

ROADMAP FOR CHINA: USING GREEN SECURITISATION, TAX INCENTIVES AND CREDIT ENHANCEMENTS TO SCALE GREEN BONDS



Climate Bonds INITIATIVE

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Instruments and incentives can give a wider range of issuers access to the market. Rapid growth in China's green bond issuance and investment is essential for green bonds to make a material contribution to meeting China's environmental investment and climate finance needs.

The paper provides specific actions for China's policymakers to put in place instruments and incentives for green bonds, with a particular focus on how to grow a green securitisation market in China that can access international capital. Specific actions for China draw on domestic and international experience.

This is the third in a series of four 2016 discussion papers issued by the Climate Bonds Initiative and the International Institute for Sustainable Development (IISD) on prospects for the Chinese green bond market.

The four papers are:

- Green Bond Guidelines (Paper 1)
- Roadmap for China's Green Bond Market-Scaling up Issuance (Paper 2)
- Roadmap for China: Using green securitisation, tax incentives and credit enhancements to scale green bonds (Paper 3)
- Extending the Joint Leadership of China and the UK on Green Finance (Paper 4)

This 2016 series of policy papers on the green bond market in China follows the March 2014 "How to Grow Green Bonds in China" report² and the report titled 'Growing a green bonds market in China: Key recommendations for policymakers in the context of China's changing financial landscape' from March 2015.

Structure of this paper

This paper is structured as follows. Section 1 provides an introductory overview of green bond development in China. Section 2 outlines challenges to widespread uptake of green bond issuance and financing multiple projects through use of green bonds in China. It also identifies which instruments and incentives can offer potential solutions.

Section 3 analyses green securitisation as an instrument to scale China's green bond market, and sets out specific actions. Section 4 reviews how tax incentives and credit enhancement instruments can assist to bring a wider range of projects and issuers to market that better match investors' risk-return requirements; and advocates a set of specific actions in response. Section 5 provides a conclusion and summary.

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1. Introduction

China's green transition requires a large volume of private capital

The rapid economic growth achieved in China over the last few decades has primarily been reliant on coal-based energy consumption, road-based transportation and a carbon-intensive industrial structure. This had led to China now facing a vast number of domestic environmental issues, including air, water and soil pollution, along with the growing impact of climate change. China's government is recognising that there is a need for China to change its high-pollution and energy-intensive growth model and transit towards a greener and sustainable economic model.

An annual investment of at least RMB 2-4 trillion (USD 320-640 billion) will be required to address environmental issues and climate change.³ The PBoC has made a clear statement that public investment alone is not sufficient to meet this investment requirement: public funds would only contribute 10% to 15% of the required investment, with the private sector expected to be by far the largest source of capital for the green transition, contributing 85% to 90%.⁴

Green bonds are proving successful in accessing private sector capital

Labelled green bonds are increasingly considered an ideal vehicle for tapping into private sector capital. These are bonds of which the proceeds are used for green assets and projects and are labelled accordingly (mostly climate change mitigation and adaptation projects). Proceeds can be allocated to new projects or for refinancing of existing green projects, or a mix of both. Green bond investors equally accept both.

Globally, the green bond market has grown rapidly, from USD 11 billion (RMB 72.4 billion) of issuance in 2013, to USD 36.8 billion (RMB 242 billion) in 2014 and USD 41.8 billion (RMB 275 billion) in 2015. The growth in green bonds is expected to continue. SEB estimates that global green bond issuance will grow to USD 80 billion-USD 100 billion (RMB 362

billion-RMB 526 billion) in 2016.⁵ China is seen as a leading source of green bond market growth going forward.⁶

Official guidelines are being established to build a robust system for green bond development

China has established official guidelines for green bond development in order to build a robust structure that ensures strong green credentials of the labelled bonds and to reduce the risk of inappropriate environmental claims and fraud:

- PBoC has established regulations for green financial bonds, including guidance on, and requirements for green definitions, management and use of bond proceeds, and reporting.⁷ PBoC is the regulator overseeing the interbank bond market, which accounts for 93% of outstanding bonds in China.
- China's macroeconomic management agency, the National Development & Reform Commission (NDRC) also set guidelines for green corporate bonds, providing a list of qualifying green projects and proposals for policy incentives.⁸
- Shanghai Stock Exchange set up rules for its green bond pilot program⁹ for listed companies and private placement from Small and Medium Enterprises (SME), which are similar to the requirements from PBoC.
- Other regulatory authorities such as the National Association of Financial Market Institutional Investors (NAFMII) and the China Securities Regulatory Commission (CSRC) are also working on green bond guidelines for other bond types in China. See Appendix 1 for an overview of the regulatory system for China's bond markets.

For further details on the official green bond guidelines in China and how they compare to international practice, see *2016 China Discussion Paper 1: Green Bond Guidelines*.

Next step: enable a wide range of issuers and projects to access the green bond market through implementing instruments and incentives

After the establishment of robust green bond guidelines, China now has the foundations in place for scaling up the issuance of and investment in green bonds. Initial steps to achieve this could involve capacity building, demonstration issuance, and construction of green project pipelines – see *Roadmap for China Paper 2: Scaling Issuance* for more details.

In tandem with these actions, the expansion of China's green bond market can be supported through the use of instruments and incentives, which enable a wider range of issuers and projects to be financed by the proceeds of green bonds. This opportunity is the main focus of this paper.

Well-structured financial instruments and incentives could bring a wider range of issuers and projects to the green bond market. This facilitates improved diversification and liquidity in the market, which can attract additional investors and lower investment risk and volatility.

Having a wide range of instruments and hence investable options with differing pricing, risk and tenor - such as municipal bonds, corporate bonds, project bonds, asset-backed securities and covered bonds - allows more issuers and projects to come to market. It also creates more options for institutional investors, each of whom may have differing criteria in regard to asset allocation, risk tolerance and diversification.

