SCALING UP GREEN BOND MARKETS FOR SUSTAINABLE DEVELOPMENT

A strategic guide for the public sector to stimulate private sector market development for green bonds

CONSULTATION PAPER

Climate Bonds INITIATIVE

Inquiry: Design of a Sustainable Financial System

Table of contents

I Background

This policy guide offers a range of options for building green bond markets which ultimately will help policymakers, regulators and public financial institutions meet their infrastructure investment needs, capital market development aims, and targets for climate action and environmental protection.[1]

It includes actions that address prominent issues with immediate effect, as well as actions that will take longer to develop. Considering the potentially long-time lag from proposing to implementing policies, means that an effective policy guide must work on a five year – or longer – time horizon.

This green bond policy guide is suitable for both developed and emerging economies. However, while green bond market development can be part of the general bond market development process, the fundamental challenges faced in underdeveloped bond markets will influence how far and fast a domestic green bond market can grow.

An annex to this report has been developed by the World Bank Group to provide an additional resource for policymakers in emerging economies with nascent bond markets to assist them in foundational bond market development.

Structure of the report

This Guide is structured as follows. Section I looks at the rationale for public sector support for climate investments, and the investment opportunities created by the move to a low carbon and climate resilient economy. It also covers the type of investors who can put capital into climate investments, and why green bonds can be a tool to access this investor base. It also provides a more detailed definition of green bonds. In Section II, the report covers the detailed actions available to the public sector to support the growth of a green bond market, divided into five action themes: market development, issuance, instruments, investment and cooperation.

1. Goal: meeting low-carbon and climate resilient infrastructure needs

ANNUAL GLOBAL INFRASTRUCTURE INVESTMENT IS USD5.9 TRILLION TO 2030[2]

The investment needs for infrastructure the next decades are huge in both developed countries and emerging economies even without taking climate change mitigation and adaptation into account. Developed economies like the EU and the US have massive infrastructure upgrade needs, while rapidly growing emerging market economies face a need to build extensive infrastructure from scratch. Emerging economies account for the majority of investment required the next decades.[3]

THE INFRASTRUCTURE BUILT MUST BE LOW-CARBON AND CLIMATE RESILIENT, ADDING TO THE FINANCING NEEDS

Ensuring that the infrastructure built is low-carbon raises the annual investment required for infrastructure from to USD6.2 trillion.[4] Even though a low-carbon economy would require more capital upfront, over the long-term this is offset by the lower costs in dealing with the impacts of climate change as well as lower running costs associated with low-carbon alternatives. For example solar power, energy efficient buildings and electric vehicles all have higher initial costs but lower running costs than their high-carbon equivalents.

The world's policy makers need to merge the two agendas of climate and infrastructure

Climate adaptation needs add another significant amount of investment, although there is considerable uncertainty around how much is required – and this will depend on what actions are taken on the mitigation side. The United Nations Environment Program (UNEP) has estimated USD150bn in adaptation investment needed annually by 2025/2030 and USD250-500bn per year by 2050 for a 2-degree Celsius scenario.[5] If temperatures continue to increase beyond the 2 degrees trajectory, the adaptation costs rise dramatically.

Despite the urgent need to build climate-resilient infrastructure suitable for a low-carbon economy, these massive investment needs are not being met. Funding for infrastructure is around USD 5 trillion each year, leaving an annual gap of more than USD 1 trillion, and only 7-13% of current infrastructure projects are estimated to be low-carbon and designed to deal with the extra impacts of a changing climate.[6]

The lower upfront investments required for high-carbon infrastructure can seem attractive for fiscally constrained governments despite being a higher cost alternative in the longer term. This is particularly the case in high-inter est rate environments in emerging economies, where expensive capital raises the overall project cost and can make high capital expenditure projects economically unviable. Reducing the cost of capital for low-carbon infrastructure, particularly the cost of debt, is therefore a crucial mechanism to facilitate investment in these projects.

Ensuring that the required infrastructure investments made now address the current and coming climate challenges in future is key. This will require the world's policy makers to merge the two agendas of climate and infrastructure, as they are complementary, not competing.

CLIMATE-FRIENDLY INFRASTRUCTURE REPRESENTS INVESTMENT OPPORTUNITIES ACROSS SECTORS

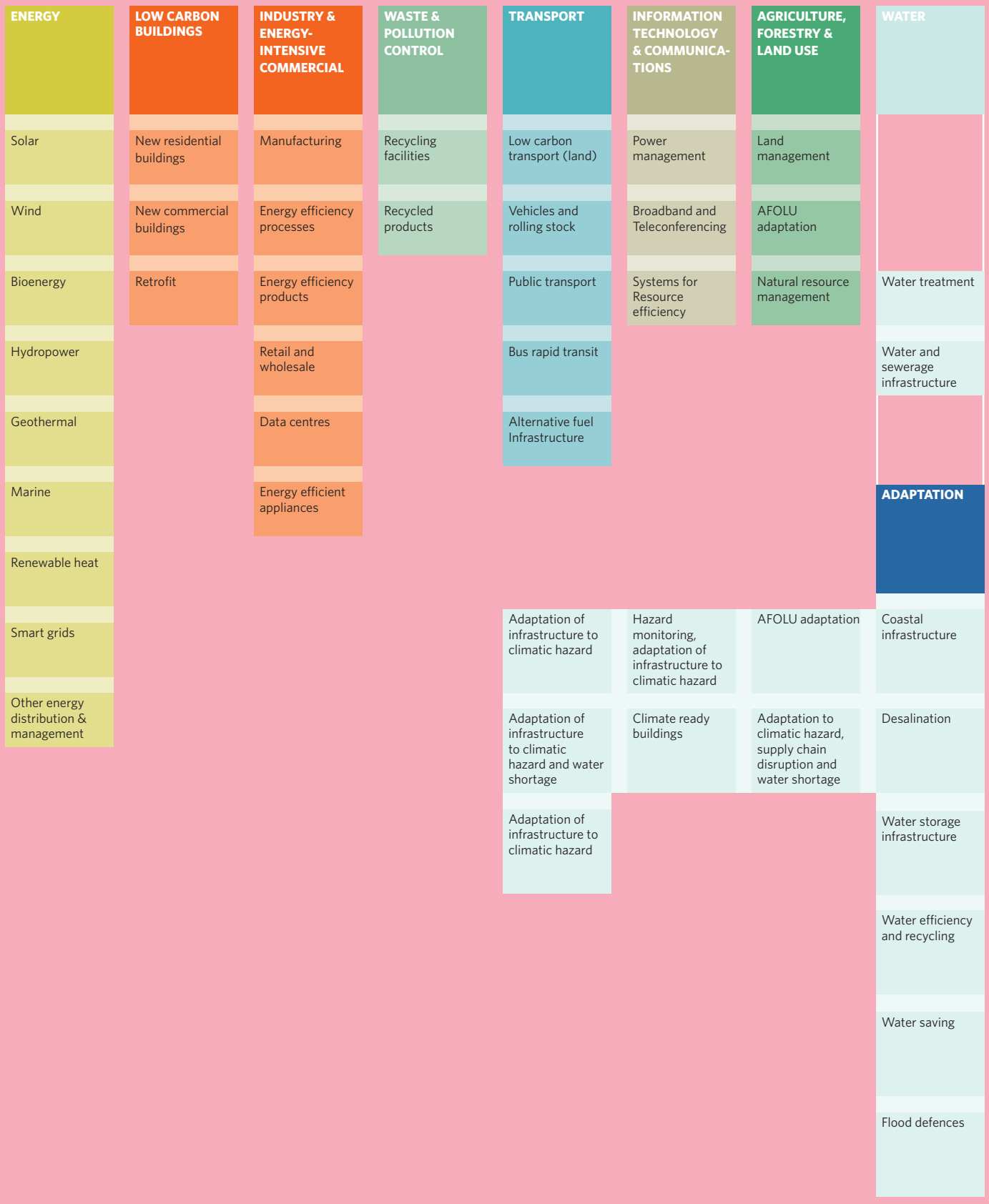
The size of the investment opportunity increases by considering the full value of the assets in the economy that are being made low-carbon and climate resilient – for example the full value of the low-emission buildings - not just the marginal costs of ensuring the infrastructure is climate-aligned.

Meeting the challenge of climate-friendly infrastructure does not require the financial sector to absorb additional costs. Instead it is about using capital for investment and

1. The Guide builds on policy work at the Climate Bonds Initiative and of the UNEP Inquiry into the Design of a Sustainable Financial System. Input came from the OECD, and from 40 stakeholders from central banks, governments, development banks, the private sector and NGOs, convened in a workshop in Washington DC, and from bilateral interviews and discussions.
2. In constant 2010 dollars. The Global Commission on the Economy and Climate (2014) Better Growth, Better Climate: The New Climate Economy Report. Available from: www.newclimateeconomy.report.
3. The infrastructure investment in developed economies as a share of total global infrastructure investment is expected to decline from nearly half of the global total in 2014 to about one-third by 2025, according to PwC (2014): Capital project and infrastructure spending - outlook to 2025. Available from: https://www.pwc.com/gx/en/capital-projects-infrastructure/publications/cpi-outlook/assets/cpi-outlook-to-2025.pdf
4. In constant 2010 dollars. The Global Commission on the Economy and Climate (2014) Better Growth, Better Climate: The New Climate Economy Report. Available from: www.newclimateeconomy.report.
5. UNEP (2014) 'The Adaptation Gap Report: A Preliminary Assessment'. Available from: http://www.unep.org/climatechange/adaptation/gapreport2014/portals/50270/pdf/AGR_FULL_REPORT.pdf.
6. Canfin and Grandjean (2015): Mobilizing climate finance: a roadmap to finance a low-carbon economy. Final report of the French Presidential Commission on Innovative Climate Finance chaired by Pascal Canfin and Alain Grandjean.

Figure 1 Climate asset taxonomy: assets considered low-carbon and climate-resilient investments

[Source: Climate Bonds Initiative]



obtaining a competitive return. The wide range of different types of climate mitigation and adaptation investments required means there are investment opportunities in all asset classes, sectors, industries and countries.

In the energy sector, the low-carbon infrastructure investments include solar energy, wind, hydroelectric energy, carbon capture and sequestration for coal, and gas transition in some countries. In the transport sector, low-carbon transportation needs to increase through a ramp-up of railway usage, urban metros, bus-rapid transit systems, electric vehicles, hybrids and bicycles. However, it is not only the energy and transport sectors that need investment in climate mitigation. Climate-friendly buildings with lower emissions profiles need to be constructed and existing buildings need to be retrofitted. Figure 1 sets out an overview of climate-aligned assets.

THE URGENCY OF INVESTING IN CLIMATE-ALIGNED INFRASTRUCTURE

The cumulative nature of the climate problem means investing now is crucial: the longer investment is delayed, the longer before emission reducing projects are on the ground, and the more likely that the economic and financial systems will not be able to avoid the downside of climate risks. Infrastructure being built now can lock in emissions for several decades to come.

Moreover, the climate system faces natural tipping points, where rising temperatures lead to further increases in emissions or temperature, for example through large amounts of methane being released from areas of permafrost as it thaws in a warmer world. This adds to the urgency of rapidly increasing investment in climate mitigation and adaptation.

Tipping points in the climate system increases the urgency of mitigation and adaptation investments

Recent estimates find that the average present value of the risks of climate change posed to financial assets from warming of 2-degrees Celsius is USD4.2 trillion, but that this rises rapidly to USD7 trillion for 5 degrees warming and USD13.8 trillion for warming of 6 degrees.[7] These are significant amounts, with even the smallest being equivalent in size to the current total value of listed oil and gas companies.[8]

Another rationale for acting sooner rather than later is that with increasing climate change in the future capital will need to be diverted to react to damages from extreme events and there will be less capital available for preventative investment.

2. Policy strategy: mobilising institutional investors' capital for climate investments

Institutional investors can be an important source of additional capital to help fill the finance gap. The size of the investments required for a low-carbon and climate resilient economy requires financing over and above that which has been available from traditional public sector (governments) and private sector (commercial banks) sources. Institutional investors, such as pension funds and insurance companies, with sizeable and growing assets (USD93 trillion per 2013)[9] are increasingly looked to as one possible source of additional capital to fill these financing gaps.[10]

Institutional investors are increasingly looking to exploit investment opportunities that mitigate the risks arising from climate change

Institutional investors – particularly more experienced investors from OECD countries – are increasingly looking to exploit investment opportunities that mitigate the risks arising from climate change. The ability to tap into institutional investors' capital pool for low-carbon and climate resilient investments is increasing, as the integration of environmental, social and governance (ESG) factors into their investment process has seen a rapid increase over the past few years. For example, the Principles for Responsible Investment (PRI), for investors committed to the integration process of ESG, has members representing USD59 trillion of assets under management per August 2015. The PRI increasingly features 'mainstream' asset owners and managers, particularly from North America and Europe.

In September 2014, a coalition of investors representing USD24 trillion of assets under management – coordinated by the Global Investor Council on Climate Change, the PRI and the UNEP Finance Initiative – made a statement saying they are ready to invest in climate. The coalition called on governments to support increased investment in climate solutions.

3. Policy approach: bonds provide a channel to mobilise institutional investors

BONDS ADDRESS THE INVESTMENT NEEDS OF INSTITUTIONAL INVESTORS

Bonds address the investment needs of institutional investors, making them appropriate investment vehicles to tap into their large capital holdings at scale. Bonds, especially to finance infrastructure, offer long-term maturities. This makes them a good fit with institutional investors' long-term liabilities, such as to pension holders who will cash in their pensions in several decades time, and allows asset-liability matching. Nongovernment bonds can also provide much-needed diversification and more attractive yields, especially in markets with limited supply of bond instruments and a high concentration of investments in government securities.

At the same time bond returns are relatively stable and predictable when compared to equity. This is another important feature for investors looking after beneficiaries' assets, such as retirees' savings, and ties in with a global trend of a shift in asset allocation strategies, with an increasing share of bonds compared to equities.[11]

7. Economist Intelligence Unit. (2015) The cost of inaction: recognising the value at risk from climate change. The Economist. Available from: http://www.economistinsights.com/sites/default/files/The%20cost%20of%20inaction.pdf.
8. Ibid.
9. Kaminker, C. et al. (2013) Institutional investors and green infrastructure investments: selected case studies. OECD Working Papers on Finance, Insurance and Private Pensions, No.35, OECD Publishing.
10. Institutional investors can be broken down into asset owners and investment managers. Asset owners pool money from individuals and organisations (beneficiaries) to act as professional investors on behalf of others. They include insurance companies, pension funds, foundations and endowments, and sovereign wealth funds. Investment managers undertake the day-to-day management of these assets, either in-house or through external asset management companies.
11. Walker, M. (2014) The Great Rotation. Invesco Perpetual. Available from: https://www.invescoperpetual.co.uk/portal/site/ip/contentDetail?contentId=1a9d6f86578a5410VgnVCM100000c1f1bf0aRCRD.

BONDS ADDRESS THE FINANCING NEEDS OF GREEN INFRASTRUCTURE

Bond financing works well for low-carbon and climate resilient infrastructure projects post-construction. In the initial phases of these projects, most funding is done via bank financing. Banks, rather than institutional investors, have the risk assessment expertise required for pre-completion project lending, as evidenced by initial infrastructure financing still largely being done through bank debt.[12] The role of bonds issued for institutional investors should consequently be seen less as tool to raise money for a specific project at its initial stages and more as a tool for re-financing, providing an exit strategy for equity investors and bank lenders (see Appendix 1a).

As the projects are maturing and risks falling, the risk-profile of the projects becomes more suitable for bond finance. At this stage, moving from bank financing to bond financing can be beneficial.

First, refinancing initial bank loans with bonds can provide companies with a lower cost of capital. This is particularly crucial for many low-carbon projects – with already relatively high capital expenditures, the cost of capital can be a significant factor in determining their economic viability. Making capital cheaper is even more important in emerging market economies, where the majority of climate-friendly investment is needed over the next decades, because of generally higher interest rates. Second, the potential longer tenors of bonds compared to bank loans can allow companies to lock in financing for a longer period of time, reducing refinancing risks.

THE LABELLED GREEN BOND MARKET IS GROWING RAPIDLY

The rapid growth in the labelled green bond market has shown in practice that the bond markets provide a promising channel to finance climate investments.

Labelled green bonds are defined as bonds with proceeds used for green projects and labelled accordingly by the issuer. The vast majority of these green projects are focused on climate change mitigation or adaptation, but there is a small share of the market, which also funds green, non-climate projects, such as public green spaces. Per June 2015, the largest share of labelled green bonds has been issued

Figure 2: Labelled green bond issuance by project type[13]

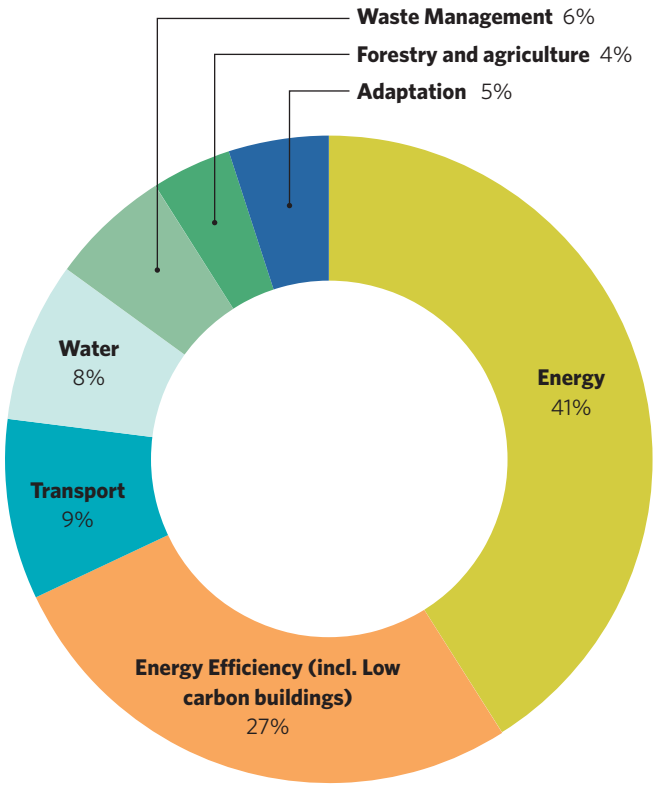
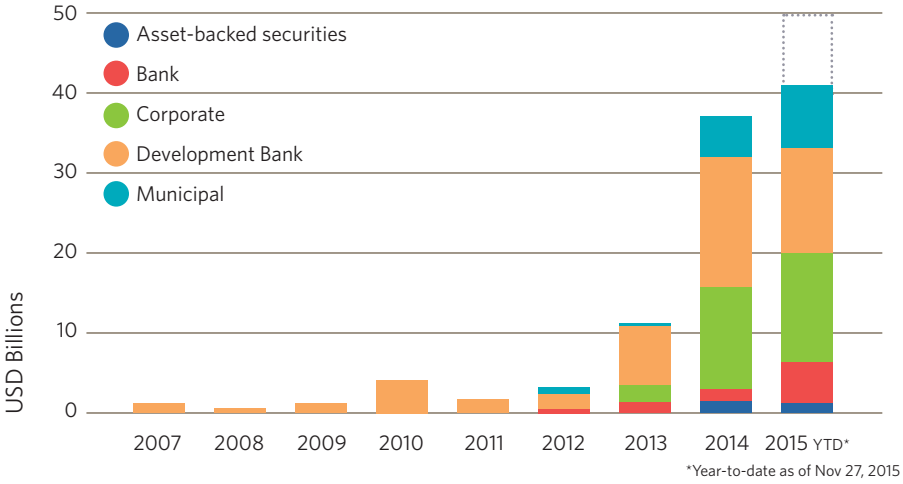


Figure 3: Global labelled green bond issuance (USD billion/year)[15]



*Year-to-date as of Nov 27, 2015

for renewable energy, low-carbon buildings and industry and transport (see figure 2).

There is not yet a common definition in the market for what assets and projects can qualify for labelled green bond issuance, although international standards for what qualifies as a green bond for climate mitigation and adaptation are being developed (see section A).

USD36bn of labelled green bonds was issued in 2014, up from $11bn in 2013. Per December 2015, more than $40bn of green bonds had been issued.

In addition to the labelled market, there is a much larger universe of bonds that finance climate mitigation and adaptation that are not labelled as green. As of June 2015, this additional unlabelled climate bond universe stood at $532bn.[14] The labelled segment of the climate-aligned bond market is growing faster than the unlabelled segment. Characteristics of the labelled market that can explain the rapid growth are set out below.

GREEN CREDENTIALS DEFINED BY THE ASSETS, NOT THE ISSUING ENTITIES

A key characteristic of labelled green bonds explaining the growth of the market is that it's about green assets, not green entities.

12. PwC (2013) Capital Markets: The Rise of Non-Bank Infrastructure Project Finance. Available from: http://www.pwc.com/en_GX/gx/capital-projects-infrastructure/publications/assets/pdfs/pwc-capital-markets-the-rise-of-non-bank-infrastructure-project-finance.pdf. 13. The Climate Bonds Initiative (2015). Data per 2 September 2015.
14. The Climate Bonds Initiative and HSBC (2015) Bonds and climate change: State of the market 2015
15. The Climate Bonds Initiative (2015). Data per 1 December 2015.

Whether a bond can be labelled green depends upon whether the projects it funds qualify as green projects. This means any bond issuing entity with a portfolio of eligible green projects can issue a labelled green bond, regardless of whether or not it would qualify as green at the entity level. This feature of labelled green bonds explains the rapid growth of the market for two reasons.

First, the labelled green bond market matches a greater array of green issuers and investors. For example, some investors may not see a large commercial bank as a good investment for environmentally sustainable reasons. But if the bank issues a bond with proceeds earmarked solely to finance a wind farm and labels it accordingly, then that bond is a labelled green bond and can attract these investors. The ability to issue labelled green bonds presents opportunities for a wide range of issuers, enabling scale.

Second, it enables labelled green bonds to have comparable risk-adjusted financial returns to non-green bonds. This is because the risk of the bond is determined by the issuer's' full balance sheet rather than simply the green assets funded by the bond. The treasuries of the issuing companies have been providing the risk-bridge needed to get green projects and assets to an investment grade rating that meets the need of institutional investors. A development bank or a blue-chip corporation uses the strength of its balance sheet to borrow at low cost and invest in high-priority areas where it has special expertise. This is an efficient way to fund projects seen as risky by investors.

The additional benefits achieved by the labelling of the bonds as green, compared to not labelling them, has been another discussion point in the market. The green label makes it simple for institutional investors, who increasingly have made climate change commitments, to identify green investments. The label is a discovery tool that reduces friction in the investment process.

Box 1: Additionality of labelled green bonds: providing an exit strategy for banks and project developers

Proceeds from labelled green bonds can fund new green projects or refinance existing green assets. This has led to market wide discussions of whether additional projects or assets are financed as a result of green bonds. Primarily, bonds are refinancing tools that allow issuers to free up capital from existing assets. This role is crucial in the capital pipeline. In the higher risk construction phase of projects it is important for issuers, equity investors or banks providing loans to know that once operational the asset can be refinanced through bonds. Project developers need to be confident when investing in the early high-risk stage of projects that green projects can be refinanced easily and potentially at a better price. This is the additionality green bonds can achieve. The refinancing role of bonds in the capital pipeline is covered in detail in Appendix 1a.

