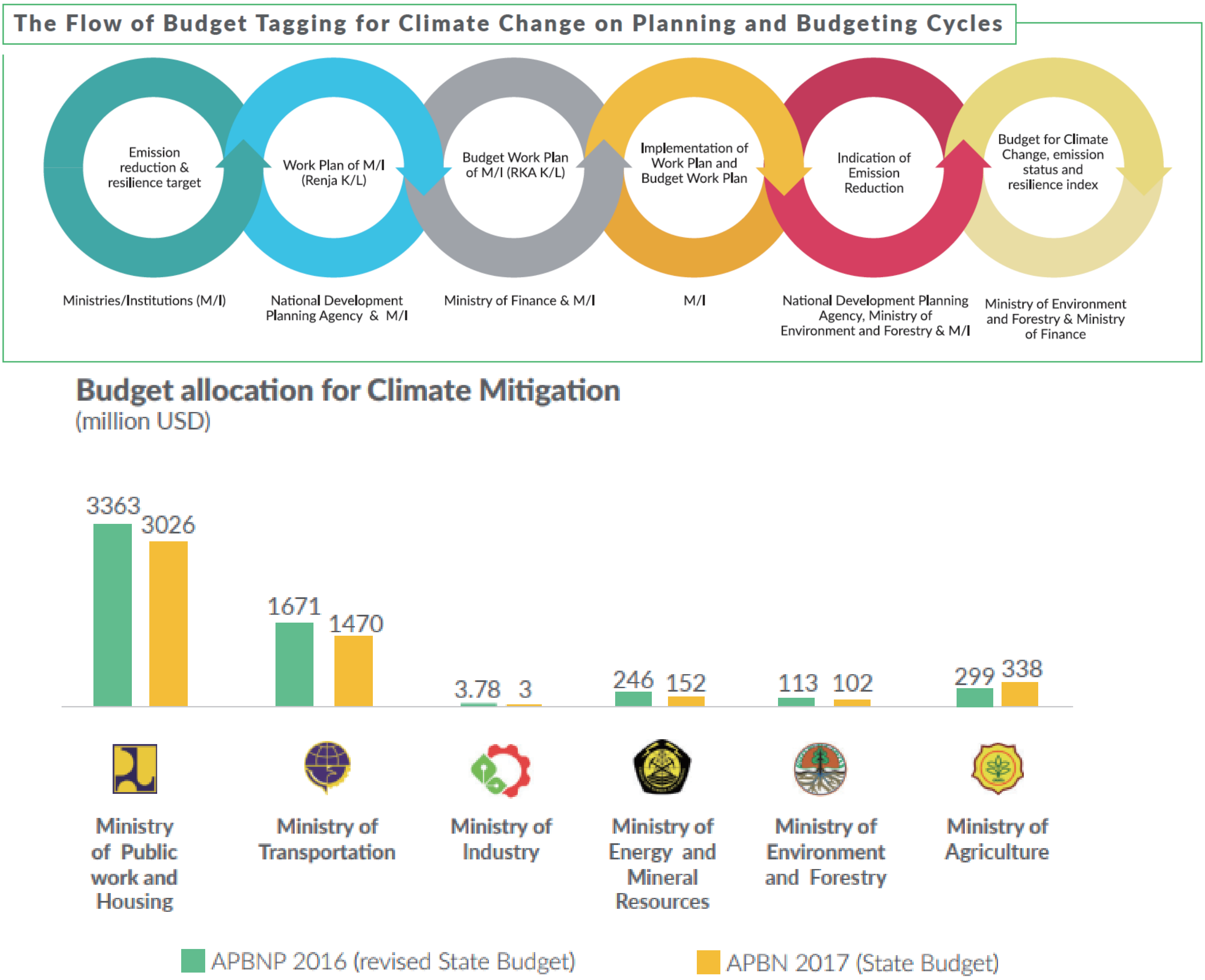

Chart 9 CBT application for Indonesia's sovereign green bond

Financial and non-financial corporates are the main issuers of green bonds in Asia. Contrary to public issuers, they do not have incentives or tools to measure the impacts of their issuances against the country's NDC. The lack of incentives includes that fact that regulators and government do not set quantifiable measures to examine the alignment with NDCs, only providing directional guidelines about the eligibility of underlying project types. From the demand-side investors do not currently require such information.

4.3. Underwriters

A great variety of banks are identified in the bond underwriters' category. A mix of international and Chinese underwriters can be seen in leading the ranking in terms of total green bond value. The upper echelons of underwriters cover dozens of deals while the lowest ranking ones have few.