Diversity and scale of investment opportunities are all important aspects that can be major factors in the investment decisions made by institutional investors. This is the case for the development of any new bond market, including China's green bond market.

2. Challenges to enabling issuers and investors to join the green bond market

2.1 Small-scale projects and lack of aggregation instruments

The minimum bond issuance size which is typically required by the majority of institutional investors can be a hurdle for small-scale green projects unless they have suitable aggregation mechanisms. In mature bond markets, institutional investors typically look for issuance sizes of USD 200 million and above, preferring USD 1 billion plus deals. In emerging markets including China, smaller issuance sizes to a minimum of USD 100 million are acceptable.

Many green projects are much smaller than this, making capital raising difficult. For example, in the US market, a residential PV solar installation is typically worth around USD 25,000, large-scale commercial PV solar projects around USD 3 million and commercial energy efficiency retrofits are typically valued between USD 1 million and USD 10 million. Residential energy efficiency upgrades are even more fragmented.¹⁰

Using aggregation instruments to bundle together small-scale green assets could create appropriate green financial products to meet investors' deal size requirements. Asset-backed securities (ABS) and covered bonds are the most established aggregation instruments in the traditional bond markets.

'Yieldcos' are another type of relevant aggregation instrument that may have application as an aggregator of small-scale projects and then corresponding bond issuance. This is more likely once the Chinese market matures and other aggregation mechanisms and processes have established an initial track record within the market and amongst investors.

2.2 Low credit ratings for some non-state owned corporate green bond issuers and green projects

To be attractive to investors, the financial profile and credit worthiness must be comparable to the risk-return characteristics of non-green bonds.

In the early stages of the Chinese green bond market, as for any new financial

Table 1: Challenges and potential solutions for China's green bond market

Challenge	Potential Solution
Small-scale projects and lack of aggregation instruments create barriers to achieving issuance scale	<i>Instruments available:</i> Green securitisation, including use of standardised loan contracts and financial warehouses.
Low credit-ratings for potential green bond issuers create barriers to attracting institutional investors	<i>Instruments available:</i> Credit enhancement. Green securitisation.
Low credit-ratings for green projects create barriers to attracting institutional investors	<i>Instruments available:</i> Credit enhancement.
Green bond investment must be increased to keep pace with scaling up of green bond issuance	<i>Incentives available:</i> Tax incentives for green bonds, including green asset-backed securities.

market, investors are typically looking for low-risk investments, as they are yet to gain familiarity and comfort with the new asset class. For green bonds, this means the investor appetite is focussed on bonds rated as investment-grade, which to date have accounted for the vast majority of the international green bond market.¹¹

Some Chinese non-state owned smaller corporates may find it difficult to issue green bonds rated as investment-grade due to their low credit ratings or unrated status. This challenge does not apply to banks and state-owned enterprises, who have sufficiently robust credit ratings. Low-credit ratings may also be a challenge for green asset-backed securities at the initial stages of the market's development, due to limited credit performance history of green assets, such as solar and wind power assets.

2.3 Increasing green bond investment

Institutional investor demand for green bonds is strong; currently there is greater demand than suitable investment opportunities available. However, the majority of the proven investor demand is in developed countries. The institutional investor base and asset allocation approaches in emerging economies are less mature.

As the issuance of green bonds into the market grows over time, investor demand must continue to grow to keep pace with the expanding supply of green bond deals. Demand-side support from the public sector in the early stages of market development is therefore valuable.

This particularly applies in early markets where state based support and policy direction can provide a measure of certainty for investors to offset other potential risk factors in the investment equation. Facilitating increased investment can function as a pull factor to encourage more issuance of green bonds into the market.

2.4 Mapping challenges to solutions

Table 1 provides an outline of the challenges to enabling issuers and investors to get involved in China's green bond market and some of the instruments and incentives which may be effective in overcoming those challenges.

The next section of this report covers green securitisation in detail, while Section 4 discusses credit enhancement and tax incentives for green bonds.

3. Key instrument for aggregation: green securitisation

This section of the report looks at the opportunities for green securitisation in China in much greater detail. The sub-sections examine the rationale for pursuing green asset-backed securitisation, the current status of China’s overall securitisation market as well as its nascent green securitisation market, and provide a roadmap for supporting growth.

3.1 The rationale for green asset-backed securitisation in China

The securitisation process is the same for green assets and for other kinds of assets

From a financial point of view, the green securitisation process is the same as the securitisation process for any other kinds of assets. See Figure 1 below for an illustration of this process:

1. The originator identifies and pools assets into a reference portfolio. This portfolio is sold to an issuing agent, usually a special purpose vehicle (SPV), which is set up by financial institutions.

2. The issuing agent finances the acquisition of these assets through issuing asset-backed securities to investors.

The only difference with green securitisation processes compared to other securitisations is that the originator must use the money raised from the asset-backed issuance to finance green assets and/or projects.

Green securitisation is relevant for both new and existing asset classes

There are two types of green asset-backed securities (ABS):

- ABS where the cash flows which are backing the issuance of the bond arise from green assets, and the proceeds raised from investors for the issuance of the bond are allocated to green assets. This type of green ABS is suitable for new green asset classes such as renewable energy.