THERE IS STRONG INVESTOR APPETITE FOR LABELLED GREEN BONDS

There are many indicators of the strong investor appetite for labelled green bonds:

- A high level of oversubscription compared with non-green issuances. For example, the first labelled green bonds from a Chinese issuer[16] in the international markets: the $300m issuance from wind energy company Goldwind received orders of $1.4bn.[17] Oversubscription gives the issuer the flexibility to upsize the bond. For example, the first green bond out of India from Yes Bank to double its offering from INR 5bn to INR 10bn.
- Pledges from banks and insurance companies to invest a set amount into labelled green bonds[18] and investor statements supporting the growth of the labelled green bond market. In December 2014 an investor statement to support the green bond market was signed by asset owners and fund managers with a combined $2.62trn assets under management.[19] In 2015, another investor statement setting out expectations for the green bond market was signed by 26 investors.[20]
- Specialised green bond funds are being launched.[21]

CREATING A POSITIVE CLIMATE CHANGE NARRATIVE

Green bonds can create a positive narrative for investing in climate change solutions. The active engagement of the private sector in the green bond market can help create a virtuous circle, in which national leaders push for new climate agreements with increasing confidence that the capital will be available to make the agreements a reality.

WITH THE RIGHT SUPPORT IN PLACE USD 1TN OF GREEN BONDS COULD BE ISSUED A YEAR BY 2020

Drivers for a potentially rapid expansion of annual green bond issuance include increasing annual infrastructure investment and a larger share of the infrastructure being climate-aligned over time. In particular, investment areas such as rail and telecommunications are seen by scientific experts to qualify as low-carbon as they enable the displacement of high-carbon travel. Based on current practice in developed countries, it is assumed that 30% of infrastructure investment will be financed by bonds, both directly through infrastructure bonds and indirectly, through corporate bond, banks bond and municipal bond issuance.

More details of the estimation for how to get to USD1 trillion of green bond issuance annually by 2020 is set out in Appendix 1b. Note that this estimation is an order of magnitude estimation based on top-down analysis rather than a detailed projection of expected green bond issuance. Future more detailed sector-specific estimations are recommended.

4. The importance of public sector involvement to kick-start new markets

Public sector action is vital to support the green bond market, and achieve the potential rapid market growth outlined in

16. The use of proceeds of the bond are not earmarked specifically for green projects, but as at least 90% the company's activities are aligned with a low-carbon and climate-resilient economy, the independent opinion from DNV-GL on the bond's green credentials conclude that the bond is aligned with the international Green Bond Principles.
17. Desai, U. (2015) 'China's first green bond to spur interest for future deals', Reuters. 20 July 2015. Available from: http://www.reuters.com/article/2015/07/20/china-greenbond-idUSL4N0ZW4XN20150720.
18. In 2015 public pledges came from Zurich Insurance, Deutsche Bank treasury, KfW, Barclays treasury and ACTIAM to build €1bn green bond portfolios.
19. Climate Bonds Initiative (2015): Investor Statement re: Green Bonds & Climate Bonds. December 2014. Available from: https://www.climatebonds.net/get-involved/investor-statement
20. Ceres (2015): A Statement of Investor Expectations for the Green Bond Market. February 2015. Available from: http://www.ceres.org/files/investor-files/statement-of-investor-expectations-for-green-bonds
21. Swedish insurance company SPP, SEB Asset Management, Nikko Asset Management, BlackRock, Calvert, Shelton Capital Management and State Street all manage green bond funds.

II Policy Actions to Grow Green Bond Markets

the previous section. The need for public sector support is not specific to green; for any new bond market there is a central role for the government to create an enabling environment to support healthy and dynamic growth of the green bond market.

Voluntary market action has started to channel capital to climate change mitigation and adaptation projects, but it is not doing so at sufficient scale and pace given the urgency of the climate change challenge. Over time the market may be able to break down the barriers without policy support from government, but public sector actors can and should speed up the process by supporting existing market initiatives and taking action where the market is not.

Public sector action in the financial system is a complement to climate policies in the real economy, not an alternative.[22]

SYNERGIES BETWEEN PRIVATE SECTOR AND GOVERNMENT ACTION

Action in the private sector makes it easier for governments to take action. It is not sufficient to rely on governments to initiate action on its own. The rapid expansion of the green bond market has illustrated this important dynamic: the market-driven growth of green bonds has spurred policymakers around the world to engage on supporting further green bond growth, both internationally and by growing domestic green bond markets.

Implementation of the proposed action areas will have to take into account the broader financial and macroeconomic context as well as country specific context. Support for the green bond market can be complementary to achieving other non-environmental policy objectives as well, such as improved transport and water infrastructure and social housing, as green bonds can finance climate-friendly infrastructure in these priority areas. Public sector support for green bonds should therefore not replace other important policy objectives. Relevant priorities include post-crisis economic recovery, sustainable pensions, meeting energy, water and food needs, and public trust in the financial system.[23] The global scope of the report limits the ability to consider country-specific contexts.

The rapid growth of the labelled green bond market has caught policymakers' attention around the world and increased interest in their development. What is required to grow green bond markets varies between developed countries and emerging economies, as the latter first require more fundamental bond market development actions as well.

Growing green bond markets in advanced economies

Bond markets in advanced economies, in particular US and Europe, are largely mature and properly functioning. While growing robust labelled green bond markets poses particular challenges, the general bond market infrastructure is already largely in place. Having a solid market foundation with well-developed and capable market participants can make it easier to introduce new approaches like green bonds. The largest share of investors with environmental commitments is also found in the advanced financial markets in Europe, US and Japan. These drivers can explain why the developed economies lead the adoption of innovative structures and instruments that support green bond market development in the initial years of the market.

Growing green bond markets in emerging economies

In contrast, in many emerging market countries bond markets are underdeveloped. They face fundamental challenges that can slow the pace of green bond market growth. While there has been considerable bond market growth in emerging markets since the Asian financial crisis in 1997, the growth is highly concentrated in selected larger emerging economies, such as China, India and Malaysia. In other countries, the bond market is often very small, with access limited to a small range of participants. Issuance is usually concentrated in a few established companies, often from the financial sector. Issuance related to strategic sectors, such as infrastructure, is limited or non-existent in most countries. These capacity constraints of local bond markets will influence how far and fast domestic green bond markets can grow in emerging economies, however, green bond transactions could still take place even if the general bond market is underdeveloped. The annex of this report from the World Bank Group highlights the challenges and actions needed to develop the underlying non-government bond market.

Green bond transactions could still take place even if the general bond market is underdeveloped

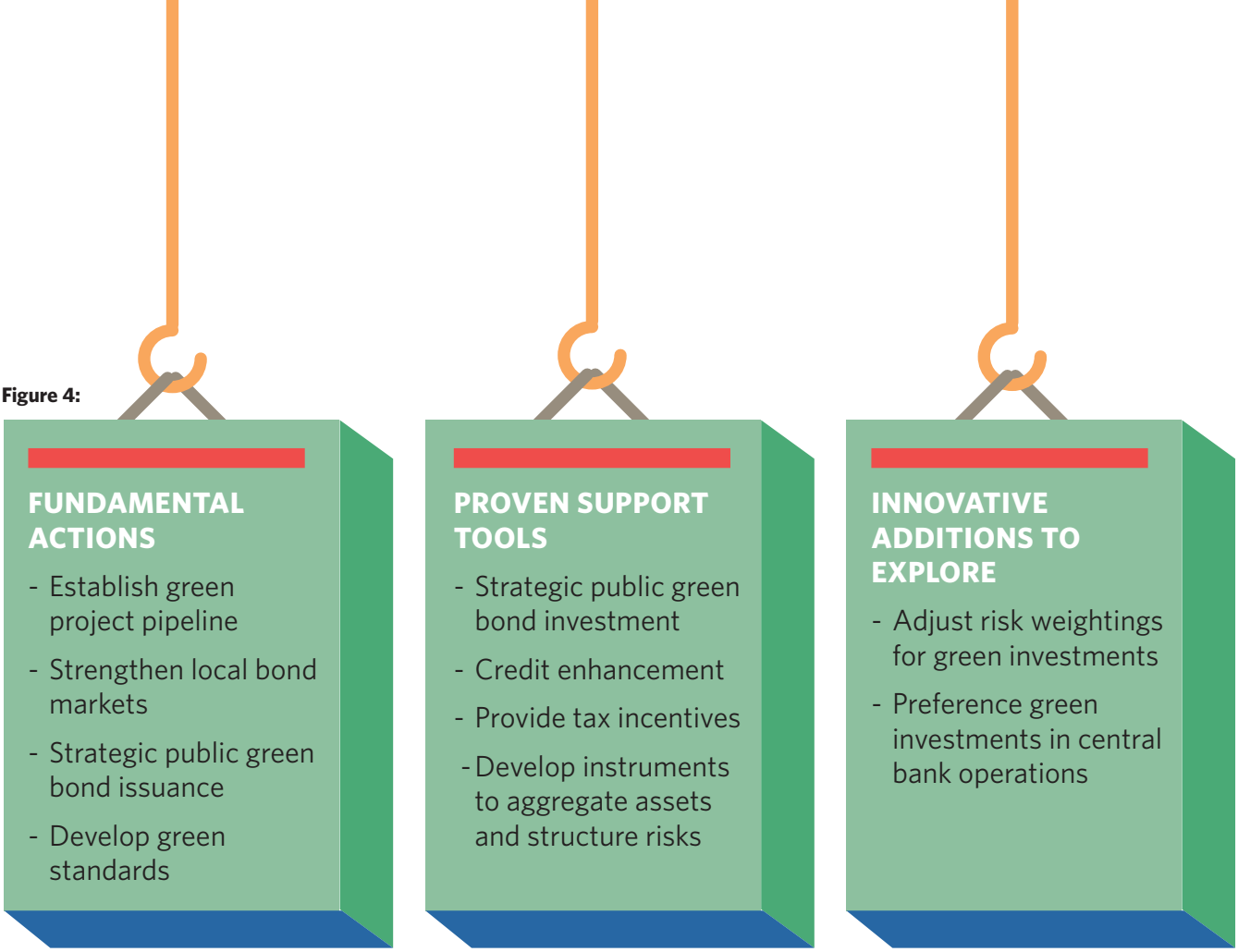
In addition, the pressure to create green financing might intensify the urgency of – or possibly act as a catalyst for - broader bond market reform. Emerging economies are where the majority of investments for low-carbon and climate resilient infrastructure are needed in the coming years.[24] The urgency of the climate change challenge and the infrastructure investment needs means countries cannot wait until they have mature bond markets to channel investments to green.

The process can be mutually reinforcing: policymakers can benefit from taking into account the needs of green infrastructure early on as key regulations are put in place, helping to accommodate issuers and investors to facilitate green transactions. At the same time, green infrastructure players can form an important part of the issuer base, helping to grow the overall market. Additionally, making sure market structures are conducive to green might be easier when there is an on-going process of change underway.

Focusing on financing a policy priority area in the early stages of general bond market development is not new, or specific to green. India is one example that has taken this policy priority approach with growing a domestic

22. Lake , R.(2015): Financial Reform, Institutional Investors and Sustainable Development. UN Inquiry Design of a Sustainable Financial System Working Paper. Available from: http://apps.unep.org/publications/pmtdocuments/-Financial_Reform,_Institutional_Investors_and_Sustainable_Development___A_Review_of_Current_Policy_Initiatives_and_Proposals_for_Further_Progress-201.pdf
23. Lake , R.(2015): Financial Reform, Institutional Investors and Sustainable Development. UN Inquiry Design of a Sustainable Financial System Working Paper. Available from: http://apps.unep.org/publications/pmtdocuments/-Financial_Reform,_Institutional_Investors_and_Sustainable_Development___A_Review_of_Current_Policy_Initiatives_and_Proposals_for_Further_Progress-201.pdf
24. The infrastructure investment in developed economies as a share of total global infrastructure investment is expected to decline from nearly half of the global total in 2014 to about one-third by 2025, according to PwC (2014): Capital project and infrastructure spending - outlook to 2025. Available from: https://www.pwc.com/gx/en/capital-projects-infrastructure/publications/cpi-outlook/assets/cpi-outlook-to-2025.pdf

Figure 4:



bond market (see appendix 1c). While India is aiming to support infrastructure investments more broadly, rather than specifically green infrastructure, it illustrates how bond markets can be used to encourage investment into a specific area in the market's early stages in emerging economies.

Policy tools to grow a green bond market

To address the green bond challenges, the public sector can use the tools they commonly use for general bond market development, but apply them in a more concentrated fashion to facilitate specific investment in green projects. In emerging economies, such green bond specific public sector support must come in addition to support for more general foundational aspects of bond market development must occur to enable a green bond market to flourish.

These policy actions are divided into the following three categories: Fundamental Actions, Proven Support Tools, and Innovative Additions to Explore (see Figure 4 above). The most fundamental actions are market-building activities that have low fiscal impacts and proven success in supporting bond markets. Next, there are proven support tools that have been used to further support bond market growth in certain countries, but their use for labelled green bonds will vary depending on the policy priorities and fiscal space in different countries. Lastly, there are innovative ideas that could be explored, that are currently being used by certain leading players. When exploring these potential areas for action, the public sector needs to consider possible unintended consequences of supporting green bonds through these mechanisms.

The rest of this Guide discusses these actions as part of five themes that define a bond market ecosystem. The themes are:

A: Market development and environment

B: Issuance: facilitating supply of green bonds

C: Instruments: scaling up the deal flow suitable for green bond issuance

D: Investment: facilitating demand for green bonds

E: Cooperation

Each theme starts with challenges to developing a green bond market, followed by a discussion of the policy actions available to address the green bond market development and specific, detailed action points for different public sector actors.

A Market development

Challenges to green bond market development

To enable the initial development of any bond market, including a green bond market, there are several elements related to the broader enabling environment that need to be in place. For the green bond market specifically, there is a need for robust green credentials to achieve the overarching goal of meeting climate goals and infrastructure needs. While there is a balance to find between stringency for climate impact of individual issuances and overall scale of the market, ensuring some level of climate ambition in the bond issuances is necessary. Developing clear guidelines and standards for what is green establishes the foundation for a green bond market.

Developing clear guidelines and standards for what is green establishes the foundation for a green bond market

GUIDELINES AND STANDARDS REDUCE TRANSACTION COSTS

Governments supporting the growth of green bonds need to be assured that the green bonds will have a significant impact on meeting climate, or other environmental, targets. Similarly, investors want to know that the green bonds they invest in will have a genuine environmental impact. Both governments and investors want to avoid the risk of "greenwashing", in which bonds are labelled as green, but the proceeds are in reality allocated to assets that have little or doubtful environmental value. They need to be able to evaluate the green credentials of the bonds and do this with low transaction costs.

Currently, lack of commonly accepted standards in the market for what is green means investors and governments can occur significant transactions costs in evaluating the environmental credentials of labelled green bonds. Cost-reducing economies of scale to provide the required assurance to market players on green credentials cannot yet be achieved.

Policy actions for green bond market development

(i) Setting guidelines and standards for green bond issuance

CURRENT TOOLS IN THE MARKET

Simplifying the process of evaluating green credentials of the bonds facilitates scaling of the market. Standards are instrumental to scale and comparability in other parts of the financial markets: for example, standardised financial statements and accounting practices. This reduces the transaction costs of green bonds for investors, issuers and policymakers.

The main tools in the market to address the issue of definitions and standards for green bonds are the Green Bonds Principles and the Climate Bonds Standard scheme (see Box 2). Most green bonds use some sort of external review or benchmark measure to assure investors of the green credentials of the bond.[25] An independent review, commonly called a second party review, is used by 60% of green bonds.[26] A smaller, but growing, number of green bonds are certified against the Climate Bonds Standard by independent verifiers (see appendix 2a for more details).[27]

HARMONISATION OF COUNTRY-SPECIFIC STANDARDS CAN REDUCE TRANSACTION COSTS

Some country-specific definitional frameworks will emerge to suit the environmental priorities of the country in question. While climate change has been the central environmental area being addressed with green bonds so far, many emerging economies in particular have other environmental concerns as well, including localised air and water pollution. Country-specific definitions might be required to address the different priorities. For example, China is at present developing China Green Bond Guidelines and definitions (see Appendix 2b). But ensuring that the market does not get too fragmented is crucial – if too much is country specific, global investors will incur significant transaction costs. This is starting to be recognised in certain parts of the market. For example, harmonising green bond standards across countries in the EU is on policymakers' agenda under the EU's Capital Markets Union.[28]

Box 2: Green bond definitions and standards in the market to date

GREEN BOND PRINCIPLES: VOLUNTARY GUIDELINES FOR THE GREEN BOND ISSUANCE PROCESS

The Green Bond Principles, issued early in 2014, are a set of voluntary guidelines developed around the design and reporting characteristics of green bonds. The Principles promote the idea of green bonds being about the use of proceeds for green assets rather than for green "issuers". They cover establishing sound management processes for the use of proceeds and the use of independent reviewers for both environmental credentials and robust reporting practices.

An updated version of the Principles was published in March 2015. While the Principles do include broad categories for what can be included as green projects to be financed by green bonds, they do not try to promote detailed criteria to standardise what is green.

CLIMATE BOND STANDARDS: CRITERIA FOR WHAT IS GREEN, AS WELL AS THE ISSUANCE PROCESS

The Climate Bond Standards seek to provide common, science-referenced classification for the green bond market of what is green. The Climate Bonds Standards Board, which represents investors with $34trn of assets under management, oversees the development of the Standards. Update highlighted text to; The Board convenes scientists, investors and other specialists in expert committees that develop clear and science-based criteria to identify the assets and projects that can be financed with green bonds. The newly updated Climate Bonds Standard also sets up issuance processes for green bonds, fully integrating the Green Bond Principles.

25. CICERO, Vigeo and DNV GL continue to be significant providers of second party reviews. Newcomers in the past year are oekom, Sustainalytics and KPMG.
26. Climate Bonds Initiative and HSBC (2015) Bonds and climate change: State of the market 2015.
27. A full list of approved verifiers under the Climate Bonds Standards is available online: www.climatebonds.net.
28. European Commission. (2015). Green Paper: Building a Capital Markets Union. Available from: http://ec.europa.eu/finance/consultations/2015/capital-markets-union/docs/green-paper_en.pdf.

THE PUBLIC SECTOR CAN SUPPORT DEVELOPMENT AND UPTAKE OF GREEN BOND STANDARDS

Public entities are well placed to support the uptake of green bond definitions, standards, reporting and certification best practices. Development banks in particular can play a role here. First, they can encourage best practice green processes indirectly by showcasing best practice in their own green bond issuances. They can also take a more direct role, by actively advising issuers on how to follow best practices in the market relating to processes around eligible projects, such as the tracking of funds, external verification/certification and reporting. For example, International Finance Corporation (IFC) is developing a Green Bond Advisory Package to enable the Green Bond Principles to be adopted in a credible way in emerging markets.

Government can seek to level the playing field for transparency, disclosure and reporting costs between green and non-green bond issuance

Public sector players and various market actors can work together on the development of country-specific definitions and standards through Green Bond Market Development Committees. Committees with representatives from central banks, ministries, development banks and other financial sector players are emerging in various countries around the world, including Mexico, Brazil, Turkey, India, China, Canada and California. Global cooperation between the Committees will allow ideas and policy proposals to be shared and activities to be synchronized. China is one country that has made progress on country-specific green bond guidelines; these are expected to be published in December 2015 (see more details in Appendix 2b). In December 2015, India's capital markets regulator, the Securities and Exchange Board of India, also entered a public consultation process for developing country-specific green bond guidelines.

Starting with market led approaches to standardisation is appropriate, but over time there is potential to tap into the existing international standards apparatus to facilitate the harmonisation of standards that have developed in the market. Relevant standards systems can include the UNFCCC and the ISO-system.

Table 1: Action points: market development

ACTIONS	ACTOR(S)
Green Bonds Guidelines and Standards	
Support the development of definitions and standards for labelled green bonds that allow harmonisation of incentives and markets	
○ Provide financial support to market schemes developing definitional frameworks and standards for green bonds	Any public entity
○ Establish and/or fund Green Bond Market Development Committees at the country or regional level to explore whether country-specific definitions/standards is needed, and if so, convene actors to develop these	Financial regulators, central banks, Ministry of Finance
Encourage clear reporting and an external evaluation of adherence to the definitions and standards	Development banks, municipalities, green banks, Ministry of Finance for sovereign green bond issuance
○ Adhere to the above in own issuance; demonstration for other market players	
○ Develop How-to guides for private sector issuers based on own experiences, and make them easily available online	
○ Consider making public support mechanisms, such as green bond tax incentives, conditional on reporting and certification	Ministry of Finance, financial regulators
Reduce relative costs of green bond disclosure and reporting by strengthening the disclosure and reporting requirements on environmental performance for all bonds, extending the work done on pushing for environmental disclosure in corporate reporting/equities to fixed income.	Financial regulators

(ii) Levelling the playing field for transaction costs of green bonds and non-green bonds

Currently, green bond issuers absorb the additional transaction costs associated with second opinions and certification.[29] Government can seek to level the playing field for transparency, disclosure and reporting costs between green and non-green bond issuance by extending the focus on disclosure requirements on green credentials to all fixed income issuance. This would mean that non-green bonds would also have to provide information on use of proceeds, and comment on the environmental impacts of the use of proceeds. In the equity space, much progress has been made on improving disclosure practices for environmental indicators, which could provide lessons for how to extend this to the bond space.

29. Feedback from issuers suggests the benefits - including investor diversification, marketing of environmental activities and increased collaboration between internal departments - more than outweigh the costs of disclosure and reporting. The costs of disclosure and reporting for green bonds are relatively small compared to the overall cost undertaking a bond issuance, but there is also an element of perceived high cost that can act as a deterrent for prospective issuers, particularly smaller issuers.

B Issuance

Challenges to increasing green bond issuance

Green bond issuance has grown rapidly the past years, from USD11bn in 2013 to expected issuance of USD50bn in 2015. However, the level of issuance is still falling short of investor demand, which continues to outstrip the supply of green bonds.

LIMITED BANKABLE GREEN PROJECTS

A limitation on green bond issuance is limited bankable green projects suitable for financing through bond issuance. The challenges to develop such a robust pipeline of green projects includes lacking prioritization of strategic green projects by government entities, around which private sector sponsors and investors could then be mobilized. Lack of clarity about the green project pipeline among the investor community in terms of number and type of potential projects makes it difficult for investors to plan. If there is a perception that there is only a small trickle of investable green bond projects, they will not devote resources to develop capacities required to invest in this space. With limited investor capabilities, governments also become less certain there will be investors ready to provide capital for the green projects they are developing, creating a vicious cycle.

CAPACITY BUILDING FOR ISSUERS

Another challenge is to encourage issuers that do have portfolios of suitable green projects to tap the green bond market to finance their projects. There is a need for capacity building amongst issuers, particularly in emerging markets. This includes educating issuers about the benefits and challenges of green bond issuance compared to standard bond issuance and how to issue. A challenge is getting demonstration issuance to market from large, well-known issuers to kick-start country level markets around the world.