Overall, larger green bond issuances tend to attract a greater number of prominent international underwriters whilst smaller ones tend to be underwritten by local or regional underwriters with little participation from international banks. While Chinese state-owned banks like Bank of China and Agricultural Bank of China top the ranking, European underwriters also predominate in the upper echelons of green bond underwriters above American investment banks. Standard Chartered, HSBC and Crédit Agricole lead the rest.

Charts 10 presents the primary underwriters of green bond issuances in different markets.

China	HK	India	ASEAN
Bank of China	HSBC	Barclays	HSBC
Agricultural Bank of China	Credit Agricole	JP Morgan	Danareksa
China Construction Bank	UBS	Citigroup	Dubai Islamic Bank
Industrial and Commercial Bank of China	Merrill Lynch	HSBC	Maybank
HSBC	Standard Chartered	Standard Chartered	BNP
China Merchant	JP Morgan	MUFG	Abu Dhabi Islamic Bank
Credit Agricole	Citigroup	Deutsche Bank	BPI Capital
Standard Chartered	China Construction Bank	Credit Suisse	Standard Chartered
BNP	BNP	Morgan Stanley	CLSA
Guotai Jun'an Securities	United Overseas Bank	Goldman Sachs	Credit Suisse

Chart 10 Top 10 underwriters in different markets. Source: stock exchanges in markets covered

4.4. External reviewers

Noticeably, 83% of the green bonds have been reviewed by external service providers. The types and scopes of these reviews vary and the external reviewers are composed by three main categories, namely environmental consultancy firms, audit firms and rating agencies. Charts 11 shows the primary underwriters of green bond issuances in different market.

International prominent environmental consultancy firms include such as CICERO, Vigeo Eiris and Sustainalytics and local firms as Beijing Zhongcai Green Financing Consultant in China and Emergent Ventures India also appear regularly as second party opinion providers. Since green bond issuances grow rapidly in China and Hong Kong, it is noticed that there are more local service providers, including Lianhe Equator Environmental, Shanghai Brilliance and China Bond Rating, which are associated with domestic rating agencies.

The global "Big Four" audit firms including Ernst & Young and KPMG offered a number of assurances to issuers, mainly in China and ASEAN countries. CBI certifies bonds under its Climate Bonds Standard and Certification Scheme within the purview of its strict scientific criteria that is in line with the two-degree Celsius warming limit outlined by the Paris Agreement. After examining a total of 373 green bonds, 35 bonds are found to have been certified by CBI, or 9.4% of the total.

China	HK	India	ASEAN
Ernst & Young	Vigeo Eiris	KPMG	CICERO
Deloitte	Sustainalytics	Emergent Ventures India	Sustainalytics
CICERO	CICERO	Sustainalytics	Vigeo Eiris
Beijing Zhongcai Green Financing Consultant	Lianhe Equator Environmental		Ernst & Young
Hong Kong Quality Assurance			RAM Consultancy

Chart 11 Top 5 external reviewers in different markets.
Source: stock exchanges in markets covered

4.5. Legal advisors

Many bond issuers seek advice from a mix of local and international law firms. In China, a few high profile local law firms, such as the King & Wood Mallesons and Beijing Deheng, are featured in a considerable portion of the onshore green bond deals. However, international law firms such as Linklaters, Clifford Chance and Latham & Watkins continue to dominate, with more than a dozen green bond deals covered by these top three law firms in the league table.

Legal Advisors	Size (In Million USD)	
Linklaters	$	20,680
King & Wood Mallesons	$	15,280
Clifford Chance	$	11,881
Latham & Watkins	$	3,850
Beijing Deheng Law	$	3,018
C&T Partners	$	2,519
Dacheng	$	1,898
Grandall Law	$	1,666
Junhe LLP	$	1,601
Sidley Austin	$	1,300

Chart 12 Top 10 legal advisors in markets covered. Source: stock exchanges in markets covered

China	HK	India	ASEAN
King & Wood Mallesons	Linklaters	Linklaters	Clifford Chance
Linklaters	Clifford Chance	Latham & Watkins	Latham & Watkins
Clifford Chance	Zhong Lun		White & Case
Beijing Deheng Law			Milbank Tweed
C&T Partners			Allen & Gledhill

Chart 13 Top 5 legal advisors in different markets. Source: stock exchanges in markets covered

4.6. Investors

Green bonds that originate from Asian emerging markets have attracted a myriad of investors from different countries. Investors that comprise commercial banks, private funds, insurers and asset managers are the main investors in green bonds. According to CBI's data, investment by commercial banks accounts for 52% of the China onshore green bond market purchases, followed by different types of investment funds (34%)[17].