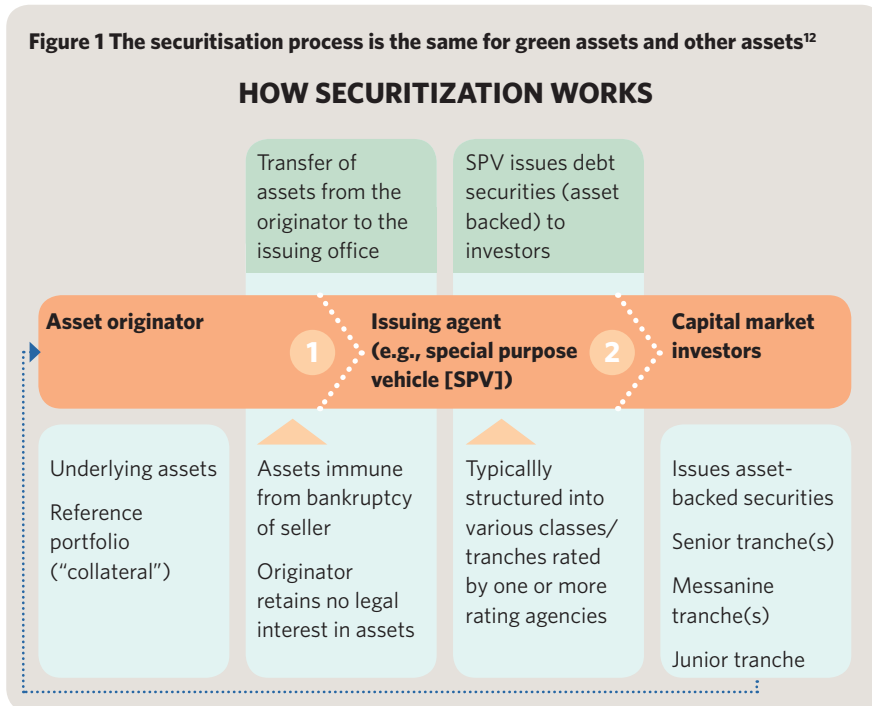


Table 2: Asset classes suitable for green securitisation

Green asset	New asset class or fits within existing asset class
Mortgages to green buildings	Existing asset class
Car loans to electric vehicles and hybrids	Existing asset class
Loans to green small-to-medium enterprises (SMEs)	Existing asset class
Cash flows arising from solar and wind assets (both small and larger scale renewable energy projects qualify)	New asset class
Loans for energy efficiency upgrades	New asset class

- ABS where the cash flows which are backing the issuance of the bond arise from non-green assets (or a mix of green and non-green assets) but the proceeds raised from investors from the issuance of the bond are allocated to green assets. This type of green ABS is suitable for use within existing asset classes that are already being securitised.

Table 2 provides an outline of how green asset classes fall within new asset classes for securitisation, or within existing asset classes which have a long history of securitisation.

Benefits of green securitisation

Asset-backed securitisation helps banks and companies to free up capital for more lending by enabling them to sell existing loans on to other investors in the capital markets, including pension funds and insurance companies. The benefits of securitisation for green projects arise from improved access to capital for refinancing, and access to capital at lower cost, as the aggregation process of securitisation allows green projects to obtain capital from the public bond markets.¹³

Asset-backed securities issued in the public bond markets can offer lower cost of capital compared to bank financing, which is typically the alternative funding source for small-scale assets.¹⁴ Accessing capital at lower cost is important to achieve low-carbon investments at the necessary scale, as for high capital expenditure projects - which low-carbon projects typically are - the cost of capital has a strong influence of the economic viability of the project.

Green securitisation can also help address low credit ratings at the issuer level in China

For green, general obligation bonds, which make up the majority of the green bond market to date both globally and in China, the risk-return of the green bond is independent of the green project risk, as the credit risk is based on the full balance sheet of the issuer.

Nevertheless, achieving a sufficiently high credit rating for potential green bond issuers can be a challenge. In China, this challenge applies particularly for non-state owned companies.

For green asset-backed securities the rating is determined by the green project risk, i.e. independent from original issuers (the originator).

Green securitisation allows the green assets to be detached from the originator's balance sheet and its credit rating. For instance, a original green bond issuer with an overall "B" rating with "AAA"-rated assets on its books might be able to raise funds at an "AAA" rather than "B" rating by securitising those specific assets.¹⁵

Chinese issuers who have lower credit ratings or whose credit ratings are not well recognised by the international market, could use green securitisation to make the credit rating of their green issuance independent from their general balance sheets. This could allow issuers to gain improved access to capital at lower costs.

International experience: majority of green ABS issued in the US market for renewable energy and energy efficiency

Currently, the vast majority of green ABS issuance to date has occurred in the US market only. Leading examples from the US market include solar developer SolarCity, energy efficiency lender Renovate America and sustainable infrastructure company Hannon Armstrong.

SolarCity is largest installer of residential solar in the US. Its ABS issuances are backed by cash flows from solar assets. As of March 2016, SolarCity has issued five ABS: the first issuance reached USD 54.4 million, backed by cash flows from power-purchase agreements for the electricity generated by a bundle of residential rooftop PV installations of around 5000 of their customers; the second issuance was for \$70.2m, made up of close to 6,000 agreements, while the third issuance was for \$201.5m, with close to 16,000 power purchase agreements backing the issuance.

Renovate America is a financing provider of the California-based Property Assessed Clean Energy (PACE) financing provider. As of March 2016, it has issued two labelled green ABS as securitisation of PACE loans. The latest deal was for USD 217.5 million in February 2016, backed by 9,252 PACE loans levied against residential properties in 27 California counties. The proceeds of these green ABS will be used to refinance home improvements projects, such as renewable energy, energy efficiency and water improvement projects through the Home Energy Renovation Opportunity (HERO) programme.^{16 17}

Hannon Armstrong is a US-based listed sustainable infrastructure investor, who has issued USD 100 million of low-carbon asset-backed securities in December 2013. The credit profile of the issuance was based on the cash flows from over 100 individual wind, solar and energy efficiency projects; all had investment grade credit profiles. This deal is a good illustration that a blended portfolio approach, bundling a mix of different green assets in one ABS issuance, is possible. In October 2014, Hannon Armstrong issued more low-carbon asset-backed securities for USD 115 million, backed by wind assets.