Policy actions to increase green bond issuance

(i) Developing a priority list of strategic green projects

A starting point for coming up with a priority list for green projects is high-level targets and strategies for climate change and infrastructure development, which many countries have developed on a national basis. This can include the Intended Nationally Determined Contributions (INDCs) that have been developed as part of the United Nations Framework Convention on Climate Change (UNFCCC) process, which outline the post-2020 actions each country is planning to take under a new international climate agreement.

While the INDCs set the direction of travel, they do not provide a specific pipeline of investable projects to highlight where the investment opportunities will be and what they will look like. The goals expressed in these strategies/INDCs can be used to devise a list of key strategic projects that the government can prioritize over a reasonable timeframe. This would provide investors with a pipeline of low-carbon and climate resilient investment opportunities at a more granular level of detail.

National agencies (such as those established in Australia, UK and South Africa) would be instrumental in leading this effort. They can devise a list of strategic projects, and work with the investor and development bank partners to structure projects and bring them to market. This approach is now being used in a number of emerging economies: Kenya is one example of a country that has devised a strategic project priority list.

Governments can also access technical assistance to improve planning and pipeline development, including the Green Climate Fund's Programme for Readiness and Preparatory Support, the Global Green Growth Institute (GGGI), and UNEP PAGE.

(ii) Ensuring financial viability of projects

Financial viability is a crucial element to ensure project attractiveness to investors. This is not a policy action that is specific to the bond market, but a critical upstream piece to get right to allow bond financing to take place. Revenue sources of a project are a key consideration and may require support from the government in terms of revenue guarantees to complement and cover any shortfalls in market demand. For example, the Colombian government is offering availability payments to toll-road projects that are part of its on-going toll road development program to offset shortfalls in user fees. Similar mechanisms can be replicated in the low-carbon transport space.

However, there could be options for governments to ensure financial viability through other channels such as increased

Box 3: Land-value capture increases the financial viability of low-carbon transport

Public transport, such as metro systems, bus rapid transit and rail, remains underfunded because it is difficult to capture the full value of these developments in the revenue streams of projects. Passenger payments are one source of revenue for transport projects, but in addition, one of the largest financial benefits of increased public transit is from its land value premium.[30] Access to public transit is an immediate boost to adjacent land values, which is a positive externality usually captured by private actors. It is crucial to find relevant strategies so that a share of the value can be captured by the transport project itself rather than being absorbed only by property developers. Land value capture tools include tax increment financing districts, development charges, development rights, and joint development. For example, development charges can be raised by additional taxation on private developers to help finance transit-oriented development.[31]

In Hong Kong, Mass Transit Railway Corporation (MTR) is an example of a company that can finance public transport through value capture from property near metro lines. When MTR began in 1975, the Hong Kong government sold or gave land to MTR with the understanding that the revenue from property development would help support the transport system without public subsidy. MTR is already working to build on its value capture transportation model in mainland China.[32]

30. Fogarty et al. (2008) Capturing the Value of Transit.
31. Ang, G. and V. Marchal (2013) Mobilising Private Investment in Sustainable Transport: The Case of Land-Based Passenger Transport Infrastructure. OECD Environment Working Papers, No. 56, OECD Publishing.
32. Jacqué, P. (2015). Sky dwellings: the transit operators building real estate over the tracks. Guardian. Available from: http://www.theguardian.com/cities/2015/mar/27/real-estate-railways-public-transport-hong-kong-paris.

collaboration between planners, policymakers, the private sector and investors. An interesting example of such a mechanism exists in the low-carbon transport sector through land-value capture (Box 3).

(iii) Ensuring pipeline transparency for investors

Making the pipeline of green infrastructure deals clear to investors has benefits. Investors are incentivised to develop stronger capabilities

Making the pipeline of green infrastructure deals clear to investors has benefits. Investors are incentivised to develop stronger capabilities in investing in green infrastructure if they know there is a strong pipeline of attractive green bond investment propositions coming through. This would again provide an incentive for infrastructure planners to scale up the pipeline of investable projects, confident in the knowledge that there is strong investor demand for their projects. Investor transparency for infrastructure pipeline is improving for infrastructure in some countries, such as the EU and China (see Box 4). The challenge is now to ensure these pipeline discussions on infrastructure more broadly begin to focus on low-carbon and climate resilient infrastructure.

(iv) Establishing a collaborative platform for governments, investors and development banks

The Green Infrastructure Investment Coalition can facilitate collaboration between investors, governments and development banks on green infrastructure pipelines

In addition, an action-focused collaborative platform allowing governments to collaborate with other market players will be beneficial. The collaboration would include institutional investors and other private sector investors who have capital and an increasing focus on addressing climate change in their investments. It would also feature development banks, as they have the capabilities to de-risk these investments. This would deliver green infrastructure investments with risk-adjusted returns that allow investors to increase their allocation of capital to this pipeline of green investments.

The Green Infrastructure Investment Coalition can facilitate this three-way dialogue (see Box 5).

Box 4: Examples of infrastructure investment pipelines

The European Commission has proposed a European Investment Project Pipeline for infrastructure investments. This will "facilitate access to information for investors on investment opportunities across the EU and maximize investor participation in financing".[33] The preliminary proposals include a central EU-level website to provide links to Member State projects/pipelines and project information through the Connecting Europe Facility and European Structural and Investment Funds. The EC hopes that increased transparency on infrastructure projects in member states will reduce investment friction between investors and these projects.[34] Another example is China, who in 2015 published a pipeline of over 1000 projects to be funded and constructed through public-private partnerships, with a total value of RMB 1.97 trillion (USD 317.75 billion).[35]

Box 5: Green Infrastructure Investment Coalition

Established in 2015, the Coalition is brought together by the Climate Bonds Initiative, PRI, UNEP Inquiry and the International Cooperative Mutual Insurers Federation (ICMIF). The aim of the Coalition is to bring together investors, governments and development banks to help increase the flow of institutional investor capital to green infrastructure investments around the world. Participants want to:

- Better understand the forward pipeline of green infrastructure investments.
- Examine barriers to capital flows and propose solutions
- Shape the capital market instruments needed to ensure capital flows. The Coalition will also support investors to review asset allocation strategies to make sure they will be able to take advantage of the huge deal flow on the horizon.

Coalition members are investors, government and development banks. Investment banks will participate as observers and facilitators. The primary activity of the Coalition will be to hold roundtables to find out about and discuss government green investment plans, including specific pipelines being developed by individual agencies such as State energy and rail companies. As of mid-November 2015, the Coalition organisers are in discussion with dozens of organizations about joining.

33. European Commission (2015) Building a Capital Markets Union. Green Paper. Available from: http://ec.europa.eu/finance/consultations/2015/capital-markets-union/docs/green-paper_en.pdf.
34. Ibid.
35. Goh, B.. (2015) 'China invites private investors to help build $318 billion of projects', Reuters. Available from: http://www.reuters.com/article/2015/05/25/us-china-economy-infrastructure-idUSKBN0OA07R20150525.

(v) Encouraging strategic green bond issuance from public entities

Strategic green bond issuance from public entities can play an important role in kick-starting the green bond market in its initial stages. Such demonstration issuance can help engage investors and educate them about the asset class but with greater comfort, since the issuer would be a well-recognized entity compared with a private sector issuer. It can also play an important signalling effect, showing the market that the government is moving forward on climate change in practice.

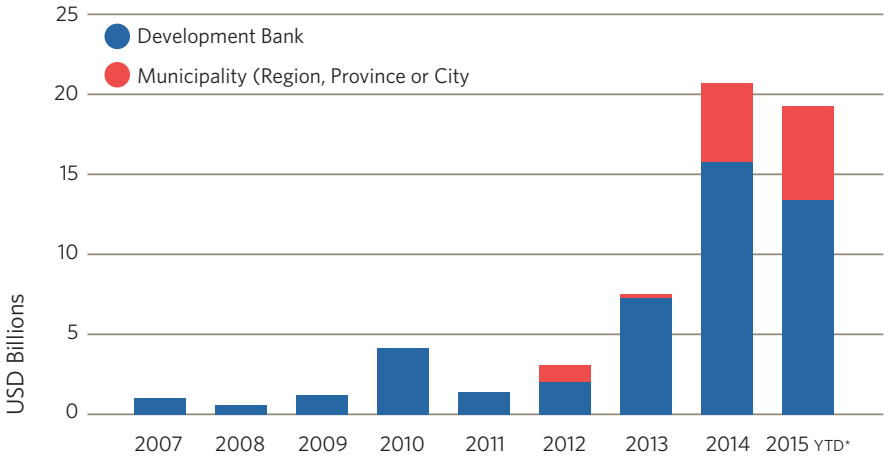
In addition to development banks and municipalities, which have already demonstrated their issuance in the market, public issuance can come from green banks and sovereigns

In the international green bond market, development banks and municipalities have already been active in providing strategic issuance of green bonds, as set out in Figure 5. In addition to development banks and municipalities, which have already demonstrated their issuance in the market, public issuance can come from green banks and sovereigns.

MULTILATERAL INSTITUTIONS AND DEVELOPMENT BANKS – PIONEERS IN GREEN BOND ISSUANCE

Development banks, both domestic and international, represent other key strategic issuers that can provide important demonstration transactions for green bonds. Investors can take comfort in their established status and usually high credit ratings and thus can be introduced to the green asset class without being exposed to significant financial risk. In 2007, the European Investment Bank (EIB) issued the first labelled green bonds, called Climate Awareness Bonds, and as of June 2015 they have issued US$11.5bn of green bonds, making EIB the largest issuer in the market.[37] The World Bank and the IFC have also been pioneers in creating the green bond market, issuing US$8.1m and US$3.4m to date, respectively. The World Bank and the IFC have also been pioneers in creating the green bond market.[38] All three development institutions have credit ratings of AAA, making their green bonds safe investment-grade bonds that can introduce institutional investors to green projects without being exposed a significant level of financial risk.

Figure 5: Development banks and municipalities are leading global green bond issuers[36]



*Year-to-date as of Nov 27, 2015

More recently, domestic development banks, such as the German development bank KfW,[39] have also issued green bonds to help grow domestic markets. There is still much untapped potential for strategic green bond issuance from development banks. For example, the newly launched Asian Infrastructure Investment Bank can play an important role (see Box 6), and domestic development banks in both developed and emerging economies can develop domestic green bond markets. The China Development Bank and the national Brazilian Development Bank (BNDES) are two examples of domestic development banks with large volumes of green loans on their books that could enter the green bond market to refinance and so free up their balance sheet for more green loans.[40]

36. Climate Bonds Initiative (2015). Data per 2 September 2015.
37. Climate Bonds Initiative (2015). Data per June 2015
38. Since issuing its first green bond in 2008, per September 2015, the World Bank has issued USD8.1bn of green bonds (in 18 current currencies). The IFC has issued a smaller amount with a total USD3.4bn in green bonds, but the IFC was instrumental in kick-starting the green corporate bond market in 2013, when they issued the first USD1bn benchmark green bond issuance that got the attention of corporates and investors.
39. KfW has issued 4 green bonds between July 2014 and July 2015 for a total of USD4.4bn
40. China Development Bank is the largest development bank in the world and has invested $80 billion in renewable energy projects. BNDES has committed about $50 billion to low-carbon energy projects.
41. Asian Infrastructure Investment Bank, (2015). http://www.aiibank.org/html/aboutus/AIIB/. Date Accessed: 07/07/2015.

Box 6: A role for the Asian Infrastructure Investment Bank

The new Asian Infrastructure and Investment Bank is an opportunity to support the growth of a green bond market to finance the green infrastructure needed in Asia over the next decade. This China-led bank will initially have an authorized capital stock of USD100 billion. The AIIB has stated that it represents "an institution built on respect for the environment" and will focus on development of infrastructure and other productive sectors in Asia. These include energy and power, agriculture development, water supply and sanitation, and environmental protection.[41] The Chinese government has already been taking steps towards growing a green bond market domestically (see Box 13), and China's preeminence in the AIIB may help to further green bonds throughout the rest of Asia. Multilateral Development Banks (MDBs) that have been instrumental in establishing the green bond market early on should be proactive in sharing with the AIIB lessons learned from past green bond issuances and collaborations with the private sector.

MUNICIPALITIES, CITIES AND OTHER SUB-NATIONAL ENTITIES – A GROWING OPPORTUNITY

Municipalities, cities, and state-owned utility companies can be important strategic issuers of green bonds at the sub-sovereign level. 2013 and 2014 saw the issuance of green city and municipal bonds in the green bond market in the US, Europe and South Africa (Box 7).[42] Green municipal bonds are an important area for future growth as cities and sub-sovereign entities raise finance to meet climate infrastructure requirements. Cities are key players in addressing the climate-friendly infrastructure challenge, accounting for 70% of emissions – and this share is growing as the world becomes increasingly urbanised the next decades, especially in emerging markets.[43]

Importantly, green municipal bonds can be issued by cities or city-affiliated entities, for example city-affiliated utilities.[45]

Cities are key players in addressing the climate-friendly infrastructure challenge, accounting for 70% of emissions. Green municipal bonds can be issued by cities or city-affiliated entities, for example city-affiliated utilities, and municipal bond agencies.

There is also potential for the growing number of municipal bond agencies to issue green bonds. For example, Kommunalbanken, the Norwegian municipal bond agency, has issued two green bonds.

However, in many emerging markets, sub-national entities are not well-positioned for bond issuance and could benefit from specific measures to help develop this market, such as: (i) capacity building to ensure robust fiscal and debt management policies and practices, as well as adequate and transparent financial management and accounting practices; (ii) credit enhancement from governments / multilateral institutions; and (iii) possible provision of tax incentives for an initial period to foster market development. Some examples of these efforts include World Bank's City Creditworthiness initiative[47] and Green City Bond Coalitions (see Box 8), both of which help to build capacity of sub-sovereign issuers.

SOVEREIGN ISSUANCE AT THE NATIONAL LEVEL – LARGE POTENTIAL

The national government being one of the largest and established issuers of bonds in a country could serve as one of the first strategic issuers of green bonds. This would entail a Ministry of Finance or National Treasury issuing a sovereign bond, whose proceeds would be earmarked to finance a specific green program of the country. For example, countries could issue a green bond with proceeds allocated to the Green Climate Fund to meet their commitments to capitalise the fund. This could entice the private sector to increase their green bond engagement; for example, the Vice Chairman for Deutsche Bank Group, Caio Koch-Weser, called for OECD governments to issue the first government green bond in May 2015.

GREEN BANKS AND FUNDS - POSSIBLE NEW PLAYERS

The green banks that have emerged the last years in several countries are also potential issuers of green bonds, particularly over time as their operations scale. Over ten green infrastructure banks are now in operation around the world.[48] Although so far no green bank has issued labelled green bonds, green banks that are set up to capitalise through bond issuances are well placed to issue green bonds.[49] More green banks might move to capitalise through bond issuances as they mature. For example, the UK Green Investment Bank is considering issuing green bonds in the future.[50] The proposed China Ecological Development Bank will also be allowed to issue bonds, based on the latest plans.[51]

Green funds can also capitalise through green bond issuance. For example, the Commonwealth Green Finance Facility launched in November 2015 is planning to capitalise through green bond issuance after initial capitalisation from sovereign contributions.

Box 7: Johannesburg's green bond paves the way for other emerging market cities[44]

Johannesburg city in South Africa issued the first emerging market green city bond in June 2014. The R1.5bn (USD139 million), 10-year bond was rated BBB, based on the rating of Johannesburg as an issuer. The bond was 1.5 times oversubscribed, showing strong investor demand. Proceeds of the bond will be used for renewable energy (solar PV and water heaters), waste-to-energy and low-carbon transport (hybrid buses). While Johannesburg did not get a second opinion on the green credentials of the bond, which would be a recommendation for other cities, it is an example paving the way for other emerging market cities to issue green bonds.

Box 8: Green City Bond Coalitions

The Green City Bond Coalitions aim to build cities' capacity through an education programme which includes:

- Providing cities with toolkits, such as how-to issue guides. A global how-to guide for Green City Bonds was launched in December 2015.
- Supporting them on green bonds issuance by connecting them with organisations who can prepare them, such as strategic support by development banks, and supporting in the roadshow process
- Providing a platform for knowledge and best practice sharing between cities' treasuries
- Investor engagement activities

Coalition members and cities and city-affiliated entities. In 2015, a US Green City Bond Coalition was established by Climate Bonds Initiative, C40, NRDC, CDP, Ceres and As You Sow. A Scandinavian Coalition is also in the process of being established, with Coalitions for Europe, Latin America, Africa, India, China and Asia-Pacific are in the pipeline.

Action Points: Issuance

Table 2: Action Points: Issuance	
ACTIONS	**ACTOR(S)**
Strengthen pipeline planning and transparency	
Develop a priority list of strategic green projects • Establish National Infrastructure Planning Agency for identifying and developing a pipeline of key infrastructure projects, including green infrastructure projects • Translate high-level climate- and infrastructure strategies to a pipeline of investable projects, among others **Ensure pipeline transparency:** make green project pipelines accessible to institutional investors **Participate in the collaborative Green Infrastructure Investment Coalition** between governments, investors and development bank to provide a platform for consultation in the pipeline development process	Ministry of Finance, Ministry of Environment, National Agency for Infrastructure Planning + International organisations and development banks offering technical assistance
Action Area: Encourage strategic green bond issuance from public entities	
Encourage strategic green bond issuance from national governments, sub-sovereign entities (e.g., municipalities, cities), development banks, and green banks. **Provide capacity building and/or technical assistance for sub-national** issuers, if needed, along with possible credit enhancement and/or tax incentives, to facilitate their access to the bond market.	Ministry of Finance Municipalities, city-affiliated entities (e.g. utilities), municipal bond agencies Development banks Any public entity

42. Green city bonds were issued Ile de France (Paris), Massachusetts, California, New York, Gothenburg and Stockholm, amongst others. Johannesburg became the first emerging market Green City Bond issuer in June 2014.
43. The World Bank (2015). City Creditworthiness Initiative: A Partnership to Deliver Municipal Finance. Available from: http://www.worldbank.org/en/topic/urbandevelopment/brief/city-creditworthiness-initiative.
44. Climate Bonds Initiative (2014) Just Out: First emerging market green city bond. Available from: https://www.climatebonds.net/2014/06/just-out-first-emerging-market-green-city-bond-city-johannesburg-green-bond-approx-r15bn.
45. One example is DC Water, the municipal-linked water utility for Washington DC in the US, who issued USD350m of labelled green bonds in 2014.
46. Kommuninvest (2015) Kommuninvest – Green Bonds Framework. Available from: http://kommuninvest.se/wp-content/uploads/2015/05/Kommuninvest-Green-Bonds-Framework-6-May-2015.pdf.
47. The World Bank (2015) City Creditworthiness Initiative: A Partnership to Deliver Municipal Finance. Available from: http://www.worldbank.org/en/topic/urbandevelopment/brief/city-creditworthiness-initiative.
48. UNEP Inquiry (2015) The Coming Financial Climate: Aligning the Financial System with Sustainable Development. Available from: http://staging.unep.org/inquiry/Portals/50215/Documents/The%20Coming%20Financial%20Climate.pdf.
49. This included KEXIM in South Korea, Canada's Ontario Financing Authority and Export Development Corporations and GEMS in the US.
50. IPE (2015) UK announces 'staged privatisation of Green Investment bank. Available from: http://www.ipe.com/news/esg/uk-announces-staged-privatisation-of-green-investment-bank/10008636.fullarticle.
51. PBoC and UNEP Inquiry (2015): Establishing China's Green Financial System.

C Instruments

Challenges to enabling a wider range of issuers and projects

In the development of any new bond market, a wide range of instruments - such as municipal bonds, corporate bonds, project bonds, asset-backed securities and covered bonds - facilitates diversification and scale. It allows more issuers and projects to come to the market. This is also the case for the green bond market. Diversity and scale of investment opportunities are all important aspects that can be major factors in institutional investors' decision to invest.

SMALL-SCALE PROJECTS AND LACK OF AGGREGATION MECHANISMS

One particular challenge in the green bond market is developing aggregation mechanisms, such as asset-backed securities and covered bonds, as green infrastructure projects are often small scale compared to traditional infrastructure investments. The minimum bond issuance size typically required by the majority of institutional investors can be a hurdle limiting small-scale green projects to tap the bond markets without suitable aggregation mechanisms. In developed bond markets, investors typically look for issuance sizes of USD200 million and above, preferably USD1 billion deals, while in emerging markets smaller sizes of USD100 million are acceptable. Many renewable energy and energy efficiency projects are much smaller than this,[52] and residential energy efficiency upgrades are even more fragmented.[53]

Asset-backed securities (ABS) and covered bonds are the most established aggregation instruments in the bond markets, and will therefore be the focus for this report. Another type of relevant aggregation instrument, yieldcos, is covered briefly in Appendix 3a.

However, barriers currently remain on the supply-side that prevent private market actors from using these aggregation mechanisms at scale. Growing securitization and covered bond markets for any asset means creating a sufficient pipeline of underlying assets and standardising the underlying asset (often a loan of some sort). In emerging economies, this comes in the addition of the fundamental challenge of creating legal frameworks to enable asset-backed securities and covered bonds as financial instruments.

Table 3: The main types of aggregation instruments in the bond market

INSTRUMENT	DESCRIPTION	GREEN CREDENTIALS
Asset-backed securities	Bundling of non-tradable assets - such as loans, leases, receivables - into debt securities. The securities are usually issued through a separate legal entity set up for that purpose (a Special Purpose Vehicle - SPV) and the securities are backed by the income associated with the asset pool.	Two types of green asset-backed securities: 1. Proceeds are earmarked for green assets, but cash flow backing the issuance can also be from non-green assets 2. The cash flow backing the issuance is from green assets
Covered bonds	Debt securities similar to securitizations but with key distinctions: (i) the underlying assets remain on the balance sheet of the issuers; (ii) investors have dual recourse to the issuer and an underlying cover pool, offering extra security to investors, and (iii) only banks can issue them. The total outstanding amount of covered bonds globally is over USD2.8 trillion.[54]	Green covered bonds have proceeds earmarked for green assets. The cover pool backing the bond can include a mix of green and non-green assets, as establishing a separate green cover pool is not allowed under current regulations.

LOW CREDIT RATINGS, PARTICULARLY IN EMERGING MARKETS

In addition to the aggregation issue, an additional challenge is that the risk-return of green bonds must be attractive to institutional investors, in other words comparable to the risk-return of non-green bonds. Different types of green bonds place the green project risk differently; green general obligation bonds place the risk with issuers, while asset-backed bonds place the risk with investors (see Appendix 3a for details).

For green general obligation bonds, which make up the majority of the market to date, 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, particularly in emerging economies.

For green asset-backed securities, the rating is determined by the green project risk, and 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 (see appendix 3b for details). It is not an indicator that low-carbon and climate-resilient investments are inherently less financially viable.

