

Nassiry, Darius

Working Paper

Green bond experience in the Nordic countries

ADB Working Paper, No. 816

Provided in Cooperation with:

Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Nassiry, Darius (2018) : Green bond experience in the Nordic countries, ADBI Working Paper, No. 816, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/190237>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by-nc-nd/3.0/igo/>



ADB Working Paper Series

**GREEN BOND EXPERIENCE
IN THE NORDIC COUNTRIES**

Darius Nassiry

No. 816
March 2018

Asian Development Bank Institute

Darius Nassiry is a senior research associate at the Climate and Energy Programme, Overseas Development Institute, and advisor to the Climate Bonds Initiative.

The views expressed in this paper are the views of the author and do not necessarily reflect the views or policies of ADBI, ADB, its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

Working papers are subject to formal revision and correction before they are finalized and considered published.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. Some working papers may develop into other forms of publication.

The Asian Development Bank recognizes “China” as the People’s Republic of China.

In this report, “\$” refers to US dollars.

Suggested citation:

Nassiry, D. 2018. Green Bond Experience in the Nordic Countries. ADBI Working Paper 816. Tokyo: Asian Development Bank Institute. Available: <https://www.adb.org/publications/green-bond-experience-nordic-countries>

Please contact the authors for information about this paper.

Email: dnassiry@gmail.com

The author gratefully acknowledges the contributions and suggestions for improvements to earlier versions of this paper from: Magnus Borelius, Head of Treasury, City of Gothenburg; Bridget Boulle, Monica Filkova, and Beate Sonerud, from the market analysis team at the Climate Bonds Initiative; Kajetan Czyz, Programme Director, Sustainable Finance, at the Cambridge Institute for Sustainability Leadership; and Robert Youngman, Team Leader, Green Finance and Investment, and Hideki Takada, Senior Policy Analyst, Environment Directorate, at the OECD.

Asian Development Bank Institute
Kasumigaseki Building, 8th Floor
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

© 2018 Asian Development Bank Institute

Abstract

The global green bond market has grown rapidly in recent years, increasing from \$3 billion in 2012 to over \$100 billion in 2017.¹ Given the broad acceptance and strong demand from investors, green bonds have emerged as an important financing solution, raising finance for climate change mitigation and adaptation investments, particularly in developing countries, where the need for such investments is significant. The Nordic region has pioneered the issuance of green bonds. The World Bank and Skandinaviska Enskilda Banken (SEB) developed the green bond concept in 2008 in response to investors' demand for climate-related investments.² Since then, Nordic issuers have played a leading role in green bond issuance, particularly for local green finance. This paper summarizes the Nordic experience with green bonds with a focus on local financing structures and highlights key points that may be of value for developing countries, particularly those in Asia and the Pacific, in exploring green bonds as a means to raise finance for climate change mitigation and adaptation investments.

JEL Classification: F3, G2

¹ Climate Bonds Initiative (2017a) and OECD, ICMA, CBI, and GFC (2016).

² See <https://sebgroupp.com/large-corporates-and-institutions/our-services/markets/fixed-income/green-bonds>

Contents

1.	INTRODUCTION	1
1.1	Scope and Purpose of the Paper	1
1.2	Scale of Need and Relevance	1
2.	OVERVIEW OF THE GREEN BOND MARKET	2
2.1	Current Status and Recent Trends	2
2.2	Key Drivers of Issuance	3
2.3	Challenges/Barriers to Future Growth	4
2.4	Green Bonds for Cities' Finance	6
3.	NORDIC ISSUANCE OF GREEN BONDS	6
3.1	Subnational Pooled Financing Mechanisms	7
3.2	Gothenburg (Sweden) – First City Green Bond Issuer	8
3.3	Vasakronan (Sweden) – First Corporate Issuer	9
3.4	Kommuninvest (Sweden)	9
3.5	Kommunalbanken (Norway)	10
3.6	KommuneKredit (Denmark)	10
3.7	MuniFin (Finland)	11
4.	CURRENT PRACTICE IN IMPACT REPORTING	12
4.1	Role of Nordic Investors	13
5.	POTENTIAL OPPORTUNITIES FOR NEW ISSUERS IN ASIA AND THE PACIFIC	13
5.1	Preliminary Estimates of the Scale of the Opportunity	13
5.2	Recent Trends in the PRC	14
5.3	Issuance in India	15
6.	CONCLUSION	15
	REFERENCES	17
	ANNEXES	
A.	Projections for the Volume of Green Bond Issuance in 2017	23
B.	City of Gothenburg – Green Bond Framework	24
C.	Excerpt from the Guidelines for Establishing the Green Financial System ...	26