3.2 Current state of China's overall securitisation market

Policy support for securitisation in China has been growing

Asset-backed securitisation in China started just on a decade ago when in 2005 the PBoC and CBRC jointly published the guidelines for credit assets securitisation pilot programme.¹⁸ In June 2005, PBoC established initial rules of disclosure for ABS and in November 2005, CBRC released detailed regulations for financial institutions covering access to the market, capital requirements, and risk management. These regulations form the basis of the current securitisation market in China.

In 2012, PBoC, CBRC and the Ministry of Finance published guidelines to expand the securitisation pilot programme. It has further encouraged non-bank financial institutions such as insurance companies, securities companies and pension funds to invest in ABS. In 2013, the State Council released policies to provide guidance for financial institutions on using ABS to support small and medium-sized enterprises (SMEs).¹⁹

In January 2015, a registration and recording system for securitisation was established.²⁰ Under the new system, qualified institutions do not have to get approval from CBRC and PBoC each time they issue an ABS. Instead, they only need to register and put on record each new issuance. This is a significant change for China's securitisation market which is expected to result in accelerated development.

With the registration and recording system established, in May 2015, the State Council enlarged the scale of the securitisation pilot programme, increasing the total issuance under the programme by RMB 500 billion to RMB 900 billion.²¹ Meanwhile, more rules for disclosure and credit ratings have been established to assist with risk management.

China's securitisation market has grown rapidly the since 2014

Despite policy support for securitisation being in place for a decade, the majority of the growth in China's securitisation market

has primarily occurred since 2014. ABS issued across 2014 and 2015 was more than five times the total ABS issued in the nine years leading up to 2014.²² ABS outstanding in China now sits at RMB 770.4 billion.²³

State-owned banks and medium sized financial institutions are the main issuers of ABS in China

State-owned banks and medium sized financial institutions issue ABS in the form of collateralised loan obligations (CLOs), which account for the largest share of issuance in China's ABS market.²⁵ ABS issuance from corporates, such as auto companies, accounts for a smaller share of the market.²⁶

The securitisation market in China has become more diversified

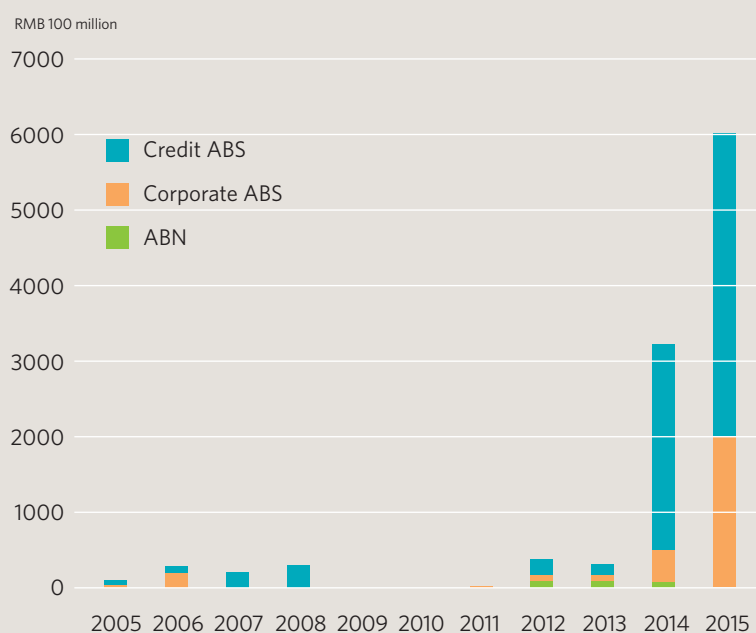
Underlying assets for securitisation have become more diverse in China. For example, in the interbank market, Collateralized Loan Obligations (CLOs), the most common ABS structure used in China, have been issued that are backed by green loans, loans to fund machinery for construction projects, mortgages, auto loans, credit cards, and syndicated loans.

In the exchange market, where ABS issued by corporates are traded, underlying assets include smaller loans, mortgages, receivables from property management, online lending, and medical facility leases. A large proportion of underlying assets for corporate ABS fall into the categories of financial leasing, charging right from public entities, and accounts receivable.

International investors and issuers are present in China's securitisation market

Foreign institutions participate in the securitisation market in China both on the investor and issuer side. In 2015, the first foreign investment in ABS in China's domestic markets was made under the RMB Qualified Foreign Institutional Investors (RQFII) programme.²⁷ The first foreign issuance of ABS in China's domestic market also occurred in 2015, when HSBC issued an ABS in China in January 2015.

Figure 2 ABS issuance in China from 2005 to 2015²⁴



3.3 Green securitisation in China

As a sub-set of the overall securitisation market, China is also developing its green securitisation sector. Green securitisation covers securitisation transactions where proceeds of the deal are allocated to green assets; either the underlying assets backing the deal from a credit perspective, or other green assets.

Asset-backed securities that could have been labelled as green have already been issued in China

Since 2005, seven green ABS have been issued in China, with the individual deal size ranging from RMB 680 million to RMB 3.5 billion (see table 3 below). These ABS are qualified as green under the Green Bond Endorsed Project Catalogue²⁸ as well as the international Climate Bonds Standard. However, only 2 of those deals have been labelled and marketed as green by the issuer.

The green ABS deals issued in China to date have been backed by various types of underlying assets, including revenues from

solar, waste-to-energy projects, electricity fees from biomass energy, and accounts receivables from wastewater treatment facilities.

In 2006, the first ABS that could qualify as green was issued by Nanjing Urban Construction Investment company, although the deal was not labelled as green at the time. The ABS used wastewater treatment fees as underlying assets. The company has since issued a second tranche in 2011. The majority of the green issuance in the market has however occurred since 2015, when policy momentum for green securitisation in China further increased via the NDRC.

Industrial Bank of China issued the first labelled green ABS from a bank in 2016

To achieve scale in the green securitisation market, green securitisation from banks is important, as this currently accounts for the largest share of China's overall securitisation market. In 2016, the Industrial Bank of China became the first Chinese bank to issue a green ABS by aggregating a relatively small pool of loans: 42 loans from 29 borrowers.