52. For example, a residential PV solar installation is typically worth around USD27,500, a large-scale commercial PV solar projects around USD3m52 and commercial energy efficiency retrofits are typically valued between USD1m and USD10m.52
53. The average size of the loans held under the UK Green Deal energy efficiency upgrade programme stands at £3500
54. Segobiano, M. et al. (2015). Securitization: The Road Ahead. IMF Staff Discussion Note. Available from: http://www.true-saleinternational.de/fileadmin/tsi_downloads/TSI_kompakt/sdn1501_IMF_Analyse.pdf.

Policy actions to enable a wider range of issuers and projects

(i) Aggregation of green assets through asset-backed securitization

The main benefit of securitization is the ability to recycle capital to generate new lending. By offloading existing loans, lenders can originate new ones. For institutional investors, securitization has two main benefits: (i) access to smaller-scale, illiquid assets that they would otherwise not be able to invest in; and (ii) risk-return diversification because the ABS is backed by a large pool of assets, and access to different risk profiles through tranching. For the projects being financed, the benefits materialise in improved access to capital, and access to cheaper capital.[55]

Despite significant potential, the market for green asset-backed securities has yet to take off, and the vast majority of issuance to date has occurred in the US market only (figure 6).

STANDARDS FOR GREEN LOANS COULD BE DEVELOPED AND UPTAKE ENCOURAGED

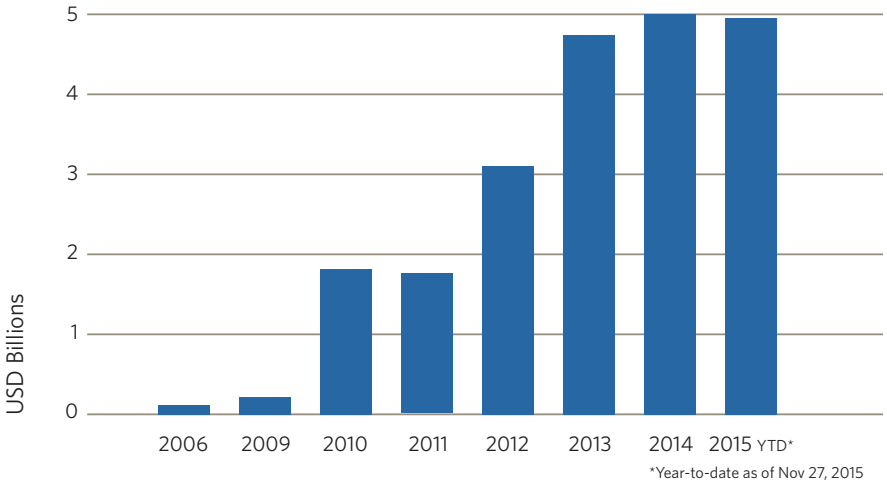
To facilitate securitization of loans, it is crucial that new green loans are standardised – this was instrumental in kick-starting securitization in other areas such as mortgages. Currently there is a lack of standardised loan contracts available for green assets. Government could play a role in facilitating 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.

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. Similar initiatives can be replicated by the public sector in other countries, using the standards already developed by NREL. Countries such as Korea and China, which are in the early stages of a rollout of green assets suitable for securitization, in particular solar panels, would be good places in which to start the standardisation of loan contracts.

Table 4: Assets suitable for green asset-backed securities issuance:

Within asset classes that are already being securitised	New asset classes which are starting to be securitized
○ Mortgages to green buildings ○ Car loans to electric vehicles and hybrids ○ Loans to green small-medium enterprises (SMEs)	○ Solar and wind assets or loans to these projects ○ Energy efficiency project loans

Figure 6: Annual issuance of green asset-backed securities globally[56]



*Year-to-date as of Nov 27, 2015

Where possible, the public sector should help to scale up securitization by encouraging harmonisation of standards on a regional basis. For example, there is an opportunity to utilise the momentum of the EU Capital Markets Union to harmonise high-quality securitization. There is an opportunity to expand this on-going standardization process to include green asset categories such as renewable energy assets and green mortgages.

The public sector could facilitate uptake of the standard contracts by making this a requirement to qualify for warehousing and credit enhancement. This was an effective mechanism used to drive the initial standardisation in the mortgage market in the 1980s. Mortgages are now the largest segment of the securitisation market.

Once standards 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 securitization support mechanisms, such as warehousing and credit enhancement. 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 some emerging markets, such as China, there is also potential for governments to play a stronger prescriptive role in mandating standardisation of loans.

55. Climate Bonds Initiative (2015). Data per 10 June 2015.
56. The Inter-American Development Bank has worked with KfW and the Mexican National housing bank, SHF, to fund EcoCasa. This scheme, which began in 2012, provides preferential loans that are on average 2% below market rates. Source: Barbosa, E.I. (2015) Winner case study summary: EcoCasa, Mexico. Ashden. Available from: http://www.ashden.org/files/case_studies/EcoCasa%20Mexico.pdf.

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 make 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. In Mexico, international and local development institutions are collaborating to provide lower interest rates to finance sustainable homes.[57]

Policymakers could also provide tax incentives to encourage more investment in green loans. In the Netherlands a green projects scheme offers exemption from capital gains taxes as well as an income tax reduction.[58]

WAREHOUSING OF GREEN LOANS TO AGGREGATE ACROSS ORIGINATING ENTITIES

A limited deal flow of standardised green loans in individual project developers and banks can be a barrier to securitization at the early stages of the market, as 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 a green warehouse entity by using different models. One option is a public-private partnership. There are several examples from the US market, for example, the Warehouse for Energy Efficiency Loans (WHEEL) in Pennsylvania (Box 9).

In 2014, in the US, 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 $40m financial warehouse.

Similarly, a green warehouse could also be hosted or supported by a development bank. 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 (see Box 10). In emerging markets and smaller economies, such a regional warehouse for green securitization could be useful to overcome the challenge of limited green assets to securitise in individual countries. In addition to Latin America, an Africa-wide warehousing could be explored.

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

Box 9: Warehouse for Energy Efficiency Loans in the US [59]

In Pennsylvania, the Warehouse for Energy Efficiency Loans (WHEEL) was established as a public-private partnership in 2014. Under the program , approved local contractors offer loans to customers to finance energy efficiency projects. The loans are bought into a financial warehouse by the company Renewable Funding, using a credit facility capitalised by a mix of public money, from the State of Pennsylvania Treasury, and private money, from the commercial bank Citi.

This process continues until the aggregated amount of loans in the warehouse is big enough for the capital markets. At that point, the loans are bundles together and sold to institutional investors as securities backed by energy efficiency loans. The issuance of ABS is possible because there is data on the performance of energy efficiency loans under a low-cost loan program offered by the State of Pennsylvania since 2006. This allows investors to evaluate the expected credit risk and financial performance of energy efficiency loans.

Box 10: Inter-American Development Bank supports green securitization in Latin America[60]

In Mexico, a green ABS deal is underway, as the first green ABS deal in Latin America. supported by the Inter-American Development Bank (IADB) and the Clean Technology Fund (CTF). USD125m of securities are planned, which will be backed by energy efficiency loans to SMEs. The deal is happening in two stages, with the first stage in the process to complete in 2015:

1. Create a vehicle to buy loans for SME energy efficiency projects, and at the same time, work on standardization of the loans. The IADB offers a USD50 million credit line to warehousing of the loans.

2. Bundle the loans and issue ABS with USD50 million of partial guarantees from the IADB for credit enhancement. Aggregation will be easy because the loans were already standardized in step 1 by the two Mexican energy service companies, ECON and VEOLUS.

In November 2015, the IADB received funding from the Green Climate Fund to support extension of the Mexico pilot project to other countries in Latin America. IABD's work in Latin America demonstrates the potential for asset-backed securities in emerging markets where many low-carbon and climate resilient investments are too small-scale and disaggregated to access bond markets.

57. Ministry of Housing. (2010) The Green Funds Scheme: A Success Story in the Making. NL Agency. Available from http://www.rvo.nl/sites/default/files/bijlagen/SEN040%20DOW%20A4%20Greenfunds_tcm24-119449.pdf.
58. Renewable Funding (2014) U.S. Homeowners to Benefit from Groundbreaking Home Energy Loan Financing Platform. PR Newswire. Available from: https://renewfund.com/news/u_dot_s_homeowners_to_benefit_from_groundbreaking_home_energy_loan_financing_platform-4091.
59. IABD (2015). IDB to support energy efficiency financing through the issuance of Green Bonds in Mexico. Available from: http://www.iadb.org/en/news/news-releases/2015-05-19/energy-efficiency-in-mexico,11161.html.
60. For more details on the issuance from BerlinHyp, see a full review from Climate Bonds Initiative (2015). Available from: https://www.climatebonds.net/2015/05/review-first-ever-green-covered-bond-pfandbrief-issued-german-giant-berlinhyp-eur500m-7yr

(ii) Aggregation through green covered bonds

There is also significant potential for issuance of green covered bonds, in particular for mortgages. The first green covered bonds for green mortgages were issued in 2015 by bank BerlinHyp.[61]

The main benefit of covered bonds is the ability to access long-term funding at a lower cost, as they are a well-recognised product that provide lower risks to investors, given well-defined, high quality underlying assets with predictable repayment patterns. Covered bonds provide investors with liquidity while offering more attractive returns than government securities. They also have preferential capital treatment under Basel III and Solvency II regulations, the former applicable to banks that act as investors and the latter to insurance companies.[62]

Covered bonds are issued under a dedicated legal framework, which defines the minimum quality standards for the assets that are to serve as collateral. Should the original assets become impaired, the issuer is required to replace them with other performing assets. The legal framework defines which types of assets covered bonds can be issued for.

Legal frameworks are established in most European countries; Europe is the main market for covered bonds, with Germany accounting for the largest share of this. Legal frameworks for covered bonds also exist in a range of countries outside Europe, although in many emerging economies legal frameworks for covered bonds must still be developed.[63]

In the current legal frameworks, assets typically included as collateral are real estate mortgages, public debt, shipping mortgages and aircraft mortgages, with real estate mortgages accounting for the bulk of issuance in practice. Each issuer can only have one cover pool per asset type.

Adding new green asset classes to the covered bond framework is possible provided the underlying green assets could adhere to the strict criteria required by the legal frameworks. Industry associations have for example explored whether renewable energy assets, such as wind and solar assets, could qualify as cover pool assets, but concluded that renewable energy is not yet a sufficiently mature asset class to qualify.

Table 5: Assets suitable for green covered bond issuance

Within asset classes that covered bonds are already issued for	New asset classes
Mortgages to green buildings	Solar and wind assets or loans to these projects

(iii) Credit enhancement to de-risk investments

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.

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.[64] So far, in the few deals seen in the green securitization market, abnormally high levels of overcollateralisation have been required as a market-led credit enhancement to gain investment ratings on the deals. This reduces the value proposition of green securitization for issuers, and limits market growth in initial stages. 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.[65]

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.[66]

De-risking support for green bonds tap into the on-going trend that public sector entities, such as development banks, are moving from providing funds directly to focusing on absorbing risk to mobilise private capital.[67]

Credit enhancement can be more cost-effective than direct subsidies to achieve climate infrastructure targets, particularly in emerging economies

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

61. Although, this treatment is currently only available for covered bonds that use only standard assets in their cover pool as defined by the relevant regulation.
62. Kälberer. W. et al. (2014, September) European Covered Bond Fact Book. ECBC. Available from: http://ecbc.hypo.org/Content/Default.asp?PageID=501.
63. For example, S&P has rated 3 solar securitization deals BBB, and the agency has stated they expect ratings will be limited to low investment grade for the near future. Source: S&P (2015): With limiting operating history in the sector, solar transactions will remain at the BBB level – for now. July 2015.
64. Ibid.
65. Mention as a challenge by Chinese companies represented at the China Green Bond Conference at London Stock Exchange, October 2015.
66. For example, in 2014, the European Commission's Investment Plan proposed an increasing focus on mobilising private capital rather than providing funds directly. Source: Kidney, Sonerud, Dupre, et al (2014): Financing the Future. Report for the European Commission DG Klima.
67. Nelson, D. and Shrimali, G. (2014) Finance Mechanisms for Lowering the Cost of Renewable Energy in Rapidly Developing Countries. Climate Policy Initiative. Available from: http://climatepolicyinitiative.org/wp-content/uploads/2014/01/Finance-Mechanisms-for-Renewable-Energy-in-Emerging-Economies-Slide-Deck.pdf.

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.[68] Unlike subsidies, which are a sunk cost, credit enhancement instruments, can also recover some of the cost for governments from successful green projects, for example in the form of user fees from publicly-backed guarantees or revenue claims from mezzanine investments taking a first-loss position.[69] Moreover, credit enhancements are market-based instruments that do not distort the market, if used correctly, unlike subsidies, which often do. Before implementation, however, it should be analysed where the private sector would be willing to provide credit enhancement as well, to ensure optimal use of public funds.

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 3c.

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. This can be done by:

- Integrating a preference for supporting green bonds in existing suitable credit enhancement schemes.
- Establish specific green credit enhancement schemes by replicating successful existing non-green credit enhancement and cornerstone investment schemes. At present the Overseas Private Investment Corporation (OPIC) is the only development institution that offers a specific green credit enhancement program.
- Explore the concept of policy risk insurance (see appendix 3c).

Entities well placed to provide credit enhancement 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. 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.

68. Nelson, D. and Shrimali, G. (2014) Finance Mechanisms for Lowering the Cost of Renewable Energy in Rapidly Developing Countries. Climate Policy Initiative. Available from: http://climatepolicyinitiative.org/wp-content/uploads/2014/01/Finance-Mechanisms-for-Renewable-Energy-in-Emerging-Economies-Slide-Deck.pdf.
69. Mazzucato, M. (2014). The Entrepreneurial State: Debunking Public vs. Private Sector Myths. New York: Anthem Press.

Action Points: Instruments

Table 6: Action Points: instruments

ACTIONS	ACTOR(S)
Product development: aggregation, green securitization and green covered bonds	
Support the development of standard contracts for low-carbon assets ○ Establish working group on loan standardization, working with private sector actors	Development banks,
Support the uptake of standard contracts for green loans ○ Make standards requirement to qualify for public green bond support mechanisms (preferential lending, warehousing, credit enhancement, tax incentives, preferential risk weightings etc) ○ Provide market actors with targets for lending volume of standardized loans in a given asset class ○ Mandate standardization of loans	Department of Energy Development banks, green banks, Ministry of Finance, Capital Markets Authority
Support the establishment of warehousing facilities for aggregation ○ Set up specialized green warehouse entity in public-private partnership ○ Use established green bank / development bank as host of green warehouse	Development banks, green banks, Ministry of Finance
Explore the development of green covered bonds, in particular for covered bonds for mortgages, and the future inclusion of renewable assets in covered bond regulatory frameworks.	Covered bond regulators
Improving risk-return profile: credit enhancement	
Development banks could apply the existing development bank credit enhancement toolkit (Guarantees, first loss debt, monoline insurance) to support green bonds ○ Prioritising green in existing credit enhancement programs ○ Establishing separate green credit enhancement programs, modelled on successful existing programs ○ Collaborate with other development institutions on specific deals to leverage individual areas of expertise ○ Prioritize replicable, simple, reliable deals	Development banks
Green banks, the Green Climate Fund and similar entities could provide credit enhancement and cornerstone investment to green bonds	Green banks, Green Climate Fund and similar entities
Government treasuries could offer sovereign guarantees by establishing green infrastructure guarantee schemes to credit enhance selected green infrastructure bonds	Ministry of Finance
Explore policy risk insurance to address policy risk for investors	

D Investment

Challenges to increasing green bond investment

Investor demand for green bond is strong, with more investor demand than green bond investment opportunities available currently. However, the majority of the proven investor demand is in developed countries, as the institutional investor base in emerging economies is less developed. Moreover, as the issuance into the market grows over time, investor demand must continue to grow to absorb the expanding supply of green bond deals. Demand-side support from the public sector is therefore valuable. Facilitating increased investment can function as a pull factor to encourage more green bond issuance into the market.

Facilitating increased investment can function as a pull factor to encourage more green bond issuance into the market

CAPACITY CONSTRAINTS

There are still many aspects that can constrain the ability for investment to keep up if supply of green bonds rises, especially in emerging markets. Capacity constraints to investment in green bonds hinge around the newness of the market and the lack of understanding of the risk and return characteristics involved, which is aggravated by the lack of historic data and credit ratings (as discussed in the previous section on instruments).

FAILURE TO INTEGRATE CLIMATE RISKS

Further regulatory disincentives currently exist to investment in green bonds as current financial market risk assessments focus on financial issues and do not give full weightings to climate change and other non-financial risks. On the one hand, quantitative data is lacking to show that some climate investments outperform (an example being the emerging evidence that mortgages to energy efficient homes have a lower default rate than other mortgages, controlling for factors such as income).[70] On the other hand, individual high-carbon investments can be seen as higher risk than is currently estimated, as they could become 'stranded assets' as the world transitions to low-carbon.[71] Climate-friendly investments overall can be argued to pose a lower risk to the financial system as a whole.

Policy actions to increase green bond investment

(i) Capacity building for investors

Public sector entities can facilitate private investors to invest in green bonds through capacity building. Similarly to the actions proposed above for general bond investor base development, the public sector can provide educational materials, workshops and support market-led initiatives for green bond investor engagement and training. Engaging investors more actively earlier in the investment process by involving them in the development of green infrastructure investment pipelines, as set out in section B, could also facilitate more green bond investment.

Public sector entities can also support North-South cooperation on building an investor base in emerging markets. Tapping into investors from developed economies is useful while the domestic investor base in emerging markets is being developed. Many investors in developed economies are searching for yield and have capital that can meet the massive investment needs in emerging markets. In particular, large global institutional investors with headquarters in developed economies but with local offices in emerging markets can invest in green bonds in the local markets. They can tap into the internal company expertise of investing in green bonds that has been acquired in their developed market offices.

Public sector entities can also support North-South cooperation on building an investor base in emerging markets

(ii) Tax incentives to green bond investors or issuers can reduce the cost of capital

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.

It should be stressed that the use of tax incentives for green bonds will depend on the macroeconomic and fiscal position in different countries and on the policy priorities of governments. Green bond development actions should be carefully integrated with other development goals – particularly in developing economies with limited fiscal resources – so as not to crowd out other parts of the development agenda.

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.[72] Many governments, including the US, Mexico and India, allow municipal bond issuances to be tax-exempt.[73,74] More examples of the different types of tax incentives used in bond markets are set out in appendix 4.

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,[75] and these incentives are therefore best used only for larger markets that have a sufficient internal market. Conversely, tax-credit bonds provide benefits directly to the issuer. This can be a more

70. Sahadi, B. et al (2013) Home Energy Efficiency and Mortgage Risks. Institute for Market Transformation. Available from: http://www.imt.org/resources/detail/home-energy-efficiency-and-mortgage-risks
71. For earmarked green bonds, the impact on risk-return is more complicated, as it depends on the overall impact on climate and carbon risk on the risk rating of the issuer, as it is the issuer's financials that determines the performance of the earmarked green bonds. Integration of climate and carbon risks in financial analysis of all bond investments will be facilitated by improved disclosure in the bond markets generally (see action area 1) and improved climate risk methodologies.
72. Spatuzza, A. (2015). In depth: The Funding Challenges Facing Brazilian Wind. Recharge. Available from: http://www.rechargenews.com/wind/1395600/in-depth-the-funding-challenges-facing-brazilian-wind.
73. Leighland, J, and C. Mandri-Perrott. (2008) Enhancing the creditworthiness of municipal bonds: Innovations from Mexico.
74. Vaidya, C. and H. Vaidya. (2010) Market-Based Financing of Urban Infrastructure in India.
75. Personal Communications with institutional investor on tax and bond policy

cost-effective approach than tax-exemption for investors to reduce financing costs for infrastructure.[76] 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.

COORDINATION OF TAX INCENTIVES BETWEEN JURISDICTIONS CREATE A LARGER INVESTOR POOL

For economies with smaller bond markets, tax incentives should be coordinated between as many jurisdictions as possible. This is particularly important for tax-exemptions given on the investor-side, as mentioned above. For example in the EU, there is room to move to harmonise any tax incentives put in place for green bonds. While the EU does not have direct power to provide green tax incentives for investors to improve the risk-return profile of green investments, the EU has strong convening power: it can get relevant national policymakers and market actors together to create tax policies with the largest impact.

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 (see Box 11).

In April 2015, China proposed tax incentives for labelled green bonds specifically, in the form of tax exemptions for institutional investors that allow them to treat the green bonds as treasury investments. According to government estimates, this 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, but the government considers it a small budgetary cost. 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.

(iii) Strategic public investment in green bonds provide an important signaling effect

In addition to supporting capacity building and providing direct incentives, the public sector can facilitate private investors to invest in green bonds by leading by example by investing public funds in green bonds.

INITIAL PUBLIC INVESTMENT CAN REDUCE PERCEIVED RISK FOR PRIVATE INVESTORS

Encouraging public domestic funds to invest in green bonds can increase private green bond investment by setting an example and reducing the perceived risk for private investors. It can also lead other countries to follow with their domestic funds. Public sector investment can play a role in capacity building for private investors to gain understanding and confidence in the green bond market. It would also provide another indicator to investors and other financial market players that the government is acting on climate change. Governments can encourage sovereign wealth funds, public pension funds and development banks to invest in green bonds where they fit within the financial mandate of public funds. It is not recommended that the government mandate a certain amount of investment in green bonds, as the primary objective for sovereign wealth funds, public pension funds and alike, remains achieving financial returns. In addition, governments can also establish a specific public investment fund for green infrastructure.

The report now looks in more depth at these four areas and how they can invest in green bonds.

SOVEREIGN WEALTH FUNDS OFFER SIGNIFICANT AND GROWING INVESTOR POTENTIAL

Sovereign wealth funds are estimated to have around USD5 trillion of assets under management - and are expected to double in size in the next decade - providing significant potential for green bond investment.[80] Facilitating intergenerational transfer of sovereign wealth is one of the reasons why sovereign wealth funds are established. Since climate change will have a negative impact on future generations, the intergenerational transfer motivation provides a rationale for these funds to be increasingly directed to climate-friendly investments, including green bonds.

Box 11: US: tax-exemption for municipal bonds and bonds funding renewable energy projects

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.[77]

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.[78] This makes CREBs and QECBs similar in concept to green bonds, as proceeds are earmarked for green projects.[79]

In April 2015, China proposed tax incentives for labelled green bonds specifically, in the form of tax exemptions for institutional investors that allow them to treat the green bonds as treasury investments

76. Musick, N. (2010): Subsidizing Infrastructure Investment with Tax-Preferred Bonds
77. Appleson, J. Parsons, E., and A. Haughwout. (2012) The Untold Story of Municipal Bond Defaults. Liberty Street Economics. Available from http://libertystreeteconomics.newyorkfed.org/2012/08/the-untold-story-of-municipal-bond-defaults.html#.VXmElEaGNcE.
78. Energy Program Consortium's Qualified Energy Conservation Bond December 2014 White Paper. Available from: http://www.energyprograms.org/2014/12/qecb-papers/
79. Tax incentives have also been used to support bonds issued to finance infrastructure projects more broadly through the Build America Bonds (BAB) program. After the success of this program, the government has proposed to make a permanent infrastructure bond subsidy program, "Qualified Public Infrastructure Bonds" modelled after BABs. Source: General Explanations of the Administration's Fiscal Year 2016 Revenue Proposals, Department of the Treasury, February 2015, 72-74.
80. Kaminker, C. and F. Stewart (2012) The Role of Institutional Investors in Financing Clean Energy. OECD Working Papers on Finance, Insurance and Private Pensions, No.23.