1. INTRODUCTION

1.1 Scope and Purpose of the Paper

The aim of this paper is to highlight the opportunity that has arisen for subnational issuance of debt in Asia following the rapid recent development of the green bond market. The paper focuses on the experience of countries in the Nordic region—particularly Sweden, Norway, and Finland—that have been frontrunners in terms of the issuance of green bonds. Specifically, the paper describes both the Nordic experience of using green bonds at the city level to access debt markets to support fiscal requirements and the model of subnational pooled financing mechanisms (SPFMs). Countries in the Nordic region have used this model, and it may be relevant for other cities and regions, including developing and emerging economies in Asia, as new financing approaches appear.

The paper proceeds as follows. First, it provides an overview of the green bond market, including the current level of issuance and recent trends, the key drivers of its rapid development, and the main challenges or barriers to future growth in the view of market participants. Second, the paper describes the development of green bonds for cities based on the experience in the Nordic countries, particularly Sweden, Norway, Denmark, and Finland. Third, it provides an estimate of the scale of opportunity available to countries in Asia to tap into the green bond market, including potential opportunities for new issuers in Asia and the Pacific and the recent experience of the People's Republic of China (PRC). Finally, the paper suggests actions for policy makers considering the green bond market as a possible option for mobilizing capital for sustainable investments.

1.2 Scale of Need and Relevance

The scale of the need to raise capital, particularly for a low-carbon, climate-resilient infrastructure to achieve the objectives of the Paris Agreement on climate change, is enormous. The World Economic Forum estimates total business-as-usual investment requirements of \$100 trillion between 2012 and 2030, or \$5 trillion per year, to secure future growth and an additional investment of \$14 trillion over the period, or \$0.7 trillion per year, in a 2°C scenario.¹ Similarly, the Global Commission on the Economy and Climate anticipates sustainable infrastructure needs of approximately \$93 trillion per year from 2015 to 2030, including approximately \$89 trillion for business-as-usual investments (or about \$6 trillion per year) and approximately \$4 trillion (or about \$270 billion per year) to shift to low-carbon investments consistent with a 2°C scenario.²

In its recent report, the OECD estimates that, for the infrastructure to be consistent with a 2°C scenario (at 66% probability), “investment needs reach \$6.9 trillion per year in the next 15 years” in energy, transport, water, and sanitation, which annual fuel savings could offset over time up to 2030, reaching \$1.7 trillion.³

¹ The World Economic Forum (2013) estimates total business-as-usual investment requirements of \$100 trillion between 2012 and 2030, or \$5 trillion per year, to secure future growth and an additional investment of \$14 trillion over the period, or \$0.7 trillion per year, in a 2 °C scenario.

² Global Commission (2014; 19). Also see Bhattacharya et al. (2016) and Bielenberg et al. (2016).

³ OECD (2017a).

For cities the estimates range from \$4.1 trillion to \$4.3 trillion of expenditure on urban infrastructure globally to maintain growth in a business-as-usual scenario, with \$0.4 trillion–\$1.1 trillion more needed to ensure that the urban infrastructure will be low carbon and climate resilient.⁴