The use of smaller pools of assets backing an ABS issuance is different to the ABS structure which is most often used in the international securitisation market. It is common practice internationally for thousands of small loans to be aggregated in structures such as mortgage-backed securities, car loan securities and solar ABS.

Next step: scale up green securitisation through different asset classes

There is potential to scale up green securitisation and expand the market to other asset classes. In particular, there is potential to develop green mortgage backed securities (mortgages to green buildings) and ABS backed by car loans to hybrids and electric vehicles. This would enable the Chinese green securitisation market to move to green ABS backed by larger, more diversified pools of smaller assets. Wind power assets could be used for ABS issuance and there is also potential to issue more solar ABS, following the first deal in China in this asset class in early 2016.

3.4 Roadmap to support growth in green securitisation in China

The public sector can play an important market development role, working with the private sector

Barriers currently remain on the supply-side that prevent private market actors from using these aggregation mechanisms at scale. Growing the securitisation markets for any asset requires the creation of a sufficient volume of underlying assets as well as standardising the underlying asset (often a loan of some sort).

Various public sector entities can take concrete actions to overcome barriers to extending the use of green securitisation as a finance source, particularly in new asset classes. Three such actions are outlined below.

In pursuing these actions, the public sector needs to work closely with the private sector to most effectively address the challenges that are currently hindering the private

Table 3: Overview of ABS issued in China as at March 2016 consistent with PBoC green project definitions for green bonds

Issuing entities	Underlying assets	Amount
Nanjing Urban Construction Investment Company	Wastewater treatment fees	RMB 2 billion (USD 307 million)
China Energy and Conservation and Environmental Protection Group (CECEP)	Electricity sales revenues from waste-to-energy projects	RMB 680 million (USD 104 million)
Tianjin Teda Company	Electricity sales revenues from waste-to-energy projects	RMB 633 million (USD 97 million)
Kaidi Ecological Environment Technology	Sales revenues and Power Line Communication (PLC) fees from bioenergy projects	RMB 3.3 billion (USD 507 million)
Chongqing Fuling Dragon Bridge Industrial Park Development	Accounts receivables from wastewater treatment facilities of Longqiao Group	RMB 1 billion (USD 154 million)
Shenzhen Energy Group	PLC fees from solar PV farm	RMB 1 billion (USD 154 million)
Industrial Bank of China (CIB)	Green loans covering pollution control, energy saving, resources utilisation and recycling, manufactures of environmental protection equipment, infrastructure management.	RMB 3.5 billion (USD 538 million)

market from taking full advantage of green securitisation opportunities.

(i) Action: support the development of standardised green loans contracts

To facilitate securitization of large portfolios of smaller loans, it is crucial that new green loans are standardised²⁹ – this was instrumental in kick-starting securitisation in other areas in the international market such as mortgages. Currently there is a lack of standardised loan contracts available for green assets in China.

The government could play a role in facilitating market-led development of standardised contracts by offering direct financial support to existing market efforts on standardisation

of green loan contracts, and establishing public-private initiatives and working groups to develop standardisation processes.

China is still at an early stage in the rollout of green assets suitable for securitisation, in particular solar panels. This is a very good time to start the standardisation of loan contracts to enable securitisation over time as the asset base suitable for securitisation grows.

It will help enormously if the contracts for these assets can be standardised from the beginning.

In the US, the National Renewable Energy Laboratory (NREL) of the Department of Energy has set up a working group for solar securitization that includes industry actors. The group has worked to develop

standardised loan contracts for solar panels, as well as operations and management standards. China could establish a similar structure to develop standardised loan contracts for green assets in China, potentially under the umbrella of the Green Finance Committee established in 2015.

(ii) Action: Encourage uptake of standardised loan contracts for green assets

Once standardised loans for green assets are developed, the next step is to ensure that the deal flow of standardised green loans is large enough for the loans to be aggregated and sold in the capital markets. The public sector could facilitate uptake of the standard contracts by making this a requirement to qualify for other green securitisation support mechanisms, such as warehousing (see below) and credit enhancement (see section 4.2).

This was an effective mechanism used to drive the initial standardisation in the mortgage market in the US, as Fannie Mae made their guarantees conditional on standardised mortgage contracts. In China, there is also potential for the government to play a stronger prescriptive role in mandating standardisation of loans.

Public institutions could also incentivise the origination of standardised loans by offering preferential lending rates to standardised loans contracts to finance green projects. Increasing the deal flow of standardised loans contracts is crucial to create asset pools large enough for securitization in the bond markets.

There are examples of the public sector providing cheaper loans to incentivise green projects. The municipal bank of Norway has offered lower interest rates on loans financing green projects since 2010, and in 2015 the US public mortgage loan provider Fannie Mae followed suit.

(iii) Action: Support the establishment of financial warehousing of green loans to aggregate across originating entities

A limited deal flow of standardised green loans can be a barrier to securitisation at the early stages of the market. The loan portfolios of each individual lender can be too small for issuance in the bond markets.

A financial warehouse that aggregates loans across originating entities can be a solution.

Public institutions could set up green financial warehouse entities by using different models:

- **A new warehouse entity can be established as a public-private partnership:** There are several examples from the US market, for example, the Warehouse for Energy Efficiency Loans (WHEEL) in Pennsylvania. Public-private partnerships are widely used in China.
- **Green banks can host financial warehouses:** In 2014, Connecticut's green bank, the Clean Energy and Finance Authority (CEFIA), issued their first round of securities backed by a pool of loans funding energy efficiency upgrades in commercial buildings. The green bank had grown their loan book over time, holding onto loans in a USD 40m financial warehouse.
- **Similarly, green financial warehouses could also be hosted or supported by development banks.** In 2014, the Inter-American Development Bank initiated a pilot project for securitization of energy efficiency projects in Mexico, which will be expanded to the rest of Latin America.