With the majority of funding streams to the sovereign wealth funds coming from oil and gas, there can be a diversification argument for these funds to invest in low-carbon investments.[81] Norway's sovereign wealth fund, the largest in the world, has explicitly stated that they invest in labelled green bonds (Box 12). For other investors and potential issuers, knowing a large sovereign wealth fund like Norway's is investing in green bonds can incentivise them to start engaging with the market as well.

PUBLIC PENSION FUNDS ARE STARTING TO INVEST IN GREEN BONDS

Public pension funds have around USD5.1 trillion dollars in assets in the OECD alone.[86] Bonds account for a large share of assets held in pension funds: in the OECD bonds remain by far the dominant asset class accounting for 50% of the total assets.[87] A range of public pension funds report investing in labelled green bonds, including South Africa's Government Employees Pension Fund, UN Joint Staff Pension Fund, Sweden's AP2 and AP3, and the California State Teachers' Retirement System (CalSTERS), the second largest public pension fund in the US.[88,89] As they are frequently the largest investors in the country, the purchase of green bonds by public pension funds can provide an important signalling mechanism to show value in the market and encourage other, smaller funds with less investment expertise. An increased role for public pension funds in climate investment has been called for by the private sector.[90]

DEVELOPMENT BANKS CAN PROVIDE CORNERSTONE INVESTMENT

Development banks can provide cornerstone investment to a green bond deal with the aim of attracting more private investors to the deal. Cornerstone investment by development banks can have a de-risking effect for private investors, as putting the development bank stamp on it gets investors more comfortable – this is the halo effect. One example is Australia's Clean Energy Finance Corporation (CEFC) who committed to provide cornerstone investment of up to A$75m in the inaugural green bond issued by National Australia Bank. This demonstrated the green bond potential to investors in Australia's market.[91]

There is also potential for development banks to combine their own green bond issuance with investment in green bonds from other issuers, as the IFC has demonstrated. In August 2015, IFC provided USD49.2 million of investment in a green bond issued by India's Yes Bank, using funds raised through their own green bond issuance in the offshore rupee markets.[92] This is an effective and simple model that other development banks could replicate.

Development banks can issue green bonds to finance demonstration investment in green bonds, as the IFC did in August 2015 to invest in green bonds from India's Yes Bank

Box 12: Norway's sovereign wealth funds investing in green bonds

Norway's sovereign wealth fund has assets under management of USD882 billion dollars, making it the largest in the world.[82] A separate program for environmental mandates was established for the fund in 2009. Initially, the fund chose not to engage in the nascent green bond market under the environmental mandate, as the green bond market was then considered too immature. Instead, all the funds under the environmental mandated were invested in listed equities.[83] After the green bond market grew rapidly in 2013 and 2014, the fund reported that it has started investing in green bonds under the environmental mandate.[84] In 2014, the fund cited that the main limitation to an increase in their investment in the green bond market is the still relatively small size of the green bond market.[85] As the market has continued to grow in size and diversify in currencies, ratings and issuers in 2015, this limitation is decreasing.

(iv) Green bond investment by central banks can be a source of demand

There are potential opportunities for central banks to boost demand for green bonds. The urgency and severity of the climate challenge means investigating the possible role of central banks may be warranted, as a number of emerging economies have recognized. The policies included in this section are innovative tools adopted by leading players in the market, and are outlined for possible consideration by policy makers. When exploring the potential for central banks to act on climate change, policy makers should ensure that the proposed actions do not compromise the traditional primary aims of central banks or create market distortions that can harm the market's future healthy growth and development.

EMERGING MARKET CENTRAL BANKS ARE ALREADY TAKING ACTION ON CLIMATE CHANGE

In China, the central bank has proposed policy support and guidelines for green bonds specifically (see Box 13). Bangladesh and Brazil are other countries where the central bank has been a leader in engaging on climate change. In Bangladesh, the central bank provides refinancing at preferential interest rates for loans given to renewable energy.[93]

81. SWFI (2015) Tracking the Activity of Sovereign Wealth Funds and other Public Funds. Available from: http://www.swfinstitute.org/fund-rankings/.
82. Kapoor, S. (2013): Investing for the future. Discussion paper. Available from: http://re-define.org/sites/default/files/images/SWF-Report_Final.pdf
83. Norges Bank (2014). Experience with Environment-Related Mandates. Available from: http://www.nbim.no/globalassets/documents/submissions/2014/experience-with-enviroment-related-mandates---final_10-march-2014.pdf.
84. Slyngstad, Y. (2014) Management of the Government Pension Fund Global. Available from: http://www.norges-bank.no/en/Published/Speeches/2014/25-april-Yngve-Slyngstad-GPFG/.
85. Norges Bank (2014) Environment-Related Investment Mandates in Global Pension Funds. Available from: http://www.nbim.no/en/transparency/submissions-to-ministry/2014/environment-related-investment-mandates-in-the-government-pension-fund-global/.
86. 2013 data from OECD. (2014). Pension Markets in Focus. Pp. 40. Available from: http://www.oecd.org/finance/private-pensions/pensionmarketsinfocus.htm.
87. Della Croce, R., C. Kaminker and F. Stewart (2011). "The Role of Pension Funds in Financing Green Growth Initiatives", OECD Publishing, Paris.
88. OECD (2014) Annual Survey of Large Pension Funds and Public Pension Reserve Funds. Available from: http://www.oecd.org/daf/fin/private-pensions/2014_Large_Pension_Funds_Survey.pdf.
89. Della Croce, R., C. Kaminker and F. Stewart (2011). "The Role of Pension Funds in Financing Green Growth Initiatives", OECD Publishing, Paris.
90. Koch-Weser, C. (2015) Speech from Vice Chairman for the Deutsche Bank Group. May 2015. Available from: https://www.db.com/cr/en/concrete-caio-koch-weser-addresses-G7-governments-on-climate-finance-and-responsible-investing.htm
91. CEFC commits up to $75m as cornerstone investment in NAB's Australian dollar Climate Bond issue. Available from: http://www.cleanenergyfinancecorp.com.au/media/releases-and-announcements/files/cefc-commits-up-to-$75m-as-cornerstone-investment-in-nab's-australian-dollar-climate-bond-issue.aspx
92. IFC (2015): ifc issues first green masala bond. August 2015. Available from: http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/ifc+issues+first+green+masala+bond+on+london+stock+exchange
93. UNEP Inquiry (2015): Summary insights. Available from: http://www.unep.org/inquiry/Portals/50215/Documents/Inquiry_Summary2_Insights_v3.pdf

There are additional actions from central banks that could boost demand for green bonds, some of which have not yet been implemented in the market but have been raised for possible consideration. These are outlined below.

PROVIDING PREFERENTIAL LIQUIDITY-PROVIDING OPERATIONS TO GREEN

Central banks could explore providing targeted green central bank liquidity-providing operations[94] at a lower rate, as compensation for the lower climate risk of the investments.[95] This could follow similar principles to the targeted long-term refinancing operations model used by the European Central Bank that provides cheaper loans banks only if they increase their funding to SMEs. Undertaking a study on this potential action would be required to understand fully how useful and how achievable this would be.

PREFERENCING GREEN BONDS IN COLLATERAL

Central banks could explore preferencing green bonds in collateral they are receiving for their market operations.[96] What types of bonds are accepted as collateral varies for different central banks, but almost all frameworks accept government bonds, with covered bonds, bonds issued by banks, corporate bonds and asset-backed securities also accepted in many central bank frameworks.[97] The inclusion of a wide range of asset types leaves a lot of scope for preferential treatment of different types of green bonds. Central banks have requirements for minimum credit ratings or government guarantees, but as the vast majority of green bonds issued are investment grade, and public credit enhancement may become available, this should not be a significant barrier.

INCLUDE GREEN BONDS IN RESERVE MANAGEMENT

Central banks could explore including green bonds in their reserve management policy.[98] The world's central banks managed reserves to the tune of USD10.9 trillion in 2013.[99] The central bank of Bangladesh became the first central bank to announce they would target some of their reserves for green bond investment in October 2015. The central bank's investment will focus on green bonds issued by multilaterals and other highly rated financial corporates.

Bangladesh became the first central bank to announce they would target some of their reserves for green bond investment in October 2015

While Bangladesh Bank is the only central bank so far to actively invest in green bonds, several European central banks, including those in the Netherlands and Greece, already have policies in place to integrate environmental factors for the investment of their foreign reserves. A limitation for many central banks to integrate environmental concerns in their reserve management has been the lack of green bond opportunities in the sovereign bond space, as the majority of central banks have most of their reserves in highly rated government bonds.[100] This can change if sovereigns provide strategic issuance of green bonds (see section B).

INCLUDE GREEN BONDS IN ASSET PURCHASING PROGRAMS AND QUANTITATIVE EASING

Central banks could explore including green bonds in their asset purchasing programs and quantitative easing.[101] For example, the European Central Bank could target green asset-backed securities and green covered bonds in particular in its quantitative easing program launched January 2015.[102] A challenge at present is the lack of green product being available in the market at sufficient scale. Compliance with the central banks' eligibility criteria is expected to be less of a challenge, as even at this early stage of the market, solar securitisations already comply with the ECB's rating requirements for a minimum BBB- rating without any public credit enhancement.[103,104]

When exploring each of these potential areas for action, central banks should consider potential unintended consequences of supporting green bonds through these mechanisms. In particular they should engage with private institutional investors to ensure their actions do not crowd out private institutional investment.

(v) Re-adjusting risk weightings and capital charges to better facilitate green investments

Post-financial crisis, financial regulators altered risk weightings for banks and capital charges for insurers in a reactive move to address financial risks that emerged during the crisis.[105] The adjustment in risk weightings and capital charges has however not been proactive about minimising longer-term risks, including the risks posed to the financial system by climate change. Instead there has been concern that the regulatory changes actually disincentivise long-term investment in assets such as infrastructure, including low-carbon and climate resilient infrastructure.

There are two risk-based rationales for re-adjusting risk weightings to better enable green infrastructure investment:

- Individual climate-friendly investments can have a relatively lower financial risk than individual high-carbon investments. An example being the emerging evidence that mortgages to energy efficient homes have a lower default rate than other mortgages.[106] High-carbon investments could also become stranded assets as the world transitions to low-carbon. The

Individual climate-friendly investments can have a relatively lower financial risk than individual high-carbon investments

94. Money supplied by central banks to the economy
95. Interview with central bank green bond specialist Spring 2015
96. Interview with central bank green bond specialist Spring 2015
97. European Central Bank (2013) Collateral Eligibility Requirements. Available from: https://www.ecb.europa.eu/pub/pdf/other/collateralframeworksen.pdf.
98. Interview with central bank green bond specialist Spring 2015
99. Jones, C. (2013) Central banks move into riskier assets. Financial Times 7 April 2013. Available from: http://www.ft.com/cms/s/0/66c91d4a-9f71-11e2-b4b6-00144feabdc0.html#axzz3hGrp82di.
100. Jones, C. (2013) Central banks move into riskier assets. Financial Times 7 April 2013. Available from: http://www.ft.com/cms/s/0/66c91d4a-9f71-11e2-b4b6-00144feabdc0.html#axzz3hGrp82di.
101. Interview with ECB green bond specialist Spring 2015
102. European Central Bank. (2015, January 22). ECB announces expanded asset purchase programme. Available from: https://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html.
103. S&P (2015): With limiting operating history in the sector, solar transactions will remain at the BBB level – for now. July 2015.
104. European Central Bank. (2014, October 2). ECB Announces Detailes of the Asset-Backed Securities Purchase Programme (ABSPP). Available from: http://www.ecb.europa.eu/press/pr/date/2014/html/pr141002_1_Annex_1.pdf?c4144e9908c29df066a053246f81d1ff.
105. Higher risk-weightings increase banks' capital requirements for a given level of lending, as the ratio of capital to loans that regulators require a bank to hold works with risk-adjusted capital. Similarly, capital charges impacts how much capital insurers must hold relative to the risks they are exposed to, as the capital is adjusted by asset-specific capital charges set by regulators.
106. More studies on this are required to build a substantially quantitative argument for regulators to change risk weightings. One study finds evidence: Sahadi, B. et al (2013) Home Energy Efficiency and Mortgage Risks. Institute for Market Transformation. Available from: http://www.imt.org/resources/detail/home-energy-efficiency-and-mortgage-risks

stranded asset argument is receiving regulatory attention, with for example the Bank of England looking at the risk this could pose to the financial system.

- Climate-friendly investments pose a lower risk to the financial system as a whole, as the financial system sits within the economic system, and climate change poses risks to economic growth - through increased extreme weather, sea level rises and so on. Recent estimates find that the average present value of the risks to the financial assets from global warming of 2 degrees Celsius is USD4.2 trillion. The risk to the financial system rises rapidly to USD7 trillion for 5 degrees warming and USD13.8 trillion for warming of 6 degrees.[107] Financial regulators are starting to look into this risk. In April 2015, G20 asked the Financial Stability Board to conduct an inquiry into the risks posed to financial stability from the physical impacts of climate change and the regulatory responses.[108] This is an indication that the financial risks of climate change are increasingly recognised by policymakers, although this inquiry is focused on improving disclosure of climate risks rather than changing risk weightings.

Additionally, in certain emerging economies, climate investment becoming a policy priority area can be a sufficient rationale for financial regulators to alter their policies. China in particular has already proposed using preferential risk weightings for green bonds (see Box 13). India and Brazil are other countries that are open to explore preferential risk weightings. As with the previous section on central bank action, the recommendations in this section are more innovative suggestions for exploration by policymakers. Actions proposed at this stage are largely directed towards further research and data collection before their widespread adoption could be proposed, with China being a notable exception.

ENSURING FINANCIAL REGULATIONS DO NOT UNINTENTIONALLY AFFECT GREEN INVESTMENTS

Financial regulators can ensure that changes made to risk weightings and capital charges for other reasons do not adversely affect green investments. For example, post-financial regulatory changes made to improve financial stability has had unintended negative impacts on the incentives for longer-term investments. Basel III for banks and Solvency II for insurers limit the ability of banks to provide long-term project finance and of insurers to invest in infrastructure. This affects the availability of capital for all infrastructure projects, including low-carbon projects.

The European Commission has recognised this issue, and is currently reviewing the risk weighting for infrastructure and SMEs . The review may allow for differentiating risk weightings and capital requirements to avoid restricting capital flows to these sectors.[109] Similarly, the EC should also explore the impact the regulations have had on green investments, and how revisions could ensure they facilitate green investments.

ALTERING RISK WEIGHTINGS AND CAPITAL CHARGES FOR GREEN INVESTMENTS EXPLICITLY

Financial regulators can alter risk weightings and capital charges with the primary aim of providing preferential treatment of green investments – a more active approach. For banks, financial regulators can reduce the risk weightings for climate-aligned investments, such as green bonds, compared to non-climate aligned investments in the global Basel III regulations and country-specific regulations. For insurers, regulators could reduce the capital charges required for climate-aligned investments, including green bonds, in key regulations, such as the EU Directive Solvency II and the forthcoming global risk-based Insurance Capital Standard.[110]

An alternative approach would be to increase risk weightings for non-green/high-carbon investments. In the bond markets however, this is difficult due to a lack of disclosure on environmental performance of bonds that are not labelled as green. There is not a simple qualifying label for regulators to base the risk weighting allocations on, as is the case with labelled green bonds. Levelling the playing field for bond disclosure (section A) could facilitate this regulatory option in the future.

PREFERENTIAL RISK WEIGHTING HAS BEEN USED TO SUPPORT OTHER POLICY PRIORITY AREAS

There are examples in SME lending where preferential risk weightings have been provided. The UK Business Growth Fund is one example, where the Financial Service Authority allowed preferential treatment in risk weightings to a pooled structure for SME lending.[111] The preferential regulatory treatment allowed banks to offer long-term patient capital to the SMEs they otherwise could not have done. In China, SME bonds are subject to preferential risk weightings already, setting a precedent for preferential risk weightings for green bonds, which have now been proposed (see Box 13). The public sector could explore how to replicate these models for green, but should also ensure they avoid any potential negative unintended consequences on financial stability of changing risk weightings for green.

BOX 13: PROPOSED SUPPORTIVE POLICIES FOR GREEN BONDS IN CHINA

- Preferential risk weighting. There are two options: first, if the green bond finances green loans, these loans can get more favourable risk weighting. Second, green bonds can get favourable treatment on the asset side, once held by investors. The first will incentivize an increase in issuance, the second increase in demand. As with tax incentives, this is expected to take one to two years to develop.
- Exemption from loan-deposit ratio cap for loans funded by green bonds. This is a Chinese-specific support mechanism.
- Fast-track approval procedure for green bonds. This is also potentially a China-specific lever, as bonds are subject to regulatory approval here.

These supportive public sector actions come in addition to guidelines and an evaluation scheme for green bonds (see section A) and tax incentives (see section D) for green bonds.

107. Economist Intelligence Unit (2015) The cost of inaction: recognising the value at risk from climate change. The Economist. Available from: http://www.economistinsights.com/financial-services/analysis/cost-inaction.
108. Ibid.
109. European Commission (2015) How revised bank capital requirements have affected lending: commission consults. Available from: http://europa.eu/rapid/press-release_IP-15-5347_en.htm?locale=EN.
110. GPA (2015) Progress on Solvency II and Global Capital Standards. Lloyds. Available from: http://www.lloyds.com/the-market/communications/regulatory-communications-homepage/regulatory-communications/regulatory-news-articles/2015/01/progress-on-solvency-ii-and-global-capital-standards.
111. The reduction in risk weighting was based on diversity in the loan pool, reducing the overall risk and that the SMEs in the pool were given a business advisor on the board to manage risk.

Action Points: Investment

Table 7: Action Points: investment	
ACTIONS	**ACTORS**
Capacity building	
● The public sector can support the provision of educational materials, workshops and support market-led initiatives for green bond investor engagement and training, and integrate green bond training in existing official training programs for relevant policymakers and market players ● Public sector entities can also support North-South cooperation on building an investor base in emerging markets.	All
Tax incentives	
● **Governments could extend existing tax-exemption schemes to also cover green bonds** -Relevant types of tax incentives include preferential rate for withholding tax, investor side income taxes, and issuer side tax incentives ● **Governments could establish specific tax incentives for green bond issuers or investors** - Relevant types of tax incentives include preferential rate for withholding tax, tax-exemptions for investors, and tax credits for issuers ● **Governments should collaborate to harmonise tax incentives.** - This is particularly important if tax incentives were implemented at the investor level to avoid a split market structure between eligible and non-eligible investors.	Ministry of Finance
Strategic green bond investment from public funds	
● Government funds – sovereign wealth funds and public pension funds – could invest in green bonds that also comply with financial requirements.	Ministry of Finance
● Development banks and green banks could focus on cornerstone investment to mobilise private co-investment. Development banks can also issue their own green bonds (see section B) to finance their green bond cornerstone investment.	Development Banks, green banks
Central banks bond purchasing programs	
● Re-price central bank liquidity-providing operations for green bonds: Central banks can undertake a study to understand how useful and achievable it would be to re-price central bank liquidity-providing operations at a lower rate for green bonds ● Central banks could explore including green bonds in their reserve management policy, provided the green bonds are comparable on risk-adjusted financial returns ● Central banks could explore preferencing green bonds in collateral they are receiving, provided it complies with eligible collateral requirements for bond type and credit quality ● Central banks could explore preferencing green bonds in their asset purchasing programs and quantitative easing, provided the green bonds comply with eligibility criteria	Central bank
Re-adjusting risk weighting for green bonds	
● Financial regulators can support research into the lower financial risk of certain green assets, in particular green mortgages, to develop an evidence base for future changes in risk weightings ● Financial regulators can support research into the argument for preferential risk weighting for green bonds on the basis of the systemic risk climate change poses to the financial system ● Integrate considerations for green investments in on-going reviews of the impact of risk weightings on financing of policy priority areas such as infrastructure and SMEs ● Regulators could allow differential risk weighting for green and non-green bonds, where appropriate	Financial regulator

E Cooperation

Cooperation is a crosscutting theme that applies to all the other action areas to grow a green bond market. Collaboration is required between the different players at the national level – particularly between the public sector, investors and companies - as well as internationally.

Challenges to increasing cooperation in scaling green bond markets

Cooperation among key institutions is a key component of developing a well-functioning green bond market. This is crucial in the development of any new bond market, but it becomes even more important for growing the green bond market, as there are even more stakeholders and dimensions involved. In emerging economies in particular, where green bond development can occur alongside general bond market development, collaboration across different entities is essential.

The importance of international collaboration for green bond market development is increasing as a number of initiatives are starting to take place in different countries. These different initiatives need to be accelerated and ideally coordinated to have maximum impact.

The importance of international collaboration for green bond market development is increasing as a number of initiatives are starting to take place in different countries

Policy actions to increase cooperation in scaling green bond markets

(i) Domestic cooperation between entities: Green Bond Market Development Committees

At a domestic level, collaboration between different types of public entities is essential to successfully develop bond markets that facilitate green investment. As with regular bond market formation, green bond markets need a high level champion within government. In the green bond market

Table 8: Examples of collaborative green bond actions by action theme

ACTION THEME	EXAMPLES OF COLLABORATIVE ACTIONS
A. Market development	○ Mutual recognition of guidelines and standards for green bonds between governments. ○ Collaboration to develop disclosure and reporting standards for all bonds, replicating the progress made on disclosure improvements for equities.
B. Issuance	○ Cross-country collaboration between governments and investors on brokering country-specific green infrastructure pipelines with global investor demand through a Green Infrastructure Investor Coalition. ○ Public entities that have provided strategic issuance of green bonds, in particular development banks and municipalities at this stage, can offer lessons from their green bond issuance process. ○ Develop "how to" green bond issuance guide for other public entities (cities, green banks, development banks and sovereigns) by working together, within and across issuer types. ○ Roundtables and workshops for prospective green bond issuers.
C. Instruments	○ Regional warehousing for green securitisation can be useful to overcome the challenge of limited green assets to securitise in individual countries in less developed markets. In particular, Africa-wide and Latin America ex-Brazil warehousing should be explored. ○ Cross-border credit enhancements. For example, the model of the European Investment Bank's Project Bond Initiative that provides credit enhancement for infrastructure projects in Europe can be replicated, with the aim of credit enhancing emerging market green infrastructure investments.
D. Investment	○ Harmonisation of green bond tax incentives across countries. This is particularly relevant for smaller bond markets. An example is the EU Capital Markets Union, which provides an avenue to harmonise green bond tax incentives within the EU. ○ Governments can seek to set similar broad targets for their domestic public pension funds and sovereign wealth funds, and learn from those countries that have already established environmental mandates e.g. Norway's Sovereign Wealth Fund. ○ Supporting an international forum for central banks and systems of central banks to be informed of the current developments in green monetary policy and other theoretically potential areas for action, sharing best practices. ○ Using existing international forums and organisations to develop preferential risk weightings and capital requirements for green bonds for banks and insurers respectively. The Financial Stability Board, Basel Committee on Banking Supervision and the International Association of Insurance Supervisors are especially relevant entities.

space in particular, the Green Bond Market Development Committee structures that have emerged in several countries, such as China, India, Brazil and Mexico, are one way of structuring this collaboration.