The financing requirements to reach the Sustainable Development Goals (SDGs) will also be substantial. According to the UN Sustainable Development Solutions Network, “Meeting the SDGs will require additional investments in the order of \$2 trillion–\$3 trillion per year” and “incremental spending needs in low- and lower-middle-income countries may amount to at least \$1.4 trillion per year (\$343 billion–\$360 billion for low-income countries and \$900 billion–\$944 billion for lower-middle-income countries).”⁵ The United Nations Conference on Trade and Development (UNCTAD) states: “At the global level, total investment needs are in the order of \$5 to \$7 trillion per year. Total investment needs in developing countries in key SDG sectors are estimated at \$3.3 to \$4.5 trillion per year over the proposed SDG delivery period. ... Current investment in these sectors is around \$1.4 trillion, implying an annual investment gap of between \$1.9 and \$3.1 trillion.”^{6, 7}

Given both the need to shift capital from high-carbon to low-carbon investments and the need to mobilize significant levels of capital for the low-carbon infrastructure, countries need an accessible form of finance that can meet the risk–return requirements of institutional investors to achieve the scale required and that they can direct to sustainable investments.

2. OVERVIEW OF THE GREEN BOND MARKET

2.1 Current Status and Recent Trends

Green bonds are fixed-income instruments of which the issuer uses the proceeds to finance specific projects that deliver environmental or climate benefits,⁸ and, as financial instruments that can offer stable long-term returns to investors, they are particularly well suited to financing sustainable infrastructure investments. The need to raise or shift private capital to sustainable infrastructure highlights the opportunity to leverage private capital markets in which there can be a match between the durations of fixed-income instruments, such as green bonds.

Growth in the green bond market has increased rapidly, as investors have responded positively to the opportunity. Since the initial issuances by development banks in 2007, the green bond market’s annual issuance has grown from \$11 billion in 2013 to \$81 billion in 2016, according to the Climate Bonds Initiative, an investor-focused nonprofit organization.⁹ In 2016, the total amount of climate-aligned bonds outstanding – including bonds that carry the label green bonds as well as “a larger universe of bonds financing climate-aligned assets that do not carry a green label” – reached

⁴ See Cities Climate Finance Leadership Alliance (CCFLA) (2015).

⁵ Schmidt-Traub (2015); Schmidt-Traub and Sachs (2015).

⁶ UNCTAD (2014, 140). The SDG sectors include “basic infrastructure (roads, rail and ports; power stations; water and sanitation), food security (agriculture and rural development), climate change mitigation and adaptation, health and education.” See UNCTAD (2014: xi).

⁷ The OECD estimates the current levels of investment at around \$1 trillion per year, that is, less than a third of the amount needed. See Morgado and Casado-Asensio (2015).

⁸ See OECD (2017b, Box 1.1 “Defining a Green Bond,” 23). Also see Munro (2016).

⁹ Climate Bonds Initiative (2017a).

\$895 billion, of which the issuers labeled around \$221 billion as green and \$674 billion were unlabeled¹⁰ as such but aligned with climate change goals.¹¹ The market growth has continued apace, with the total issuance reaching \$100 billion even before the year-end of 2017.¹²

Issuance by other sovereign issuers will add to the momentum.¹³ In early 2017 Poland became the first sovereign country to issue a green bond with an issuance of EUR750 million. France adopted the Climate Bonds Taxonomy as the basis for its own green investment criteria as part of its Law on Energy Transition and Green Growth¹⁴ and in July issued a green bond of EUR7 billion with a 22-year term to finance renewable energy tax credits and other green-related expenditures. In October 2017, Fiji issued a \$50 million sovereign green bond, the first developing country in Asia and the Pacific to do so, ahead of the UN Climate Change Conference in Bonn.

A recent analysis by the Organisation for Economic Co-operation and Development (OECD), which covered the People's Republic of China (PRC), the European Union (EU), Japan, and the United States (US) and focused on renewable energy, energy efficiency, and low-emission vehicles as key sectors, projected that by 2035 “bonds for low-carbon energy investments have the potential to scale to as much as \$4.7 trillion–\$5.6 trillion in outstanding securities globally and \$620 million–\$720 billion in annual issuance in the markets studied.”¹⁵

Experts project that the growth in the green bond market will continue. According to Moody's Investors Service, “global green bond issuance will reach another record in 2017” with growth driven by momentum following the Paris Agreement on climate change and continued growth in issuance from the PRC.¹⁶ Moody's estimates issuance of \$120 billion in 2017.¹⁷ The Swedish bank SEB anticipates green bond issuance of \$97 billion in 2016 and projects that the total green bond issuance in 2017 could reach \$125 billion–\$150 billion, due partly to continued growth in sovereign bond issuance from markets such as the PRC.¹⁸