Commercial banks in China could also host a green financial warehouse given their understanding of green assets and projects, and existing involvement in green credit.

At the early stage of the market, warehousing solutions can be combined with credit enhancement support (see next section for details on credit enhancement). This model of combined warehousing and credit enhancement offered simultaneously by a single public sector initiative has been

used to support the securitization of loans to small-and-medium sized enterprises (SMEs) by the European Investment Bank and the European Commission.

4. Other incentives and instruments: tax incentives and credit enhancement

4.1 Tax incentives

The rationale for tax incentives

Tax incentives can be a cost-effective tool by providing a significant boost to investment with a relatively low impact on public finances. They can reduce the interest cost of financing. Different types of tax incentives are a tool used by the public sector to support certain segments of bond markets, both in developed economies and emerging markets. China has proposed to use tax incentives to scale up the issuance of green bonds, though they have not developed a detailed implementation policy yet.

The numerous examples of tax incentives already being used successfully provide precedents for governments to step in to use tax incentives as a tool to scale up the emerging green bond market. For example, Brazil allows tax-free bonds to be issued for large infrastructure investments, construction conglomerates, and wind farm developers.³⁰ Many governments, including the US, Mexico and India, allow municipal bond issuances to be tax-exempt.^{31,32} More examples of the different types of tax incentives used in bond markets are set out in Appendix 2.

Different types of tax incentives can be used

There are different types of tax incentives that can be applied to green bonds. Tax incentives for bonds can focus on either the investor side or the issuer side, with slightly different impacts.

Making incomes from bond investments tax-exempt better facilitate a localised market, as only the investors under the jurisdiction of the particular country providing the tax incentives are eligible for the incentives. An investor-side tax incentive targeted at domestic investors does not provide an incentive to foreign investors,³³ and these incentives are therefore best used only for larger countries that have a sufficient internal market. Conversely, tax-credit bonds provide benefits directly to the issuer. This can be a more cost-effective approach than tax-exemption for investors to reduce financing costs for infrastructure.³⁴ Moreover, it does not limit domestic investors only to benefit from the incentive.

Tax incentives can also be established to attract foreign investors into domestic bond markets through preferential withholding tax rates for green bonds. Selective reductions in withholding taxes are already in place in several countries to drive foreign investment into particular policy priority areas. For example, in India, a preferential withholding tax rate was allowed for infrastructure investment, setting a precedent to use this type of tax incentive for green bonds.

There is precedent in China for using tax incentives to direct investment to policy priority areas

For example, in March 2016, the government announced tax incentives for bonds issued by China Railways in 2016 to 2018. Investors could get 50% discount on income tax on interests received from bonds issued by China Railways.³⁵

International practice: tax incentives for green bonds in practice

For green specifically, the US has offered tax incentives for bonds financing green buildings as well as renewable energy from 2009, in addition to providing tax incentives to more than 80% of the USD 3.7 trillion municipal bond market. Tax-exemption to investors has been the most significant type of tax incentive provided in the US bond markets. Interest on US municipal bonds is exempt from federal income tax. Bond coupons are usually exempt from state tax as well.³⁶

The US has also offered tax incentives to bonds financing clean energy through the US federal government's Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds (QECBs) programs, implemented in 2009. The incentives are conditional on proceeds being earmarked for "qualified conservation purposes" which include renewable energy, energy efficiency and certain mass commuting projects.³⁷

This makes CREBs and QECBs similar in concept to green bonds, as proceeds are earmarked for green projects.³⁸

Roadmap for China: implement tax incentives for green bonds

Tax incentives specifically for green bonds were first proposed by PBoC in China in April 2015, as part of a broader range of recommendations for implementing a green financial system in China.³⁹ PBoC proposed tax incentives for labelled green bonds in the form of tax exemptions for institutional investors that allow them to treat the green bonds as treasury investments.

According to government estimates, tax incentives for green bonds can reduce funding costs by 100 basis points.

Taking 5% interest rate as a starting point, that is equivalent to a 20% reduction in funding costs, which again can significantly improve the financial viability of green projects, as capital costs account for a significant share of overall project costs. The government considers it a small budgetary cost to offer these tax incentives, making it a cost effective option to support China's green transition.

Policymakers in China expect the tax incentives will take one to two years to develop, and the tax incentives are then intended to be in place for three to five years to incubate the investor base, and then they will be removed.

It is not yet clear whether tax incentives will be provided only to domestic investors, or also to international investors. Given that China aims to increase international investment, and that this is now facilitated with the opening of the interbank market to international investors in February 2016, considering tax incentives that can also help attract international investors could be beneficial. Preferential rates of withholding tax can be offered to green bonds.

4.2 Credit enhancement

The rationale for credit enhancement

Initially, investors are looking for more investment grade rated bonds to get familiar with the new market, but as they become comfortable with investing in green bonds, the market should move to lower ratings.

The green bond market in US and Europe is showing an increased diversity in ratings, although many institutional investors will still be mandated to mainly invest in investment-grade bonds, limiting their ability to invest in high-risk, high-yield bonds.

In addition, the potentially higher risk of green projects in the current investment frameworks used in the market can be an obstacle for scaling issuance.

The reason why these climate-friendly investments are often currently not as competitive on risk-return as other similar projects (in more established sectors such as oil and gas) is the same as for any market in early stages of development: unknown risks associated with new technology. It is not an indicator that low-carbon and climate-resilient investments are inherently less financially viable.