One way of structuring collaboration is the Green Bond Market Development Committees that have emerged in several countries, such as China, India, Brazil and Mexico

(ii) Internal collaboration within public entities is also important

This is particularly the important within development banks, as they play a multitude of roles in the green bond market by:

- Supporting standardisation
- Undertaking strategic issuance
- Loan standardisation and warehousing of green loans for securitisation issuance
- Credit enhancement and facilitating demand from investors through cornerstone investment
- Capacity building

(iii) International cooperation

On an international level, collaboration between similar public entities is valuable, for example between different development banks. The multilateral development banks have already increased their collaboration on green bond reporting; but there is significant scope to increase collaboration also in other areas. This includes working together on specific projects and deals, as the toolboxes at their disposal and areas of expertise differ between the different development banks.

In more innovative green bond action areas, such as central bank action on green bonds, international cooperation can be important to justify action. Central banks have coordinated to advance a common policy agenda for general bond market development, with one example being a joint statement on support for reviving the European securitisation markets from the Bank of England and the European Central Bank in 2014.

There is room for policymakers to collaborate within each of the other four action themes. Examples are set out in Table 8, although many more collaborative actions are possible.

Table 9: Action Points: collaboration

ACTIONS	ACTORS
○ Put in place a well thought-out vision for green bond market development, including the foundational bond market development actions ○ Establish a centralised task force or a champion in charge of overseeing the development process, for example in the form of Green Market Development Committees. ○ Create focused working groups to bring different actors together working on similar specific issues, such as the different action areas for foundational bond market development and green bond market development proposed in this report ○ Establish international cooperation on growing local green bond markets via existing bodies such as Financial Stability Board, G20, OECD, international standard setters (IOSCO, IAIS, IOPS etc.)	Ministry of Finance, Capital Markets Authority, financial regulators

Summary of public sector actions for green bonds

3 CATEGORIES OF ACTIONS

Recommendations for public sector action to scale green bond markets are divided into three categories: Fundamental Actions, Proven Support Tools, Innovative Additions. Public sector support is vital given both the scale of the investments required and the urgency with which we need to make them.

FUNDAMENTAL ACTIONS AND PROVEN TOOLS

The most fundamental actions are market-building activities that have low fiscal impacts, and that have proven success in supporting bond markets. Next, there are proven support tools that have been used to further support bond market growth, but their use for labelled green bonds will vary depending on the policy priorities and fiscal space in different countries. The fundamental actions and proven market boosters are tools commonly used in a transition phase to jump-start general bond market development. The difference here is that they are being applied specifically to facilitate investment in green projects.

INNOVATIVE ADDITIONS

Lastly, there are innovative ideas that could be explored, that are currently being used by certain leading players. The urgency and severity of the climate challenge means broadening the legitimate and necessary role of central banks and financial regulators may be warranted, as a number of emerging economies have recognized. When exploring these potential areas for action, the public sector should consider possible unintended consequences of supporting green bonds through these mechanisms.

This proposed public sector action plan for the financial system complements climate policies in the real economy for a rapid transition to a low carbon and climate resilient economy.

Table 10: Summary of the roles of key public sector players for green bonds

KEY PLAYERS	KEY ROLES AND POLICY ACTIONS
Development banks	○ Actively participate in Green Bond Market Development Committee ○ Work with governments and investors to develop pipeline of bankable green projects, for example by participating in the Green Infrastructure Investor Coalition ○ Support development and uptake of green bond standards ○ Strategic green bond issuance ○ Strategic green bond investment (cornerstone investment) ○ Kick-start green securitization through supporting standardisation of green loans contracts and offering warehousing ○ Provide credit enhancement for green bonds, and consider making it conditional on adherence to green bond standards
Ministry of Finance	○ Actively participate in Green Bond Market Development Committee ○ Establish National Infrastructure Planning Agency for developing pipeline of key green infrastructure projects ○ Work with investors and development banks to translate climate- and infrastructure strategies to a pipeline of concrete bankable investment opportunities. This can be done by participating in the Green Infrastructure Investor Coalition. ○ Allow green banks to capitalise via green bond issuance ○ Issue sovereign green bonds ○ Provide green bond tax incentives, and consider making them conditional on adherence to green bond standards ○ Provide credit enhancement for green bonds ○ Encourage public funds, including sovereign wealth funds and public pension funds, to invest in green bonds, provided they also ○ comply with financial requirements
Central Bank	○ Actively participate in Green Bond Market Development Committee ○ Allocate reserves to green bonds ○ Explore providing cheaper liquidity operations to green bonds ○ Explore preferential treatment of green bonds in asset purchasing and collateral programs
Capital Markets Authority	○ Actively participate in Green Bond Market Development Committee ○ Lead capacity building on green bonds for issuers and investors ○ Explore adding renewable energy to assets allowed as collateral in covered bond frameworks
Other Financial Sector Regulators (pension, insurance)	○ Actively participate in Green Bond Market Development Committee ○ Reduce relative costs of green bond disclosure and reporting by strengthening the disclosure and reporting requirements on environmental performance for all bonds ○ Active involvement in green bond capacity building for investors ○ Explore adjusting risk-weightings for green investments
Municipalities and affiliated entities	○ Strategic issuance of green municipal bonds. Green bonds can be issued by municipalities, municipal bond agencies and municipal-affiliated entities such as utilities, transport companies

Join our on-going projects

Green Infrastructure Investor Coalition

The Coalition is brought together by the Climate Bonds Initiative, PRI, UNEP Inquiry and the International Cooperative Mutual Insurers Federation (ICMIF).

The aim of the Coalition is to bring together investors, governments and development banks to help increase the flow of institutional investor capital to green infrastructure investments around the world. Participants want to:

- Better understand the forward pipeline of green infrastructure investments.
- Examine barriers to capital flows and propose solutions
- Shape the capital market instruments needed to ensure capital flows. The Coalition will also support investors to review asset allocation strategies to make sure they will be able to take advantage of the huge deal flow on the horizon.

The primary activity of the Coalition will be to hold roundtables to find out about and discuss government green investment plans, including specific pipelines being developed by individual agencies such as State energy and rail companies. As of mid-November 2015, the Coalition organisers are in discussion with dozens of organizations about joining.

Contact sean@climatebonds.net to learn more or to join the coalition

Green City Bond Coalitions

The Green City Bond Coalitions aim to build cities' capacity through an education programme which includes:

- Providing cities with toolkits, such as how-to issue guides
- Supporting them on green bonds issuance by connecting them with organisations who can prepare them, such as strategic support by development banks, and supporting in the roadshow process
- Providing a platform for knowledge and best practice sharing between cities' treasuries
- Investor engagement activities

Coalition members and cities and city-affiliated entities. In 2015, a US Green City Bond Coalition was established by Climate Bonds Initiative, C40, NRDC, CDP, Ceres and As You Sow. A Scandinavian Coalition is also in the process of being established, with Coalitions for Europe, Latin America, Africa, India, China and Asia-Pacific are in the pipeline.

Contact vanessa@climatebonds.net to learn more or to join any of the coalitions

Climate Bonds Standards and Certification scheme

The Climate Bonds Standard is a screening tool for investors and governments which allows them to easily prioritize climate and green bonds with confidence that the funds are being used to deliver climate change solutions. For more details, see Appendix 2a.

Contact justine@climatebonds.net to learn more

Green Securitization Work stream and Advisory Group

The Climate Bonds Initiative is currently working with the Grantham Research Institute on Climate Change and the Environment at the London School of Economics on a policy guide for growing a green securitization market in Europe. The policy guide will be published Q1 2016.

A Green Securitization Advisory Group is launching in December 2015 to continue to take this work forward.

Contact beate@climatebonds.net to learn more

Green Bond Market Development Committees: China, India, Brazil, Mexico, Turkey, Canada

One collaborative model that has emerged in the market to kick-start country-level green bond markets is National Green Bond Market Development Committees. The committees represent various stakeholders, in particular financial regulators, Ministries of Finance and development banks. Committees are currently being organized in Mexico, Brazil, Turkey, India, China and Canada. Global cooperation between the Committees will allow ideas and policy proposals to be shared and activities to be synchronized.

Contact sean@climatebonds.net to learn more, express your interest for joining any of the Committees or initiate collaboration with other countries' committees.

Appendix 1a:
Refinancing is the main role of bonds in the capital pipeline

The largest share of bond issuance is used to refinance debt rather than providing initial debt to a project. This is the role of bonds in the capital pipeline generally, and will therefore also be the main role of bonds in financing green projects.

BONDS CAN LOWER TOTAL PROJECT COST OF CAPITAL

Refinancing through bond issuance allows companies to take on short term bank lending for the construction phase of a project and then pay the loan back by issuing bonds once the construction phase is over. As construction is usually the highest risk part of a project, bond issuance post-construction can provide a longer-term lower cost of capital.

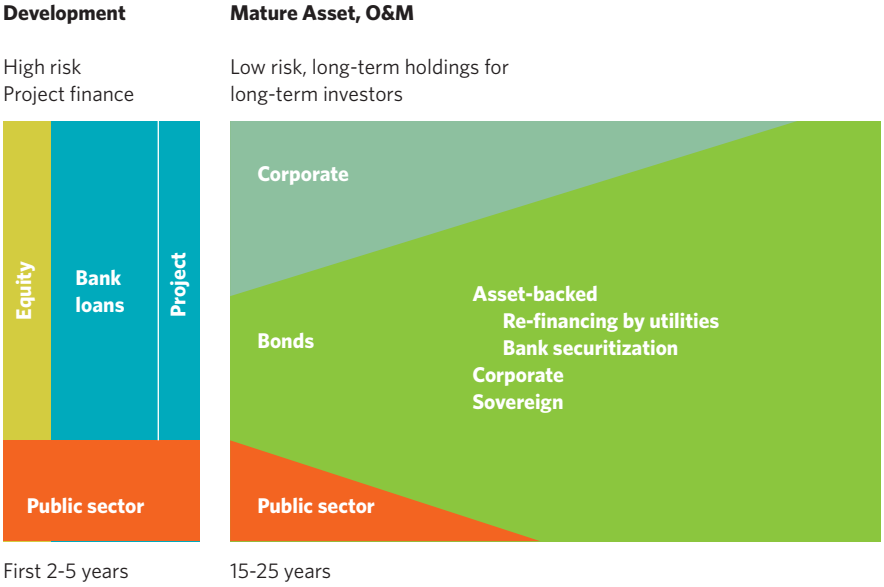
BONDS ALLOW LENDERS TO RECYCLE FUNDS TO NEW PROJECTS

Moreover, given that few institutional investors are comfortable with taking on construction risk in a large part of their portfolio, this allows the banks (and the smaller pool of institutional investors with a higher risk appetite) to more quickly recycle their funds into new projects. Having an exit strategy gives banks an incentive to create an increased pipeline for these types of loans. The easier it is for loans to be offloaded, the more likely banks are to lend more and for longer terms.

BONDS ARE PARTICULARLY SUITED FOR LOW-CARBON PROJECTS

Refinancing and obtaining lower-cost debt is particularly attractive for low-carbon infrastructure assets as they have a particularly low operating risk post-construction compared to the construction phase. This means that the difference between the cost of capital for low-carbon projects before and after construction could be significant.

Figure 7: Bonds are mainly used to finance lower risk, mature assets post-construction



Appendix 1b:
Getting to USD 1 trillion of green bonds per year by 2020

The current levels of green infrastructure investment provide a starting point to estimating the potential of green bond issuance going forward. Note that this estimation is an order of magnitude estimation based on top-down analysis rather than a detailed projection of expected green bond issuance. Future more detailed estimations are recommended.

Step 1: Current investment levels in climate-aligned infrastructure

Current investment levels for infrastructure and property can be estimated at about USD4.2-5 trillion per year[112]. The sector breakdown of current infrastructure investment is given in figure 8.

Estimates for what share of current infrastructure investment that can be classified as low-carbon and climate resilient varies. This is due to the absence of standards and disclosure. A recent estimate puts the share at 7-13%.[113] However, the share increases to around 25% if investment areas such as rail and telecommunications are included. These areas are seen by scientific experts convened by the Climate Bonds Initiative to qualify as low-carbon investments, as they enable the displacement of high-carbon travel. Around one third of power infrastructure also qualifies as low-carbon due to the already high levels of renewable energy being deployed in the energy sector.[114]

Figure 8: Breakdown on investments in infrastructure[115,116]

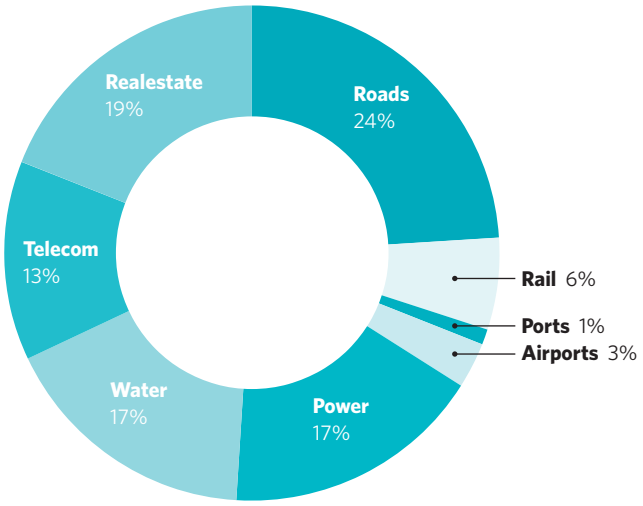


Table 11: Drivers of green bond market growth and assumptions

Variable	Assumption for 2020 green bond market potential
Population	Global population stabilises at 10bn people by 2050
Economic growth	Global GDP increases 5 fold from USD40 trillion[117] to over USD200 trillion by 2050. The GDP increase delivers a similar 5-fold increase in the value of infrastructure and property[118] - equivalent to a global per capita average equal to today's OECD average. If climate change significantly impacts economic growth rates, this GDP growth estimate will have to be revised down.
Infrastructure stock	It is estimated that the global stock of infrastructure will increase from USD15tn to stabilise at about USD77tn by 2050, using World Bank figures for current global per capita fixed capital assets[119] and applying projected GDP growth.
Annual infrastructure investment	Annual investment levels are assumed to increase steadily from the current USD4-5tn per year to reach levels of a little over USD8tn per year. By 2050, this is consistent with a steady state to maintain and replace about 10% of the infrastructure and building stock value per year.[120]
Share of infrastructure that is climate-aligned	It is assumed that there is a steady increase in the market share of fixed assets investment that is low carbon and climate resilient, converging to all annual infrastructure investment being climate-aligned by 2040.
Share of infrastructure financed by bonds	It is assumed that 30% of infrastructure investment is financed by bonds, both directly through infrastructure bonds and indirectly, e.g. through corporate bond issuance.

112. S&P, 2014 Global Infrastructure: How To Fill A USD500 Billion Hole. http://www.standardandpoors.com/spf/upload/Ratings_EMEA/HowToFIllAn500BillionHoleJan162014.pdf, PWC, 2014, Capital project and infrastructure spending Outlook to 2025; Canfin and Grandjean (2015): Mobilizing climate finance: a roadmap to finance a low-carbon economy. Final report of the French Presidential Commission on Innovative Climate Finance chaired by Pascal Canfin and Alain Grandjean.
113. Canfin and Grandjean (2015): Mobilizing climate finance: a roadmap to finance a low-carbon economy. Final report of the French Presidential Commission on Innovative Climate Finance chaired by Pascal Canfin and Alain Grandjean
114. Ren21
115. S&P, 2014 Global Infrastructure: How To Fill A USD500 Billion Hole. http://www.standardandpoors.com/spf/upload/Ratings_EMEA/HowToFIllAn500BillionHoleJan162014.pdf
116. AFR 2015, Investors Driving World Property Market Values to Hits USD13.6tn. http://www.afr.com/real-estate/investors-driving-world-property-market-values-to-hit-us136tn-20150615-ghovsk
117. 2009 figures based on US USD purchase power parity
118. Developed countries maintain their levels of development, and are joined by developing countries, leading to global infrastructure and property development converging at today's OECD average
119.
120. 2009 figures based on US USD purchase power parity

Step 2: Drivers of green bond market growth and assumptions

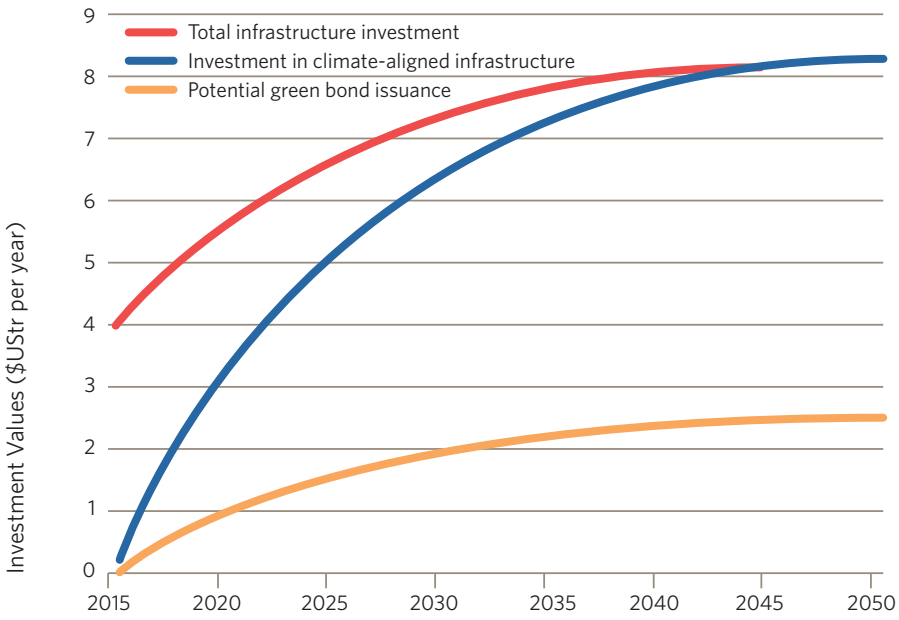
The expansion in green bond potential might be driven less by an active investor interest in green investments, and more by a collapse in confidence in investments that are unprepared for climate impacts and carbon constraint. The speed of the transition may be exacerbated by the increasing demand from institutional investors[121], government agencies[122] and litigators[123].

Step 3: Green bond potential by sector

Eligibility of assets in the sectors of real estate, ports and airport to classify as green investments will be determined by both end-use efficiency and climate resilience.

Telecommunications eligibility will be inherent by its role in de-materialising the economy – displacing travel, goods and services – though climate adaptation will also be key in this sector. Water eligibility will be dominated by the need for adaptation for both urban needs and agricultural, though eligible water investments can also be included on a mitigation rationale if they are highly efficient in energy use. The land-transport sector will include the major task of ensuring transport systems are resilient to climate change, though there will also be need to transition to non-fossil energy supply systems for passenger vehicles and freight[124]. Rail plays a significant role in enabling a low carbon economy through providing low-emission mass-transit, although adaptation investments are also critical in this sector.

Figure 9: The potential annual issuance of green bonds increases to USD 1 trillion by 2020



121. CDP 2014 QUOTE LATEST REPORT
122. US Securities and Exchange Commission, CLIMATE RISK DISCLOSURE
123. Arch Coal Action
124. Green bond issuance to finance electric vehicles, and other similar investment areas for climate-aligned, non-fixed infrastructure, come in addition to the estimates provided here.

The Indian government has made it a policy priority to grow corporate and municipal bond markets specifically to channel funds into infrastructure. This will diversify the bond market, which is currently vastly dominated by government securities.[125]

BONDS: A TOOL TO REDUCE COST OF DEBT

Bond issuance can complement the bank loans that are currently the main source of finance for infrastructure projects in India. Refinancing loans through bond issuance (see appendix 1a) can reduce the cost of debt for infrastructure, which again would dramatically improve the financial viability of infrastructure projects. Reducing the cost of debt from 14% to 7% for a renewable energy project in India can reduce project costs by as much as 32%.[126]

TAX INCENTIVES ARE USED TO SUPPORT BONDS FOR INFRASTRUCTURE INVESTMENT

India's government are using several tools to make bond issuance and investment particularly favourable for bonds that finance infrastructure. Offering tax incentives is one of tools announced in India's most recent budget from February 2015. The budget allows tax-free infrastructure bonds for road, rail, and irrigation projects, to be issued by select public enterprises. Infrastructure bonds have also previously received preferential withholding tax rates on interest payments. In the 2011/2012 budget, the withholding tax for infrastructure bonds was reduced to 5% compared to the 20% tax rates for other bonds for a temporary period until 2015, to encourage foreign investment into infrastructure in particular.[127]

In addition, tax incentives are widely used in India's municipal bond market; around 50% of this market is covered by tax exemptions.[128] The development of a municipal bond market for urban local bodies was undertaken explicitly to provide urban governments with an additional financing channel to raise funds for infrastructure demands in cities.

PUBLIC FUND FOR INFRASTRUCTURE INVESTMENT AND CHANGING INVESTOR REGULATIONS

The government has also announced the formation of a National Investment and Infrastructure Fund. This Fund will receive an annual flow of INR 20,000 crore (around USD3.15bn) to enable the Fund to raise debt and invest in infrastructure finance companies.[129]

In June 2015, the Reserve Bank of India, the central bank, allowed banks to invest in bonds issued by other domestic banks provided that the bonds are long-term infrastructure bonds. For other bonds, such cross-holding of bank bonds is prohibited.[130] The central bank is, however, limiting banks to invest only up to 10% of their corporate bond portfolio in infrastructure bonds, and only 20% of each infrastructure bond issuance can be earmarked for bank investors.[131]

THE GOVERNMENT ALSO OFFERS CREDIT ENHANCEMENT FOR INFRASTRUCTURE BONDS

In September 2015, the Reserve Bank of India opened up for banks to provide partial credit enhancement to infrastructure bonds to make them more attractive investments also for institutional investors, such as insurance companies and pension funds.[132] The credit enhancement can be provided for up to 20% of the bond in the form of a non-funded irrevocable contingent line of credit.

India's efforts to ensure the bond market is particularly attractive to finance infrastructure compared to other areas of investment provides an example for how countries can support the growth of green bond markets.