2.2 Key Drivers of Issuance

Green bonds comprise a small but growing fraction of the total global fixed-income market. The key drivers of the issuance of green bonds include the continued strong demand from issuers, particularly as sustainability and climate change themes have become increasingly prominent for investors following the Paris Agreement on climate change, and the United Nations' adoption of the Sustainable Development Goals. Institutional investors have expressed their support for enlarging the green bond market. In 2015, 27 institutional investors with \$11.2 trillion of assets under

¹⁰ “Unlabeled climate-aligned bonds are bonds whose proceeds are used to finance [low-carbon climate resilient] industries but do not yet carry the green label.” See OECD (2017, 23).

¹¹ Climate Bonds Initiative (2017a).

¹² See <https://www.climatebonds.net/2017/11/breaking-2017-green-bond-record-100bn-global-issuance-reached-during-cop23>

¹³ Hirtenstein (2017).

¹⁴ Climate Bonds Initiative (2016) and French Ministry of Environment, Energy, and the Sea (2016).

¹⁵ OECD (2016, 5). Also see Takada and Youngman (2017).

¹⁶ Moody's (2017b).

¹⁷ Moody's (2017a) and SEB (2017).

¹⁸ SEB (2017). See Annex A.

management committed to supporting policies that would expand the green bond market.¹⁹

Policy makers have signaled their growing support for the green bond market. The G20 Green Finance Study Group (GFSG) under the PRC's Presidency of the G20 expressed support for the development of local green bond markets.²⁰ The EU High Level Expert Group recommended the establishment of "a European standard and label for green bonds and other sustainable assets" to help the market to reach its full potential.²¹

For issuers of green bonds, the benefits include helping to reinforce and communicate their sustainability investment program and environmental commitment to current and prospective investors, improved collaboration between sustainability and finance teams within an organization or city, capital raising for climate change and sustainability-related investments, and a strong and growing demand from investors for green paper.²²

2.3 Challenges/Barriers to Future Growth

The assessment of the green quality of specific green bonds has been a significant issue in the development of the green bond market. Among the key barriers to continued momentum in the growth of the green bond market is the lack of consensus around green definitions in terms of "what is green?" According to the OECD:

[T]he evolving green bond market faces a range of specific challenges and barriers to its further evolution and growth. These include underdeveloped domestic bond markets, insufficient pipelines of bankable and standardised green projects, a lack of commonly accepted green standards and definitions, issuer's views on costs vs. benefits, and a general scale mismatch between projects, bonds and institutional investors.²³

A number of organizations and stakeholders have taken steps to address these barriers to the growth of the market. The Green Bond Principles (GBPs) represent a set of voluntary process or management guidelines, which emphasize transparency and disclosure as a means to foster market integrity. The GBPs focus on four areas: the use of proceeds, the process for project evaluation and selection, the management of proceeds, and reporting.²⁴

The Climate Bonds Initiative's Standard and Certification Scheme incorporates the Green Bond Principles and extends these guidelines to include a taxonomy of sector-specific eligibility criteria for assets and projects – including solar energy, wind energy, low-carbon buildings, low-carbon transport, geothermal power, and water – each developed to be consistent with ensuring a temperature increase of less than 2 °C.²⁵

¹⁹ Climate Bonds Initiative (2015).

²⁰ G20 Green Finance Study Group (2017).

²¹ EU High Level Expert Group (2017).

²² March (2017).

²³ OECD (2015).