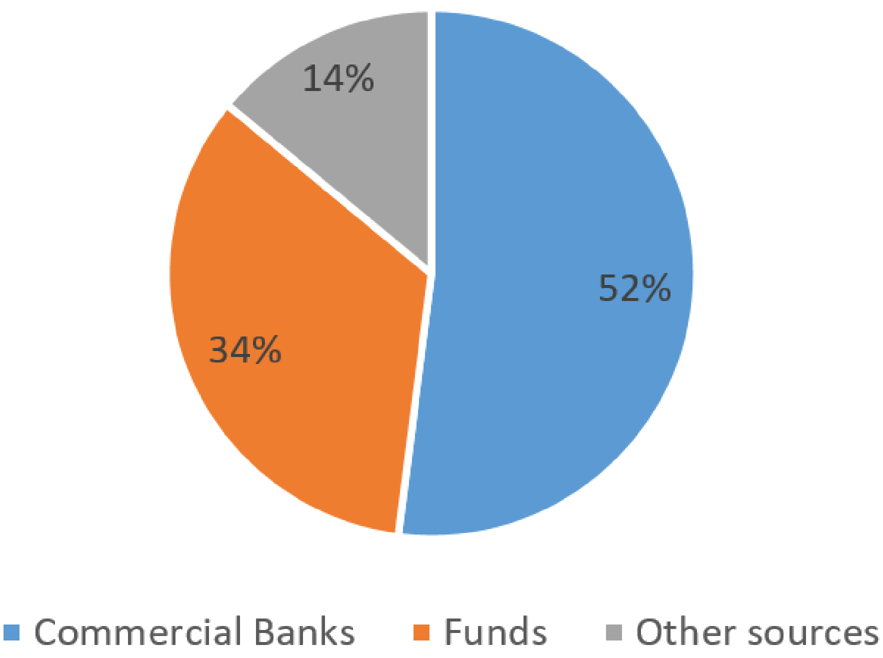

Chart 13 Type of investors in the China onshore green bond market

[17] Climate Bond Initiative, data originates from CCDC

4.7. Civil society

Civil society organisations can play a vital role to monitor the sufficiency of green bond policies and advocate for better practices in the public and private sector. In 2016, a group of Chinese and International NGOs showed their support to the G20 for the development of green finance and provided recommendations for improvement. It is also seen that there are more investor-focused NGOs engaged with market participants to further these developments including such sustainability disclosure platforms as CDP, GRESB, and the voluntary standard setting body – CBI. In recent years, prominent international NGOs such as Oxfam, WRI, and WWF have repeatedly called on the main players – including the standard-setters in the global green bond market – to increase transparency[18] and avoid greenwashing[19].

The standard green bond issuers have rarely engaged civil society stakeholders such as NGOs, local community groups, human rights groups or green groups. As long as the eligible green projects fulfil the international or regional guidelines for green bonds, issuers have rarely reached out for consultation or stakeholder engagement with local residents, workers or community groups, let alone sought the opinions of NGOs. This can also be illustrated by one green bond issued by the Export-Import Bank of India in which proceeds were deployed to a low carbon transportation project including a railway link, to supply coal to a power plant project in Bangladesh[20] which has been revealed by the organisation Banktrack. In the ongoing battle for increased issuance transparency and reduction of regulatory loopholes, civil society should continue to have a critical role to play.

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[18] WWF (2016). "Green bonds must keep the green promise!".Available at: https://d2ouvy59p0dg6k.cloudfront.net/downloads/20160609_green_bonds_hd_r eport.pdf

[19] Greenpeace East Asia (2017). "Green bond financed coal to chemical plant in China will emit millions of tons of CO2".
Available at: https://www.greenpeace.org/eastasia/press/1406/green-bond-financed-coal-to-chemical-plant-in-china-will-emit-millions-of-tons-of-co2-greenp eace/

[20] Available at: https://www.banktrack.org/blog/the_latest_rampal_scandal_essential_coal_plant_infrastructure_is_tapping_green_bond_cash

5. Recommendations

5.1. Raise reporting standards and increase transparency

To measure the contribution of green bonds to their country's NDC or to the achievement of the Paris Agreement in the future, there is a need for market participants to embrace higher standards of reporting and transparency. Regulators and policy makers have to strengthen policies and practices to ensure that all green bond issuers provide relevant and transparent reporting that would enable meaningful assessment of their contribution to the Paris Agreement. Green bond annual reports should disclose the list of projects that were financed and refinanced, the estimated environmental impact to be quantified at the individual project level and the methodology behind these measures. In April 2020, the ICMA published a handbook offering a harmonised framework for green bonds' voluntary impact reporting[21]. It offers quantitative indicators that are specific to each sector as well as reporting templates. If issuers all used these common indicators and baselines, it would be easier to compare and aggregate the contribution of green bonds.