125. Asfima. (2013) India Bond Market Roadmap. Available from: http://www.asifma.org/uploadedFiles/News/ASIFMA%20-India%20Bond%20Market%20Roadmap%20Draft_wCover.pdf.
126. Nelson, D. and Gireesh S. (2014). Finance Mechanisms for Lowering the Cost of Renewable Energy in Rapidly Developing Countries. Climate Policy Initiative
127. Beniwal, V. (2013, May 21). Govt notifies withhold tax rate cut on infra bonds. Business Standard. Available from: http://www.business-standard.com/article/economy-policy/govt-notifies-withholding-tax-rate-cut-on-infra-bonds-113052100825_1.html.
128. Vaidya, Chetan and Hitesh Vaidya. Indo-USAID FIRE project.
129. Government of India Press Information Bureau. (2015). National Investment and Infrastructure Fund to be set up. 28 February 2015.Available from: http://pib.nic.in/newsite/PrintRelease.aspx?relid=116184.
130. The Economic Times. (2015, June 1). RBI allows banks to invest in infrastructure bonds of other lenders. Available from: http://economictimes.indiatimes.com/news/economy/finance/rbi-allows-banks-to-invests-in-infrastructure-bonds-of-other-lenders/articleshow/47505656.cms.
131. Choudhury, S. (2015): RBI sets cap for banks buying other lenders' infrastructure bonds. Reuters 1 June 2015. Available from: http://in.reuters.com/article/2015/06/01/india-infrastructure-bonds-idINKBN0OH2V220150601
132. Roy, A. (2015): RBI allows banks to offer credit enhancement to infrastructure bonds. Livemint, 24 September 2015. Available from: http://www.livemint.com/Industry/D6zxa9P4RNvWpJCyuIcKuM/RBI-allows-banks-to-offer-credit-enhancement-to-Infrastructu.html

Appendix 2a:
The Climate Bonds Standards and Certification Scheme

Climate Bond Certified

The Climate Bonds Standard and Certification aims to provide the green bond market with the trust and assurance that it needs to achieve scale.

STANDARDS ALLOW LOW CARBON INVESTMENTS TO BE PRIORITISED

The Climate Bonds Standards and Certification scheme allows investors, governments and other stakeholders to prioritise low carbon and climate resilient investments with confidence that the funds are being used to deliver a low carbon and climate resilient economy. A Scientific Framework underpins the definitions of which projects and assets are consistent with a low carbon and climate resilient economy and therefore eligible for inclusion in a Certified Climate Bond.

STANDARDS REDUCE TRANSACTION COSTS

Standards reduce transaction costs for investors and policymakers as the green bond market scales. They eliminate the need for investors and policymakers to evaluate the green credentials of each individual bond issuance. Standards can also make the issuance process easier for issuers, as they know clearly what green credentials investors are looking for before they put together their green bond. How certification against standards differs from second reviews also used in the green bond market, see the table below.

SECTOR-SPECIFIC CRITERIA

The Climate Bonds Standard is made up of the overarching Climate Bonds Standard V2.0, which consists of a certification process, pre-issuance requirements and post-issuance requirements, and sector-specific Climate Bonds Standards. The sector-specific standards provide clear eligibility criteria for assets and projects in different sectors that can be used for Climate Bonds and Green Bonds. The criteria behind the standards are reviewed at least annually to ensure they are up-to-date and include new findings and technologies. Figure 10 shows the available and developing sector-specific Climate Bonds Standards.

CERTIFICATION IS AVAILABLE FOR GREEN BONDS THAT MEET THE REQUIREMENTS OF THE CLIMATE BONDS STANDARD

In order to receive the "Climate Bond Certified" stamp of approval, a prospective issuer of a green bond must appoint an approved 3rd party verifier, who will provide a verification statement that the bond meets the Climate Bonds Standard.

Certification is different from the second opinions in the green bond market. Under certification, the verifiers check the bond's compliance against a set of established criteria rather than going through an ad hoc process to define the greenness of the bond.

A detailed overview of the different types of review in the green bond market is set out in table 12.

The Climate Bond Standard allows Certification of a bond prior to its issuance, enabling the issuer to use the Climate Bond Certification Mark in marketing efforts and investor roadshows. The Climate Bonds Standards Board (comprised of members representing $34 trillion of assets under management) confirms Climate Bond Certification once the bond has issued and the proceeds have been allocated to projects and assets.

THE NUMBER OF CERTIFIED GREEN BONDS ARE GROWING

Per November 2015, 5 bonds have been certified in the market, with many more in the pipeline. The Mexican development bank's green bond is an example of a Climate Bond Certified green bond in the market.

Box 14: USD500m green bond from Mexican development bank Nacional Financiera certified

The Nacional Financiera, the Mexican development bank, issued their first green bond in October 2015. The development bank chose to certify the bond as being compliant with the Climate Bonds Standard; Sustainalytics was appointed as approved verifier. Proceeds of the USD 500m bond will be used to finance 9 wind farms located in Oaxaca, Nuevo Leon and Baja California. As certified by the Climate Bonds Standard Board, this bond is backed by these wind projects and so complies with the Climate Bonds Wind Standards. Rated as A3 (Moody's) and BBB+ (Fitch), the bond offers a coupon of 3.41% with the maturity of 5 years. Bank of America Merrill Lynch, Credit Agricole CIB, and Daiwa Capital Markets America were the joint lead managers for this issuance.

Figure 10: Climate Bonds Standards Availability:

DEVELOPED	COMING SOON
Solar	Bioenergy
Wind	Water
Low-carbon transportation: Bus Rapid Transit (BRT) systems	Low-carbon transport (rail, EVs, etc.)
Low-carbon buildings	Agriculture and Forestry

Table 12: Types of review used in the green bond market

	TYPE OF REVIEW	WHAT IT COVERS	SERVICE PROVIDERS
Pre-issuance	First party (Issuer) green bond framework	Disclosure of how proceeds will be managed and allocated, and best practice will also provide the definition of green eligible assets.	N/A – done by the issuer
	Second party review (also known as a second opinion)	Variation; some reviews cover expected adherence to the voluntary Green Bond Principles, other also provide a green bond framework for the issuer - in addition to the subsequent review, and others also cover the greenness of the eligible projects or assets.	Environmental Social and Governance (ESG) research service providers (Oekom, Sustainalytics, Vigeo), DNV GL and scientific experts (CICIERO)
	Independent third party verification against standards	Currently, the Climate Bonds Standard is the only standard available in the market to verify against. Third party verification confirms the planned green bond use of proceeds adhere to the Climate Bond Standard framework (V2.0) and relevant eligible asset-specific standards e.g. Low Carbon Transport.	Approved verifiers: Audit firms and ESG service providers
Post issuance	First party report from issuer	Disclosure of allocation of proceeds to eligible green projects and, where relevant, green performance indicators. This can be provided as part of the issuer's annual reporting.	N/A – done by the issuer
	Second party reporting	Review of the adherence of the use of proceeds to eligible green projects (defined at issuance) and reporting of key performance indicators.	ESG research service providers (Oekom, Sustainalytics) and scientific experts (CICIERO)
	Independent third party assurance	Assurance of allocation of proceeds to eligible green projects.	Audit firms
	Independent third party verification	Assurance against the Climate Bonds Standard, including the allocation of proceeds to eligible green projects and types of green projects.	Verifiers approved by the Climate Bonds Standards scheme: Audit firms and ESG service providers

Appendix 2b:
China's country-specific green definitions and standards

CHINESE POLICY MAKERS' SUPPORT FOR GREEN BONDS IS STRONG

In April 2015, a Green Finance Task Force, co-convened by the People's Bank of China (PBoC) and the UNEP Inquiry into the Design of a Sustainable Financial System, published a range of green bond policy proposals, including the development of official China-specific Green Bond Guidelines.

Since then, the Green Finance Committee – a separate quasi-government entity – has been tasked with implementation of the recommendations. Official guidelines for green bonds have now been developed, and these are expected to be launched by the end of 2015. Of the financial regulators, PBoC is leading the green bond work at present, however, the central bank is in the process of improving coordination with other regulators and market actors, including CBRC, the National Development Regulatory Commission (NDRC), banks and companies.

THE NEW GREEN BOND DEFINITIONS VS THE EXISTING GREEN CREDIT GUIDELINES

The green bond definitions will build on the current domestic definitions for green credit, set out by the China Banking Regulatory Commission (CBRC) in 2013, although there will be some differences. Compared to the Green Credit Guidelines, the green definitions in the forthcoming Green Bonds Guidelines contain a wider range of sectors including climate change adaptation. The Green Bond Guidelines will also be offer detailed technical criteria within each sector.

Under the CBRC's green definition for green credit, there was RMB 5.72trn (USD920bn) of outstanding green loans in the largest 21 Chinese banks in 2014.[133] This gives an indication of the immense immediate potential for green bonds in China, as refinancing of green loans is the main role of green bonds.

CLEAR GREEN DEFINITIONS ENABLES OTHER GOVERNMENT INCENTIVES

The government recognises that this first set of China Green Bond Guidelines is only a starting point. The government has proposed a wide range of other supportive policies to support rapid growth of a Chinese green bond market, such as tax incentives and preferential risk weightings. In practice, the government considers that different definitions will be needed as qualifiers for each of the different policy support mechanisms that they are planning to develop. The definitions used as eligibility criteria for each policy program will depend on the size of the budget for each support scheme.

The official Chinese Green Bond Guidelines also sets out criteria for management of proceeds; the process issuers must comply with to ensure that proceeds are going solely to the green assets they disclose. This will be simple for the green bond issuers with dedicated environmental arms, such as some of the large commercial banks, including the Industrial Bank of China. For issuers without an environment department, setting up specialized accounts will be required. Reporting criteria will be quite stringent to ensure green bonds are credible in the market, and investors trust that the funds will be used where said.

HARMONISATION WITH INTERNATIONAL GUIDELINES AND STANDARDS

Over time, it is expected that China will explore how to align the domestic guidelines as much as possible with international best practice to avoid fragmenting the market and better attract international investors to green bonds from Chinese issuers.

133. HSBC. (2015): Green Bonds in China, citing CBRC data for green credit to the 12 categories established under the CBRC Notice for Green Statistics as well as green credit to the 7 emerging industries.

Appendix 3a:
Yieldcos

YIELDCOS: AN AGGREGATION TOOL

In addition to asset-backed securitization and covered bonds, as covered in section C of this report, yieldcos is another mechanism that can be used to bundle smaller scale green investments to the deal size required by the capital markets.

CHARACTERISTICS OF YIELDCOS

Yieldcos are listed companies that pool projects and infrastructure assets in their operational phase that generate stable cash flows. Yieldcos normally guarantee an annual, inflation-linked dividend yield, typically around 6% in the UK (much less in the US). Yieldcos can also issue green bonds; there have been several examples in the market.

Yieldcos are particularly used to aggregate renewable energy assets.[134] Their use has grown rapidly since 2013, particularly in the US, but also to a certain extent in Europe. The infrastructure assets pooled into yieldcos are typically renewable energy plants with cash flows in the form of long-term Power Purchase Agreements (PPAs), which are agreements with utilities that have agreed to buy electricity from the yieldco at set prices. Yieldcos are often spun out from parent companies in the power sector, either by utilities or developer companies; sometimes they are special purpose vehicles designed to buy assets from utilities (e.g. Greencoat in the UK).

YIELDCOS CAN REDUCE COST OF CAPITAL FOR RENEWABLE ENERGY

Yieldcos allow companies to separate their safe assets in the operation phase from their assets in the construction-phase that are more risky. This allows access to a different investor segment and cheaper capital for the less risky assets. It has been found that yieldcos can attract equity investment for renewable energy at a 2% lower cost per year compared to investment through traditional utilities.[135] Another benefit is that yieldcos are not subject to the corporate tax a typical company must pay. Shareholders pay tax on the received dividends; but due to depreciation, tax payments can be avoided during the initial years.[136]

THE INVESTOR PROPOSITION

From an investor perspective, returns arise from the stable cash flows from operations, which are paid out in the form of dividends to shareholders in the yieldco. Almost all annual cash flows are distributed to investors in the form of fixed dividends, which makes yieldcos similar to bonds from an investor perspective. Yieldcos also offer investors liquidity, as they can buy and sell yieldco shares. Moreover, as yieldcos pool a number of assets, they diversify technological and geographical risk; meaning that they are a tool to reduce exposure to regulatory risk.

THE FUTURE OF YIELDCOS

The growth of yieldcos is expected to continue, although because yieldcos are new and tied to specific tax advantages, to what extent the structure will be attractive to investors during a period of rising interest rates is unknown.[137] Moreover, yieldcos' growth is reliant on securing new projects with long-term power purchase agreements, and being able to access relatively cheap capital to finance construction or acquisition of new cash generating assets. In Europe, the structure has been used by developers in the low-carbon space, but not yet utilities, except indirectly in the UK as buyers of some assets.

To set up a yieldco, a utility company or renewable energy developer must have a relatively large book of renewable energy assets. Yieldcos typically require an asset base of at least USD 500 million and an IPO value of USD 150-200 million.[138] This is because of the transaction costs to set up a yieldco entity, and to be able to feed it operating assets over time. This effectively limits the use of yieldcos to larger utilities or renewable energy developers.[139] There is also a concern that transferring a large share of stable cash generating assets from the parent company to a yieldco is detrimental for the parent's credit profile.[140] The yieldco model is relatively new, making it challenging for investors to know how it will perform over time as there is no long-term data available on yieldcos' performance.[141]

134. Kidney, Sonerud and Dupre (2015): Financing the Future
135. The Global Commission on the Economy and Climate. (2014) 'Better Growth, Better Climate: The New Climate Economy Report. Available from: www.newclimateeconomy.report.
136. OECD (2015): Mapping channels to mobilise institutional investment in sustainable energy.
137. OECD (2015): Mapping channels to mobilise institutional investment in sustainable energy.
138. OECD (2015): Mapping channels to mobilise institutional investment in sustainable energy.
139. Goossens, E. (2014, April 4). Renewable Yieldcos Offer 'Cheapest' Equity, Abengoa Says. Available from: http://www.bloomberg.com/news/articles/2014-04-04/renewable-yieldcos-offer-cheapest-equity-abengoa-says.
140. Global Credit Research. (2013, November 8). Moody's: YieldCos Typically Credit Negative for Bondholders. Moody's. Available from: https://www.moodys.com/research/Moodys-YieldCos-Typically-Credit-Negative-for-Bondholders--PR_286254?WT.mc_id=NLTITLE_YYYYMMDD_PR_286254.
141. Goossens, E. (2014, April 4). Renewable Yieldcos Offer 'Cheapest' Equity, Abengoa Says. Available from: http://www.bloomberg.com/news/articles/2014-04-04/renewable-yieldcos-offer-cheapest-equity-abengoa-says.

Appendix 3b:
Risks of green investments

Table 13: Who absorbs the green project risk varies for different types of green bonds

TYPE	DEBT RE-COURSE	WHO TAKES GREEN PROJECT RISK
Green general obligation bond	Standard/full recourse to the issuer; therefore same credit rating applies to green bonds as to the issuer's other bonds.	Issuer
Green revenue bond	Revenue streams from the issuer are the source of repayment for the bond, so the rating will vary from the issuer's other bonds	Investor
	Recourse is only to the green project's assets and revenue.	Investor
Green project bond	Recourse to group of non-green assets that have been grouped together as collateral - green credentials arise from proceeds being allocated to green	Issuer
Green asset-backed securities	Recourse to group of green assets that have been grouped together as collateral	Investor
Green covered bonds	Recourse to the issuer's full balance sheet, as well as a cover pool of assets. The cover pool for green covered bonds in existing asset classes are the same as for non-green covered bonds - green credentials arise from proceeds being allocated to green	Issuer

Table 14: Components of green project risk

RISK TYPE	WIND FARM EXAMPLE
Technology risk	Risk that offshore wind technology will not work as expected
Production risk	Risk that wind level will not deliver projected electricity production level
Policy risk	Risk that supportive low-carbon policies, e.g. feed-in-tariffs, will be reduced or removed.
Political risks	Not risk specific to green project
Currency risks	Not risk specific to green project
Credit risk	Not fully specific to green projects. May be higher due to the lack of history for green projects and their small scale.

Appendix 3c:
Types of credit enhancement tools for the public sector

Table 15:

TYPE	DESCRIPTION	EXAMPLE
Guarantees	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] 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]	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. 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.
Subordinated debt or equity	Public entities can invest in a project or portfolio, and take the position of accepting loss before private institutional investors. 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.	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.
Insurance	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.	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.
Policy risk insurance	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.	OPIC offers political risk insurance that includes protection against changes in feed-in-tariffs for renewable energy.

Appendix 4:
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. 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	Full	Investors	Over 80% of the US muni bond market is tax exempt, with the aim to increase funding for municipalities for infrastructure	
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

ANNEX: KEY BUILDING BLOCKS OF BOND MARKET DEVELOPMENT

Table of contents

WORLD BANK GROUP

INTRODUCTION

Bond markets can provide an important long-term financing source for key sectors, such as infrastructure and housing, in which many emerging market countries face significant investment deficits. In the post financial crisis environment, the challenge of financing infrastructure cannot be met with public sector funds and bank finance alone. With public sector balance sheets stretched and bank capital increasingly constrained, new sources of capital will need to be tapped. The focus is on mobilizing institutional investors, especially pension funds and insurance companies, to finance infrastructure through capital markets.

The development of bond markets for non-government issuers, including corporates, banks, municipalities and others, is a long and complex process. It often requires coordinated changes on the supply and demand sides, as well as in the broader enabling environment. There must be interventions in many aspects of the market, including policy, regulations and market infrastructure and participants.

Cooperation among key actors and regulatory bodies involved is critical to implement consistent, complimentary actions.

The main challenges associated with bond market development along with policy actions to address them are presented below. They are organized into five key building blocks: Creating the Enabling Environment, Building Issuance, Building the Investor Base, Instruments for Scaling up Bond Issuance and Investment, and Enhancing Cooperation.

A CREATING THE ENABLING ENVIRONMENT

1. Situation and Challenges

Bond market development can be constrained if certain important elements related to the broader enabling environment are not in place.

These include:

- Absence of stable macroeconomic and political conditions. Interest rates, inflation and exchange rates all affect the willingness of issuers and investors to participate in the domestic bond market. For example, high or volatile interest rates will push issuers and investors away from bond markets. An uncertain political situation could result in companies postponing issuance plans and investors putting their funds into conservative safe assets instead of the bond markets.
- Lack of reliable pricing benchmarks for nongovernment bonds due to the underdevelopment of the government bond market. This leaves non-government bonds without a reference yield curve for pricing.
- Financial sector policies that disadvantage nongovernment bonds compared to other instruments. Preferential tax treatment for bank deposits or government bonds compared to nongovernment bonds can steer investors to those products and make investing in nongovernment bonds less attractive. Similarly, excessive government bond issuance and policies that force investors to allocate a high percentage of investments to government securities can crowd out nongovernment bonds.
- Broader laws and regulations that may impede bond market development. This can include bankruptcy laws, contract enforcement, commercial banking, and accounting frameworks, among others. For instance, bankruptcy laws that lack clarity and credibility will be seen as a significant hurdle for recouping assets in case of a bond default. This will discourage investment.
- Lack of a credible regulator with adequate knowledge and resources to oversee market operations.
- Poorly functioning market infrastructure with unreliable systems and processes. This discourages market participants from engaging in securities transactions.

2. Policy Actions

Adopting policies that promote a stable macroeconomic and political environment
Policies that establish a stable interest rate, inflation, and exchange rate environment are fundamental for fostering interest in bond financing and investment. Uncertainties in these conditions can forestall other efforts to develop bond markets, especially with long-term maturities, as market participants will shy away from locking-in any terms on bonds during times of volatility. Political certainty is similarly important for any long-term financing considerations. For example, Brazil's ability to rein in historically high inflation towards the end of the 90s and beginning of 2000s put the country on a solid footing to grow its domestic debt markets.

Developing of a liquid and long-term government bond yield curve
This is critical to provide reliable price references for nongovernment bonds. The government must put in place a clear and predictable issuance strategy to build benchmark bonds and establish a competitive and efficient primary and secondary market structure. This will enhance price discovery and liquidity.

Promoting a supportive legal and regulatory framework
Fostering an interest in nongovernment bonds means adopting financial sector policies and conditions that ensure a level playing field between nongovernment bonds and other financial instruments. Tax policies must be reviewed to eliminate any biases that may make nongovernment bonds less attractive compared to other financial products, such as government bonds or bank deposits.

Policies that result in government securities crowding out nongovernment bond issuance and investment, such as investment guidelines for institutional investors or excessive issuance by the government, should also be assessed. Finally, a review of broader laws and regulations (e.g., bankruptcy, contract enforcement) may be needed to ensure that they are clear and robust and do not prevent bond transactions from happening.

Enabling the development of a capable, credible, and well-resourced securities regulator
The regulator should understand the nature of a wide range of fixed income instruments and be able to develop and implement suitable regulations to facilitate market development. The regulator also needs to recognize the dynamic nature of the market and should be willing and able to adjust regulations as the market develops.

Developing of adequate trading and clearing and settlement systems
The appropriate exit mechanisms for securities transactions need to be developed, even though nongovernment bonds are relatively illiquid instruments with low levels of trading. Over-the-counter trading is more conducive to nongovernment bonds than automated/broker-based exchange trading. The emphasis needs to be on ensuring efficient operation, access for all eligible market participants, and post-trade transparency through appropriate trade-reporting mechanisms.

B BUILDING ISSUANCE

1. Situation and Challenges

The lack of issuers is a fundamental challenge in developing bond markets in emerging market economies. This is due to two main factors:
(i) weak or inadequate issuance regulations, and
(ii) limited availability of potential issuers due to lack of capacity.

In addition, for the infrastructure sector —one of the potential large users of bond markets—the lack of a bankable projects pipeline and poor public-private partnership (PPP) frameworks could also limit the supply of nongovernment bonds.

The regulations around bond issuance procedures are often unduly onerous, unpredictable, and protracted, resulting in lost time and higher costs for potential issuers. This can lead issuers to forgo bond financing and turn to bank loans for faster access to funds. In terms of pipeline and capacity, the number of nongovernment issuers – municipal agencies, companies or projects - that could issue a bond is often very limited. This is due to the lack of knowledge among potential issuers about bond financing, lack of preparedness for bond issuance, and simply a lack of bankable projects that could tap the bond market.

As well, potential issuers often do not have the financial strength to incorporate bonds into their financing structures. Project structures that lack financial viability are non-starters for attracting investors. Pipeline issues also relate to sectorial policies and the absence of a clear PPP framework that can complicate project development and structuring.

2. Policy Actions

Special bond issuance regimes for qualified investors
To improve the efficiency of bond issuance procedures, policy makers can introduce special issuance regimes for bonds targeted only to qualified investors. Bonds issued to mainly institutional and possibly high net worth investors entail reduced disclosure requirements and faster approval times. Because most nongovernment bond investments are already purchased primarily by institutional investors, it is possible to design such regimes specifically with institutional investors in mind, allowing the issuance to be exempt from more onerous public offer requirements that are aimed to protect retail investors.

To improve efficiency of bond issuance procedures, policy makers can introduce special issuance regimes for bonds targeted only to qualified investors.

Such special issuance frameworks are common in advanced economies and are increasingly being introduced in emerging markets such as Brazil, Thailand, Malaysia, Peru, and Colombia. They increase the efficiency of the offering process in terms of time needed to issue the bonds, which can be critical when trying to take advantage of market windows, such as low interest rates[1]. For example, in Brazil, following the introduction of a qualified investor issuance regime in 2009, there was a notable increase in the corporate bond market issuance, in terms of both value and number of issuers, including first-time issuers. Thailand has experienced similar trends[2].

in Brazil, following the introduction of a qualified investor issuance regime in 2009, there was a notable increase in the corporate bond market issuance

Private placement regimes, where a bond is sold directly to investors in a private transaction, have even fewer requirements. These can be useful especially in helping to kick-start a domestic bond market.