Credit enhancement can allow a wider range of projects and issuers to tap the market

In the early stages of the market, in a transition phase, public entities can help absorb risk to improve the risk-return profile and make green bonds financially competitive. In developed economies, credit enhancement can particularly necessary for asset-backed green bonds, including project bonds and asset-backed securities. The lack of historical data still limits the ratings the rating agencies are willing to give to renewable energy.⁴⁰

The need for credit enhancement will change as the market matures and rating agencies continue to gain an improved understanding of the credit performance of various green assets. For the solar rooftop transactions seen so far, rating agencies report a low level of defaults and asset performance in line with expectations.⁴¹

In emerging economies, the need for credit enhancement is larger, and can apply for green general obligation bonds, as well as asset-backed bond issuance. Risks are generally higher in these markets, due to political risks and credit risks, and currency risks for international investors. Many of the potential green bonds issuers here, including municipalities, do not have investment-grade credit ratings, especially not by internationally recognised rating agencies. This can be a challenge also for issuers in the more mature bond markets in emerging economies, such as China.⁴²

While credit enhancement involves some cost to the public sector, it can be a more cost-effective way than direct subsidies to achieve climate infrastructure targets. This is particularly the case in emerging economies, where the cost of capital account for a large share of the overall project cost.

For example, in India providing a 7% interest rate concession to renewable energy projects subsidies can reduce the total cost to the government of supporting wind energy by 39% and solar by 26%, compared to the alternative of using feed-in-tariffs, tax credits, or accelerated depreciation.⁴³

International experience: how the public sector can enhance credit ratings for green bonds

A wide range of credit enhancement tools is available to the public sector, including guarantees; subordinated debt or equity, insurance and policy risk insurance. Details and examples of each are set out in Appendix 3.

Internationally, the public sector is already familiar with these credit enhancement tools. The challenge for development banks and other public entities is to take the instruments that they are already using successfully to support normal bond issuances in other policy priority investment areas, such as infrastructure, and then replicate the process for green bonds.

Internationally, entities well placed to provide credit enhancement for green bonds include development banks, green banks,

Ministries of Finance, the Green Climate Fund and other similar entities, such as the recently launched Commonwealth Green Finance Facility.

Roadmap for China: provide explicit public credit enhancement to green bonds, including green asset-backed securities

In China, NDRC has proposed new approaches of guarantees to enhance credit ratings of green bonds. For example, guarantees can be offered to issuers when their projects revenues cannot cover the total investment. Local governments are encouraged to set up green bond guarantee fund, providing guarantee for green bond issuance only.

Proposed by NDRC revenues from carbon allowance, emission rights, energy use rights, and water use rights, as well as intellectual property, collaterals of expected green revenues can be seen as means of guarantees and credit enhancement of the green bond issuance. Detailed policies regarding how to implement these proposed guarantees have not yet been released.

Chinese green bond issuers could also use credit enhancement methods that are used in other investment areas. Privately provided guarantees and collaterals have already been used in China for credit enhancement, which are mainly used by SMEs with lower credit ratings for their private placement bonds.⁴⁴ Green bond issuers could look for a third party such as large corporates, and professional guarantee corporations to provide guarantees. Alternatively, green bond issuers could use land, property, accounts receivables, stock or investment equity as collateral to achieve credit enhancement.⁴⁵

Which entity is best placed to absorb risk to mobilise private capital can depend on the target investor base, as investors' familiarity with and trust in the de-risking entity can impact how effective the credit enhancement will be in mobilising private capital. The transfer of trust from an entity, such as a development bank, involved in a green bond deal to the deal itself is called the "halo effect". It can be a powerful catalyst.

4. Conclusion

In order to address environmental issues, including air, water, soil pollution and climate change, an annual investment of at least RMB 2-4 trillion (USD 320-640 billion) will be required in China. Green bonds are increasingly considered an ideal vehicle for tapping into private sector capital. China is seen as a leading source of green bond market growth. With official guidelines being established to build a robust system for green bond development. The next step for China might be scaling up the issuance of green bonds. This could be achieved through instruments and incentives.

The lack of aggregation platform and lower credit ratings are two major challenges to scale up the green bonds issuance

In mature bond markets, institutional investors typically look for issuance sizes of USD 200 million and above. In emerging markets including China, smaller issuance sizes to a minimum of USD 100 million are acceptable. However, many green projects such as renewable energy and energy efficiency projects are much smaller than this, making capital raising difficult.

Some Chinese issuers may find it difficult to issue green bonds rated as investment-grade due to their low credit ratings or unrated status. This is particularly a challenge for non-state-owned entities. Low-credit ratings may also be a challenge for green asset-backed securities at the initial stages of the market's development, due to limited credit performance history of green assets, such as solar and wind power assets.

Roadmap for China: green securitisation

Green securitisation is seen as a key instrument to address the aggregation issue in particular

Using securitisation to bundle together small-scale green assets could help meet the large-scale investment needs from institutional investors such as pension funds and insurance funds. Green securitisation also allows the green assets to be detached from the originator's balance sheet and its credit rating.

Chinese issuers who have lower credit ratings or whose credit ratings are not well recognised by the international market, could use green securitisation to separate the credit rating of the green issuance from that of their own balance sheet.

Action: support the development of standardised green loans contracts

Currently there is a lack of standardised loan contracts available for green assets in China. The Government could play a role in facilitating market-led development of standardised contracts by offering direct financial support to existing market efforts on standardisation of green loan contracts, and establishing public-private initiatives and working groups to develop standardisation processes.

Action: Encourage uptake of standardised loan contracts for green assets

Once standardised loans for green assets are developed, the next step is to ensure that the deal flow of standardised green loans is large enough for the loans to be aggregated and sold in the capital markets.

The public sector could facilitate uptake of the standard contracts by making this a requirement to qualify for other green securitisation support mechanisms, such as warehousing and credit enhancement.

Action: Support the establishment of financial warehousing of green loans to aggregate across originating entities

A limited deal flow of standardised green loans can be a barrier to securitisation at the early stages of the market.

The loan portfolios of each individual lender can be too small for issuance in the bond markets. A financial warehouse that aggregates loans across originating entities can be a solution.