²⁴ See <https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/>

²⁵ See <https://www.climatebonds.net/standard/available>

As the green bond market becomes more standardized, the issuance across sectors, maturities, and credit ratings will increase, liquidity is likely to increase, and price differentiation may become more evident based on green qualities. A recent analysis suggests that “green bonds tighten in the immediate secondary market and on average outperform benchmarks in the first month” and tend to be over-subscribed.²⁶

In 2015, CICERO, a Norwegian climate research institute that offers “second opinions” on green bonds to evaluate the green qualities of bond issuances, developed its Shades of Green approach to “second opinions” of green bonds – its independent reviews of green bond frameworks which it categorizes as dark green, medium green or light green.²⁷

According to CICERO:

These Shades of Green give investors a clear signal, to which extent a project is contributing to building a low-carbon and climate resilient society by 2050. The grading builds on a broad qualitative assessment of each project and reflects both the climate and environmental ambitions of the bond and the robustness of the governance structure.²⁸

CICERO’s approach ranges from dark green for investments “that realize the long-term vision of a low-carbon and climate-resilient future already today” (e.g., solar and wind energy), to medium green for investments “that represent steps toward the long-term vision, but are not quite there yet” (e.g., buildings with good but not excellent energy efficiency ratings), to light green for investments “that are environmentally friendly but are not by themselves a part of the long term vision.”²⁹

In early 2016, Moody’s introduced a standardized approach for the evaluation of green bonds – its Green Bond Assessment (GBA) evaluation and research service – separate from its credit ratings, with an assessment based on five factors: (1) organization (qualifications and management), (2) the use of proceeds, (3) disclosure on the use of proceeds, (4) the management of proceeds, and (5) ongoing reporting and disclosure.³⁰

Also in 2016 the credit rating agency Standard & Poor’s proposed a green bond evaluation tool to “provide a second opinion, plus a relative green impact score on capital market instruments targeted at financing environmentally beneficial projects.” According to S&P:

The Green Evaluation is not a credit rating, and it does not consider credit quality or factor into our credit ratings. ... A Green Evaluation is based on three scores – a transparency score, a governance score, and a mitigation score (environmental impact) or adaptation score (resilience level).³¹

In addition, a number of consultancies, such as Vigeo EIRIS, Sustainalytics, and Oekom, offer assessments of the sustainability credentials of green bond issuers. For example, Vigeo EIRIS assesses ESG issues using a four-point scale (advanced,

²⁶ Climate Bonds Initiative (2017b).

²⁷ See <http://www.cicero.uio.no/en/posts/news/cicero-expands-work-with-green-bonds>

²⁸ See CICERO (2016).

²⁹ See CICERO (2015).

³⁰ See Moody’s (2016).

³¹ See S&P Global (2017).

robust, limited, and weak) and evaluates the issuer's ability to deliver on its commitments.³²

As the green bond market develops and matures, despite the persistent demand for green bonds, investors may continue to press for a standardized approach to issuance.³³ Recent controversy over a “green bond” issued by Repsol, an oil company, highlights the need for more rigorous standards in terms of “what is green” as well as a consensus about the kind of investments necessary for the transition to a low-carbon, climate-resilient economy.³⁴

2.4 Green Bonds for Cities' Finance

As the global population becomes increasingly urbanized, cities represent important focal points in terms of bearing physical climate risks as well as for mobilizing low-carbon, climate-resilient investment.³⁵ World Bank data indicate that only about 4% of cities in developing countries are creditworthy in terms of access to international capital markets and 20% can access local debt markets.³⁶

The OECD (2017b) provides a breakdown of the barriers related to framework conditions and an enabling environment for green infrastructure as well as potential barriers specific to green bond market growth. Cities in developing countries often face additional barriers in gaining access to capital. Currently only a small fraction of the total flows in the green bond market has moved towards cities in developing countries.³⁷ Despite these limitations, cities can access the green bond markets in other ways. According to the Climate Policy Initiative, these options include: city- or municipality-based infrastructure development companies that can help cities to raise finance in developing countries, often with central government guarantees; public-private partnerships with corporations or commercial banks; and domestic, bilateral, and multilateral development finance institutions (DFIs).³⁸

3. NORDIC ISSUANCE OF GREEN BONDS

For decades, beginning in the 1970s, Sweden, Norway, Denmark, and Finland have been leaders in environmental policy, regulation, societal awareness, and behavioral changes consistent with a sustainable economy.³⁹ The Nordic countries have also been pioneers in using green bonds to mobilize capital for sustainability goals.