Governments can support capacity building efforts
Educational campaigns targeted at private and subnational public bodies can explain the key features and benefits of bond financing and what it takes to issue a bond. This includes financial training of the key corporate staff in charge of managing the capital structure of a business or institution. Sometimes such training may be conducted by a local stock exchange; at other times it could be done by a public agency overseeing the corporate sector.

For infrastructure-related bonds, strengthening project planning and structuring is critical to allow bond financing to take place.
This includes improving sectorial policies and PPP frameworks, and ensuring financial capability of projects.

- Having in place well-defined sectorial policies (e.g., for transport, energy, water, etc.) with clear delineation of roles and responsibilities between the relevant national agencies can be crucial in project development. In addition, having a clear and robust PPP framework is important especially for those sectors where a PPP structure[3] is deemed most appropriate. Such frameworks can incorporate certain features to ensure a project can use bonds as part of its financing structure.

Having in place well-defined sectorial policies (e.g., for transport, energy, water, etc.) with clear delineation of roles and responsibilities between the relevant national agencies can be crucial in project development.

- Financial viability is a crucial element to ensure projects are attractive to investors. Here the revenue sources of a project are a key consideration. These may require support from the government, such as revenue guarantees to complement and cover potential revenue shortfalls, so that investors feel comfortable about the creditworthiness of the project. For example, to offset shortfalls in user fees the Colombian government is offering availability payments to toll-road projects that are part of its ongoing toll-road development program.

C BUILDING THE INVESTOR BASE

1. Situation and challenges

A limited or inexperienced investor base can be a serious obstacle to development of nongovernment bond markets. Domestic institutional investors, such as pension funds and insurance companies, often lack the capacity to analyse certain non-government products, in particular those related to infrastructure projects or less conventional investments. These investors are also relatively new in many emerging market countries, still in their formative stages due to slow pension and insurance reforms, and often risk-averse, given the nature of their core business (e.g., looking after retirees' savings and income). This is especially pronounced in places with underdeveloped credit cultures. This means the investor base is limited and not able to play a significant role in financing key development needs.

Domestic investors in emerging markets may also be constrained by regulations. Investment regulations can be highly restrictive, for example, requiring large allocations to government securities, only allowing investments in instruments with minimum rating thresholds, or only allowing the purchase of securities that are listed on an exchange. Such regulatory restrictions are particularly a limitation in countries with less developed pension systems. In those environments less experienced pension fund members (and managers) understandably need greater protection. However, restrictions can have the unintended consequence of preventing allocations to instruments such as infrastructure bonds.

2. Policy Actions

'Hand holding' is important for domestic investors

Capacity building and training of domestic institutional investors in emerging markets (including pension fund trustees, asset managers etc.) is key. It can help build the knowledge and confidence – and the necessary scale - to diversify portfolios into more productive, longer-term assets. Partnering with more experienced regional and international peers and development agencies is also effective.

Deregulation of investment regulations may be required

When it comes to regulatory restrictions, regulatory authorities are increasingly assessing their investment framework and have included provisions to allow institutional investors access to suitable products. For example, the pension fund regulations in Tanzania issued in 2012 now allow the funds to invest up to 25% of their portfolios in infrastructure investments, which includes infrastructure bonds. Many emerging market countries are increasingly letting institutional investors move into alternative assets, which often include infrastructure.

Encouraging long-term investments.

In addition to removing restrictions, some regulators are considering ways to reduce disincentives to investing in long-term investments such as infrastructure. For example, replacing benchmarks for pension funds that measure performance against short-term returns with ones that use long-term returns instead[4].

Development of properly regulated credit rating agencies

This should be promoted to support investors in their analysis of potential bond investments, especially in more complex sectors such infrastructure. Proper regulation and supervision of rating agencies, including use of appropriate rating methodologies, is important to gain investors' trust.

Co-investing can assist more experienced players

For international investors, co-investing alongside those with experience in frontier markets can provide additional comfort. For example, some leading pension and insurance companies from OECD countries co-invest alongside the International Finance Corporation (IFC). Additionally, providing investments with necessary political, currency or other risk guarantees may also be required.

1. It is important to note that these regimes allow simplification of disclosures that need to be submitted to securities regulators to make their review process more efficient, since they are often the main bottlenecks in the issuance process in many emerging markets. Issuers would still be required to provide any disclosures that may be demanded by institutional investors on a contractual basis.
2. Loladze, T. (2015) "Hybrid Issuance Regimes for Corporate Bonds in Emerging Market Countries: Analysis, Impact and Policy Choices." World Bank, June 2015
3. A public-private partnership (PPP) is a contractual arrangement between a public sector agency and a private sector party, involving private sector participation in the development, financing, construction, operation, or maintenance of public infrastructure projects (Ang and Marchal, 2013).
4. See Stewart, F., (2014), 'Providing Incentives for Long-term Investment by Pension Funds', World Bank Working Paper No.

D INSTRUMENTS FOR SCALING UP BOND ISSUANCE AND INVESTMENT

1. Situation and challenges

Having a variety of instruments that can support the needs of issuers and investors is an important element of bond market development. Bond instruments can be structured or packaged in ways that enhance their attractiveness and credit quality, making it easier for issuers to raise funding and at lower cost, while helping investors achieve greater comfort about the risk profile of a particular investment.

The instruments can be divided into three main types: direct issuance instruments, aggregation instruments, and credit enhancement instruments (See Table 1).

The direct issuance category includes more traditional, or plain vanilla, instruments—such as corporate bonds, sovereign bonds and subnational bonds—and more complex ones, such as project bonds. Aggregation instruments, which pool underlying assets such as loans, receivables or bonds, include securitizations, covered bonds, and bond funds. The credit quality and rating of securitized and covered bonds relies largely on the performance of the underlying assets. Those assets can be packaged and structured to create a form of internal credit enhancement. Credit enhancement instruments span a variety of risk mitigation tools, including guarantees, that raise the creditworthiness of an investment.

A nascent securities market typically starts with plain vanilla instruments, with the focus on diversifying issuers using the instrument. As the market develops and the country seeks to leverage its capital markets to finance strategic sectors, such as infrastructure or SMEs, the need to develop more complex instruments becomes more relevant. Developing plain vanilla instruments largely requires putting an enabling environment in place that supports general bond market development, as well as actions related to increasing the issuer and investor base discussed above. Developing the more complex instruments require additional elements, which are the focus of this section.

DIRECT ISSUANCE - PROJECT BONDS

A project bond can be broadly defined as a fixed income security issued to finance, partially or in full, the debt obligations of a single-asset infrastructure project. Expected income from the underlying project is securitized and ring-fenced to ensure payment of the bond's interest and principal, generally on a non-recourse basis. This means the creditworthiness of a project bond is linked to the expected cash flows of the project rather than the balance sheet of the project sponsor.

Project bonds could be issued for projects developed by the private sector or public-private partnerships. In addition, a revenue bond issued by a subnational entity to finance an infrastructure project is like a project bond, as its repayment depends on the cash flows generated by a specific infrastructure project.

Issuers of project bonds benefit from historically lower total funding costs than bank loans. For institutional investors the main benefits of project bonds are:
(i) they can provide a stable flow of long-term income that can match the investors' long-term liabilities and
(ii) they are a flexible instrument that can accommodate different risk appetites.

Challenges
The main challenges in developing project bonds are:

- Higher risks and uncertainty, as well as lack of project revenues, during the construction period. This makes institutional investors reluctant to invest during the construction phase;
- Cost of carry as bond proceeds are generally disbursed all at once at the beginning of construction while funds are needed incrementally as the infrastructure is built;
- Higher probability of debt contract re-negotiations responding to issues arising during construction.

For these reasons, experience so far shows that project bonds appear to work better for brownfield as opposed to greenfield projects. They are a way to refinance bank debt from the construction period once the project has entered the operation and maintenance phase and is generating steady cash flows. Partial or full guarantees (from government or development banks) can be used to reassure investors during the construction phase for greenfield project bonds.

From a legal standpoint, another challenge to project bond development is the lack of a robust securitization framework to allow the ring-fencing of project assets. This is done through a bankruptcy-remote special purpose vehicle (SPV) or another similar structure.

Table 1:

	Direct Issuance		Aggregation			Credit Enhancement
	Plain vanilla bonds	**Project bonds**	**Securitization**	**Covered Bonds**	**Bond Funds**	**Risk mitigation tools**
What are they?	Bonds backed by the full balance sheet of the issuer.	Bonds backed only by cash flows generated by a specific project.	Bonds backed by a pool of credit assets (e.g., loans, leases, bonds), whose cash flows are used to make bond payments.	Bonds backed by a specific pool of assets (e.g., loans), as well as the balance sheet of the issuer.	Participation shares in a collective investment scheme that purchases bonds issued by companies/ project.	Mechanisms that mitigate certain risks of a bond or an investment scheme (e.g., guarantees, insurance, subordinated debt, etc.), thereby improving its creditworthiness and investor appeal
Issuers/ Providers	— Sovereign — Subnational — Private Sector — Multilateral	— Subnational — Private Sector	— Private Sector	— Private Sector (only banks)	— Private Sector	— Government — Development Institutions — Private Sector

AGGREGATION - SECURITIZATION

Securitization is a financing technique that involves bundling non-tradable assets, such as loans, leases and receivables, creating new securities backed by these assets, and selling those securities to capital market investors. The securities, which are usually issued through an SPV, are backed by the income flows from the underlying assets. The credit quality of the bond is based on the performance of the underlying assets rather than the balance sheet of the entity who originated the assets. The assets can be pooled and structured in ways that create different risk profiles, for instance through overcollateralization, and in tranches that correspond to these risk categories.

Securitization has a number of benefits for the lenders, their borrowers, as well as institutional investors. For banks, securitizing loans allows them to access an alternative source of funding, often for longer term and at lower cost, especially for banks that have difficulty raising capital market financing using unsecured bonds (i.e. bonds backed by the bank's balance sheet). Securitization also provides capital relief to banks (and other regulated financial institutions), allowing them to remove assets from their balance sheet and generate new loans—increasing funds available for strategic sectors (e.g., infrastructure, SMEs).

For institutional investors, securitization has three main benefits:

(i) access to non-tradable, illiquid assets that they could not otherwise invest in;
(ii) long-term, stable cash flows with higher yields than government bonds; and
(iii) securities that provide risk-return diversification and access to different risk profiles, and the potential for high quality securities which are often limited in emerging market countries.

Challenges
Typical challenges to developing a securitization market in emerging markets include:

- Lack of a sufficient pipeline of underlying assets to securitize.
- Lack of data on historical performance of assets to be securitized.
- Lack of standardization of underlying assets. Too much heterogeneity in the assets makes it more difficult to assess default risk and potential recovery values and may deem the securitization unviable.
- Absence of a robust framework for securitization with a clear structure for a bankruptcy remote SPV, as with project bonds (see above).

AGGREGATION - COVERED BONDS

Covered bonds are debt securities similar to securitizations in that they are collateralized by a dedicated pool of assets, which enhances the credit quality of the bond, but with the following key distinctions:
(i) the underlying assets remain on the balance sheet of the issuers;
(ii) investors have dual recourse--to the issuer of the bond as well as the underlying cover pool, offering extra security to investors; and
(iii) only banks and specialised credit institutions can issue them.

In general, covered bonds are issued under a dedicated legal framework, which defines minimum quality standards for the assets that can be included in the cover pool. Eligible assets typically include different types of mortgages and public debt, with real estate mortgages accounting for the bulk of covered bond issuances to date. Should the original assets become impaired, the issuer is required to replace them with other performing assets. The existence of such requirements provides investors with confidence that the bonds are issued in a uniform way and adhere to strict standards. This in turn creates a pool of bonds which are broadly homogenous and encourages recurrent issuances, which enhances market depth and secondary market liquidity and, in turn, helps to reduce overall funding costs for the issuer.

Thus, the main benefit of covered bonds for banks is the ability to access long-term funding at a lower cost because of the high collateralization and because the product is well known and understood by investors. For these reasons, including the dual recourse feature, the inherent credit enhancement of covered bonds is even stronger than with securitization.

For investors, covered bonds provide long-term investments with greater liquidity and lower risks than securitizations—given the dual recourse and well-defined, high quality underlying assets with more predictable repayment patterns—but still attractive returns over government securities. They also receive preferential capital treatment under Basel III and Solvency II regulations, which are applicable to banks and insurance companies respectively.

Challenges
Challenges to developing covered bonds are very similar to those for securitization:

- Lack of a critical mass of underlying assets.
- Lack of standardization of underlying assets.
- Absence of a dedicated legal framework that outlines the parameters of covered bond transactions and eligible assets.

Legal frameworks are established in many advanced economies, with Europe being the main market for covered bonds. While some emerging markets have recently developed covered bond regulations, in many countries the legal framework still needs to be put in place.

AGGREGATION - BOND FUNDS

Bond funds are collective investment schemes that purchase bonds issued by a variety of companies and projects. Participation shares in the fund are sold to capital market investors. The funds are usually structured as closed-end funds and could be placed either through public or private offering regimes. The underlying portfolio can be comprised of bonds that vary by size, sector, structure and features, as well as geography, though, some bond funds can specialize in a particular sector (e.g., SMEs); they can be issued through public or private placements. Investors receive dividends based on income generated by the fund's portfolio of assets. Fund managers collect a fee for selecting and monitoring the assets.

Investors in bond funds can be institutional, high net worth, or retail, depending on the type of offering used. (Retail investors can only invest through public offerings.)
The main benefits of bond funds for institutional investors include:
(i) Scale transformation – through pooling, funds allow institutional investors to access smaller-scale investments which would otherwise be uneconomical for them to analyse and monitor, given their large portfolio holdings.
(ii) Risk-return diversification, given that investments are made in different bond

assets that could vary by sector, maturity, and other specific terms.
(iii) Outsourcing of the selection and monitoring expertise, since investors may not have the specialized knowledge and skills in-house to invest in certain complex sectors like infrastructure.

Challenges
The main challenges to developing bond funds in emerging markets relate to:

- Lack of an appropriate regulatory framework for closed-end funds.
- A rigid investment framework that does not allow institutional investors to invest in these instruments at meaningful portfolio allocation levels.
- A nascent domestic fund management industry that lacks necessary skills to analyse, select, and monitor non-government bond investments, especially in more complex sectors, such as infrastructure

CREDIT ENHANCEMENT INSTRUMENTS

In any nascent bond market, where investors are relatively inexperienced and conservative, credit enhancement instruments are needed to help bring the risk-return profile of new bond products to a level of greater comfort for investors. This is particularly the case for bonds issued by less-well-known companies or sectors with greater perceived risks, such as infrastructure. Credit enhancement is often needed to support securitized and covered bonds to further raise their credit quality.

A wide range of credit enhancement tools could be used to support investment in bonds, such as guarantees, subordinated debt or equity, insurance, and cornerstone investment, among others. They can be provided by a variety of actors but are most commonly provided by a country's public sector agency or a local, regional, or multilateral development institution.

Challenges
The main challenge usually relates to the availability of such instruments on a systematic basis, especially for more complex bond structures or sectors, such as infrastructure project bonds or SME securitizations.

Additional challenges could be linked to the complexities of designing credit enhancements to ensure their buy-in by market participants. This entails striking the right balance between adequately addressing investor concerns, to bring the investment to a sufficient comfort level, and keeping the costs reasonable for the issuers. Also, sometimes too much credit enhancement can de-risk the investment to the point where the yields are no longer attractive to investors.

2. Policy Actions

Legal and regulatory framework
Development of project bonds, securitization, covered bonds and bond funds requires putting in place a robust legal and regulatory framework that allows the instruments to be created and used. Namely, project bonds and securitization require provisions that support bankruptcy-remote special purpose vehicles and ring-fencing of assets. Here, clarity on the tax treatment of the assets transferred to the SPV is an important element. For covered bonds, a dedicated legal framework with a clear definition of eligible assets that can be included in the cover pool is the main requirement. For bond funds, a robust framework for closed-end funds is needed, which allows the funds to invest in a broad range of assets. Finally, a flexible investment framework that allows institutional investors, such as pension funds and insurance companies, to invest in these instruments is needed.

Underlying assets
Significant efforts may be needed to standardize and develop common criteria for the assets used to back securitizations and covered bonds (e.g., mortgages, SME loans, etc.) and accumulate sufficient data to analyse their performance in terms of default risk and recovery values. These standards and performance data are needed to effectively pool and structure the instruments and create tranches with different risk levels for institutional investors.

Capacity building
Education and training is needed to enhance the knowledge and skills of domestic fund managers for analysing non-government bond investments. Learning by doing through partnering with experienced foreign fund managers can also help boost domestic capacity

Availability and design of credit enhancements
Increasing the availability of instruments that provide credit enhancement and mitigate risk requires securing commitment of a public, private, or development institution that can support a certain sector, type of issuer, or transaction. These could include different types of guarantees (construction, liquidity, refinancing, etc.), subordinated debt or mezzanine facilities, and insurance (e.g., policy risk, political risk). Some guarantee schemes, especially those provided by the government, could require legal and regulatory measures that, for example, allow a public guarantee to be used to support a toll road concession program whose projects will be funded through bonds.

Efforts are also needed to design specific credit enhancement products that will work in a particular country and/or sector context. Credit enhancement instruments need to achieve a delicate balance—to be cost-effective for issuers and to mitigate risks for investors but maintain attractive yields. Too much de-risking may lose the interest of investors.

E ENHANCING COOPERATION

1. Situation and Challenges

Bond market development is a complex, long-term, multi-dimensional process involving many actors and institutions. The interrelated nature of efforts required, many of which need to be carried out in parallel, requires careful coordination to achieve fruitful results. This makes cooperation among key institutions involved in the reform process a vital component of developing a well-functioning bond market. It helps to build consensus and move the reform implementation forward and is needed both at the domestic and international levels.

Poor cooperation often results in slow progress and could render individual actions in vain if other important supportive measures (e.g., from a different market area) are stalled.

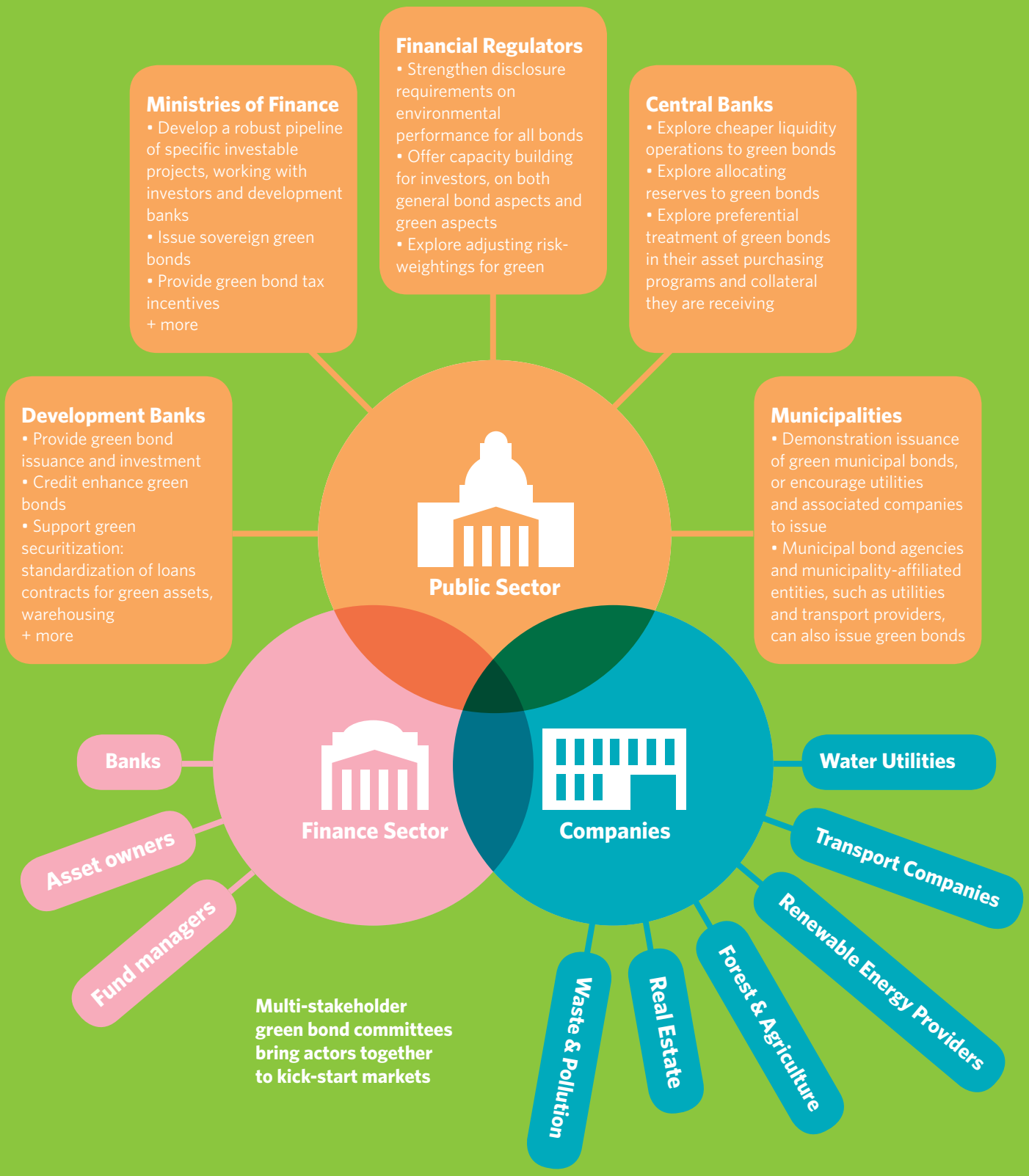
2. Policy Actions

Overseeing bond market development
Domestically, having in place a well thought-out vision for bond market development, and a centralized task force or a champion in charge of overseeing the development process, is often an important factor in driving the reform implementation forward. The task force should include key government and industry entities that play a central role in the development process, e.g., on the government side this could include the Ministry of Finance, the Central Bank, and securities and investment regulators; on the industry side – pension funds, insurance companies, investment banks, and commercial banks. Creation of focused working groups to bring together different actors who work on similar issues can also be an important component of successful cooperation.

International cooperation
This is needed to ensure that policies implemented are in line with international standards and practices, as well as to glean new knowledge and share experiences. In some cases, cooperation is important for shaping new regulatory frameworks or standards that arise as a result of crises, as well as for innovative sectors/approaches that are in early stages of development.

WORLD BANK GROUP

How the public sector can support green bond markets



The Climate Bonds Initiative is an investor focused not-for-profit, mobilizing debt capital markets for a rapid transition to a low-carbon and climate resilient economy.

Written by Beate Sonerud, with Sean Kidney and Aneil Tripathy. The Guide has been supported by the Frederick Mulder Foundation.

Design: Godfrey Design

www.climatebonds.net

Climate Bonds INITIATIVE

Inquiry: Design of a Sustainable Financial System

To find out more contact info@climatebonds.net