Roadmap for China: tax incentives and credit enhancement

Tax incentives can reduce the interest cost of financing. Different types of tax incentives are a tool used by the public sector to

support certain segments of bond markets, both in developed economies and emerging markets. China has also proposed to use tax incentives to scale up the issuance of green bonds. Tax incentives for bonds can focus on either the investor side or the issuer side. Government can make incomes from bond investments tax-exempt, or use tax-credit bonds provide benefits directly to the issuer.

A wide range of credit enhancement tools is available to the public sector, including guarantees, subordinated debt or equity, insurance and policy risk insurance. In China, NDRC has proposed new approaches of guarantees to enhance credit ratings of green bonds, including government fund and collaterals. Green bond issuers could also consider privately provided guarantees and collaterals that have already been used in China for credit enhancement.

Appendix 1 - Regulatory system of the Chinese bond market

1. Based on market type of sectors under the Climate Bonds Standard

Market type	Regulatory authority
Inter-bank bond market (93% of outstanding bonds listed here)	PBoC
Stock exchange bond market	CSRC

PBoC: People's Bank of China

CSRC: China Securities Regulatory Commission

CBRC: China Banking Regulatory Commission

NDRC: National Development and Reform Commission

NAFMII: National Association of Financial Market Institutional Investors

2. Based on bond types under the Climate Bonds Standard

Bond type	Regulatory authority	
Government bond	PBoC, Ministry of Finance, CSRC	
Central bank bond	PBoC	
Financial bond	Policy bank bond, special financial bond	PBoC
	Commercial bank bond, non-bank financial institution bond	CBRC, PBoC
	Securities company corporate bond, security company short-term financing bond	PBoC, CSRC
Short-term financing bond, medium-term notes	NAFMII	
Asset-backed securities (ABS)	CBRC, PBoC	
Corporate bond	NDRC, PBoC, CSRC	
International institution bond	PBoC, Ministry of Finance, NDRC, CSRC	
Convertible bond	PBoC, CSRC	
Listed-company bond	CSRC	
SME private placement bond	Stock Exchange	

Appendix 2 - Examples of tax incentives relevant to green bonds

Table 15

country	Bond Type	degree of tax exemption	for who	description	relevance for green
Chile	All bonds	Full	Foreign Institutional Investors	Foreign institutional investors are exempt from tax on the bond	Incentive can be replicated for foreign investment into green bonds in particular
India	Muni bonds and selected corporate bonds from public entities	Full	Investors	Tax free bonds issued by public corporations and municipal government	Examples of tax incentives used to encourage investment in a policy priority area.
USA	Muni bonds	Full	Investors	Over 80% of the US muni bond market is tax exempt, with the aim to increase funding for municipalities for infrastructure	Incentive can be replicated to apply to all labelled green bonds with robust green credentials e.g. that comply with set standards
USA	Muni bonds with proceeds for renewables and energy efficiency	Partial	Investors	Qualified Energy Conservation Bonds (QECBs) and Clean Renewable Energy Bonds (CREBs) offer special tax incentives offered for muni bonds with proceeds clean energy and energy conservation	
Brazil	Bonds with proceeds for infrastructure including construction and wind energy	Full	Investors	Tax-free bonds can be issued for large infrastructure investments, construction conglomerates, and wind farm developers	
Malaysia	Corporate ABS bonds	Partial	Issuer	Issuance expenses for asset-backed securities are tax deductible	Incentive can be replicated to cover issuance costs for green ABS in particular, making it cheaper for issuers of green vs non-green ABS

Appendix 3 - Types of credit enhancement tools for the public sector

Table 15:

Type	Description	example
Guarantees	<p>The public sector can provide partial-risk guarantees at the bond issuance stage (often called “wrappers”). This implies they lend their credit rating to the project. Partial guarantees can also be applied to contingent cost overrun facilities, a structure that has been used in the oil sector.¹⁴³</p> <p>In addition to credit guarantees, liquidity guarantees can be provided to facilitate the extension of debt tenor. Liquidity guarantees can be structured so that the public sector guarantees payment of the outstanding debt payments in the latter years of the tenor beyond what the institutional investors are willing to offer without guarantee.¹⁴⁴</p>	<p>OPIC offers Certificates of Participation, a bond wrap with US government guarantee. In 2014, they started marketing some of the Certificates of Participation as green.</p> <p>While these Certificates had always been green, OPIC now added the green label. The first Green Guaranties were issued in September 2014, and they have issued several in 2015.</p>
Subordinated debt or equity	<p>Public entities can invest in a project or portfolio, and take the position of accepting loss before private institutional investors.</p> <p>By the public taking a lower position in the repayment pecking order (a subordinated equity or debt position), the parts of the investment that sits above the public entity in this pecking order (senior equity or debt) is protected from losses to a certain extent, which makes this part of the investment lower risk and can be issued at a higher rating.</p>	<p>The European Investment Bank’s Project Bonds Initiative provides first loss for bond issuance to address the policy objectives of the EU’s Connect Europe program.</p>
Insurance	<p>The monoline insurers guarantee payment of interest and principal in the event of default. While the use of monoline insurance is more limited after the financial crisis than the other risk-reducing tools in the climate-friendly space, some initiatives are emerging.</p>	<p>A monoline venture for green bonds specifically, AMF, is currently being developed under the Finance for Resilience Initiative (FiRe), although it is not yet operational.</p>
Policy risk insurance	<p>A policy risk insurance facility would be valuable in reducing policy risks, which are a major concern for investors. The policy support put in place for green projects, such as feed-in-tariffs for renewable energy, itself introduces risk that the policy support will be removed. This is risk created by the public sector, and they are consequently best placed to mitigate the risk.</p>	<p>OPIC offers political risk insurance that includes protection against changes in feed-in-tariffs for renewable energy.</p>

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