Among the leading issuers of green bonds are the City of Gothenburg, Kommuninvest (Sweden), Kommunalbanken (Norway), Kommunekredit (Denmark), and MuniFin (Finland).⁴⁰

³² See <http://www.vigeo-eiris.com/vigeo-eiris/methodology-quality-assurance/?lang=en>

³³ See Flood (2017).

³⁴ Cripps (2016), Ellsworth (2016), and Mullin (2017).

³⁵ C40 Climate Leadership Group (2016).

³⁶ World Bank (2013).

³⁷ Oliver (2016a).

³⁸ Oliver (2016b).

³⁹ For an overview of the Scandinavian economies, see McCormick, Richter, and Pantzar (2015).

⁴⁰ For a detailed analysis of the Nordic public sector green bonds market, see Climate Bonds Initiative (2018).

3.1 Subnational Pooled Financing Mechanisms

A key principal financial innovation in the Nordic region is the use of an innovative financing mechanism to raise investment. As the FMDV, an international alliance of local and regional governments, notes:

Local and regional governments often cannot access the funding needed for projects that are essential public services, given the lack of national funding available, the lack of access to public markets, limited availability of domestic long-term debt for such purposes, and the need for support in developing viable projects. In addition, since many local projects are small in total costs (less than US\$5 million) they lack the scale to attract and secure funding.⁴¹

Subnational pooled financing mechanisms or SPFMs “have been successfully used since 1898 in securing finance for both large and small local projects, securing over \$1 trillion in finance in the US and Europe, and over \$2.6 billion in developing countries.”⁴²

An SPFM works by aggregating the financial needs of its members into a pooled financing agency (PFA), which can then issue debt and distribute the proceeds from the borrowing or bond offering to its sub-national members. Examples of Nordic PFAs include Kommuninvest (Sweden), Kommunalbanken and KLP Kommunekreditt AS (Norway), KommuneKredit (Denmark), and MuniFin (Finland).

Sweden’s Kommuninvest illustrates this model. As S&P explains in its rating opinion:

The local governments that belong to [Kommuninvest Cooperative Society (KCS)] must sign a joint and several guarantee to cover Kommuninvest’s financial commitments to become a member of Kommuninvest. The guarantee ... passes on all financial risks to Kommuninvest’s member local governments. A pro rata right of recourse agreement reduces a member’s ultimate responsibility to its own share of any liability on which Kommuninvest defaults. The joint and several guarantee commitment from Kommuninvest’s members underpins our ratings on the agency.⁴³

For both developed and developing countries, SPFMs offer a number of attractions. First, they reduce the fiscal burden on national governments of having to support sub-national entities, which can now access capital on their own, and they enable sub-national governments to broaden their sources of capital, as they can now tap private investment. Second, SPFMs can lower the costs of infrastructure projects by reducing the perceived risk through the creation of a consolidated financial entity that can borrow on the capital markets, lower financing costs due to diversified risk at the aggregate level, lower project development costs when it is possible to standardize projects, and lower the costs of monitoring and reporting the use of proceeds through the use of shared approaches (such as the common Nordic public sector issuers’ approach to green bonds described above in this paper).⁴⁴

⁴¹ FMDV (2015, 6).

⁴² Ibid.

⁴³ S&P Global Ratings Direct (2017, 1, 3). Also see Moody’s (2017c).

⁴⁴ From FMDV (2015).

In addition, the SPFM structure can improve project quality and creditworthiness by strengthening the technical capacity, which may not be present at the local level, enabling greater transparency for monitoring and reporting, and reducing the burden on local government staff, who can then spend more time providing necessary local services.⁴⁵

While SPFMs offer numerous benefits, they require supportive legal, regulatory, and institutional frameworks at the national level (such as a national law allowing sub-national entities to borrow).⁴⁶ SPFMs require a legal system that allows local entities to borrow, cooperate, and assume financial commitments jointly. In addition, to be viable, SPFMs need to aggregate the financing needs of local authorities with sufficiently strong underlying creditworthiness to support the SPFM as an aggregate financing mechanism.⁴⁷

Private sector entities have also used this pooled financing model. In Sweden a group of property companies formed a joint venture, SFF, as a funding vehicle with the purpose “to efficiently procure capital on the capital market.”⁴⁸ SFF follows a similar aggregation model by raising funds via the bond market then on-lending to sub-companies at lower rates in bond markets than would otherwise be available for the sub-companies.