An important aspect of green bond transparency lies in the external review conducted by various players, but standardization and quality control of this process is not yet sufficient. ICMA has published high-level guidelines setting out principles. CBI also has clear requirements for the verification process of climate bond certification. This review finds that few external reviewers have disclosed their methodology and the process in a way comparable to credit rating firms. Better disclosure by reviewers would be a good practice to enhance credibility.

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[21] Available at: https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Handbook-Harmonized-Framework-for-Impact-Reporting-220520. pdf

5.2. Build an underlying project database for green bonds

NDCs lay out countries' targets and goals on climate change mitigation and adaptation. As such, they are useful to identify where investments are needed and where green bonds could contribute the most. Chart 14 from the International Finance Corp (IFC) highlights where Asian countries need to direct investments in order to achieve their NDCs and transition to a net-zero carbon economy. It is recommended that underlying project databases are built to monitor whether investment sectors and the impacts of green bonds are aligned with national NDCs. The database from the Institute of Public & Environmental Affairs (IPE) stands as a good reference. This database collects comprehensive data on Chinese entities' emissions and pollution source supervision records and contributes to the application of supply chain and green credit procedures in China. In China's recent update on climate investment and financing, it is recommended that eligible project pools are built around a platform which can also connect funders and project owners. With the right content requirements, such a database could enable the measurement of green bonds' contributions to NDCs and help the monitoring of the green credentials of green bonds.

Sector	East Asia Pacific NDCs
Renewable Energy	24
Forestry	19
Energy Efficiency	19
Agriculture	18
Transport	18
Waste	15
Water	13
Urban	9
Buildings	7
Industries	7

Chart 14 Numbers of sectors included in NDCs,
highlighting the key sectors most relevant to private sector investment[23]

[22] Available at https://www.ifc.org/wps/wcm/connect/59260145-ec2e-40de-97e6-3aa78b82b3c9/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES&CVID=lBLd6Xq

[23] "Climate Investment Opportunities in Emerging Markets", IFC, 2016

5.3. Strengthen stakeholder participation in market development

Mechanisms should be established to enable different stakeholder groups to participate more fully in market development of green bonds.

▶ Regulators:

Chart 15 presents recommendations for actions needed for monitoring and tracking the proceeds of green bonds from regulators' perspectives, with reference to UNDP public climate financing framework.

Stakeholder Group	Action Needed
Regulators (financial system)	• Establish budgeting estimate for mitigation and adaptation plans at the sectoral level • Set higher disclosure requirement for green bonds, e.g. mandatory annual impact reporting of green bonds and differentiation of refinancing existing projects and financing for new projects • Enhance the accountability of the green bond issuance practices
Regulators (climate strategy)	• Allocate the national funding needs for each sector • Evaluate the aggregated impacts of green bonds

▶ Intermediaries:

Intermediaries such as underwriters and external reviewers can help issuers enhance the green bond's impact disclosure and align the evaluation methodology with national and sectoral climate mitigation and adaptation needs. The green bond frameworks and external reviews continue to be focused on the use and management of proceeds, green projects eligibility and environmental issues, as stipulated by the ICMA's Green Bond Principles.

With the mainstreaming of sustainable investing, the portfolio's environmental and social impacts have become increasingly important for the Investors. The current portfolio accounting framework focuses on the aggregate impacts of the whole portfolio. Better accounting and transparency on impact at sectoral and country level would benefit the investor and enable better understanding of investment positions in the local context.

▶ Civil society organisations:

The involvement of civil society organisations (CSOs) or local community groups is not common throughout the various stages of green bond issuance. One of the major focuses of civil society has been on the eligibility of underlying projects at the point of issuance, which has included controversies over the inclusion of fossil fuel[24] and hydro power projects[25]. The other area of focus is related to impacts during project implementation. CSOs can play a significant role in monitoring impact and engaging local communities. Furthermore, CSOs can participate in the construction of the project database recommended above by providing the platform with insights and feedback on wider social, environmental and community aspects of any project seeking to qualify for green funding.

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[24] China Dialogue (2020). "China's new green bond catalogue could be greener". Available at: https://chinadialogue.net/en/business/chinas-new-green-bond-catalogue-could-be-greener/

[25] Available at: https://www.environmental-finance.com/content/news/cbi-criticised-for-hydropower-accreditation-proposal.html