The examples described below enable a more detailed discussion of the SPFM financing structure.

3.2 Gothenburg (Sweden) – First City Green Bond Issuer

In 2013, the City of Gothenburg became the first city⁴⁹ and the first Nordic issuer to issue an SEK500 million (\$77 million) green bond, the proceeds of which were used to fund public transport, water management, energy, and waste management projects.⁵⁰ In 2014, Gothenburg returned to the market with an SEK1.8 billion (\$273 million) bond; and in 2015 the city issued an SEK1 billion (\$126.6 million) bond. The city returned to the green bond market in 2016 and 2017. Gothenburg forecasts the issuance of SEK12.7 billion (\$1.46 billion) for green investments by 2019.⁵¹ Gothenburg’s green bond program funds projects for climate change mitigation, adaptation, and sustainability initiatives based on its green bond framework.⁵² In 2016, Gothenburg won the UNFCCC’s Momentum for Change award for its green bond program.⁵³

⁴⁵ Ibid.

⁴⁶ Op. cit., 11–12.

⁴⁷ Op. cit., 19.

⁴⁸ See <https://www.svenskfastighetsfinansiering.se/investor-relations/grona-obligationer>

⁴⁹ See http://unfccc.int/secretariat/momentum_for_change/items/9935.php

⁵⁰ See <http://finans.goteborg.se/en/greenbonds/> and SEB (2013).

⁵¹ See City of Gothenburg (2016), *Current and Expected Green Projects*, 16.

⁵² Annex B provides the City of Gothenburg’s green bond framework as an illustrative example.

⁵³ See <http://newsroom.unfccc.int/climate-action/2016-momentum-for-change-lighthouse-activities/>

According to the City of Gothenburg's Head of Treasury, Magnus Borelius, the city took the initial decision to issue a green bond based on an interest in exploring green bonds as a way to raise capital for the city's sustainability program investments.⁵⁴ The city has also experienced a better demand for its green bond offerings than its ordinary bonds and has broadened its investor base.⁵⁵ An additional benefit of the green bond program has been to improve collaboration between the city's finance and environmental departments, which today work much more closely and effectively together as a result of the program.⁵⁶

3.3 Vasakronan (Sweden) – First Corporate Issuer

Buildings use nearly 40% of the energy produced by society⁵⁷ and represent 30% of global energy-related CO₂ emissions.⁵⁸ Vasakronan is Sweden's largest property company, with properties in Stockholm, Uppsala, Gothenburg, and Malmö.⁵⁹ In 2013, Vasakronan was the world's first corporate green bond issuer,⁶⁰ and it remains the largest corporate green bond issuer in Sweden with SEK5.2 billion in green bonds outstanding.⁶¹

Vasakronan has committed to fulfilling a sustainability mandate with a focus on financial, environmental, and social dimensions based on the principles in the UN Global Compact, including taking "a precautionary approach to environmental challenges," undertaking "initiatives to promote greater environmental responsibility," and encouraging the "development and diffusion of environmentally friendly technologies," which provides a framework for the company's green financing program.⁶²

The company has elaborated a sustainability program with specific environmental, financial, and social performance targets set as part of a plan each year, reporting in accordance with the Global Reporting Initiative.⁶³ As a result of these initiatives, Vasakronan reduced the carbon emissions from its portfolio by 97% between 2006 and 2013 and reduced its energy use by 30% over the same period.⁶⁴

3.4 Kommuninvest (Sweden)

The Kommuninvest Cooperative Society (Kommuninvest i Sverige AB) is a voluntary membership organization that is jointly owned by local government authorities (288 municipalities and county councils/regions out of 310 local governments) and

⁵⁴ Comment by Magnus Borelius, Head Treasurer of the Treasury, the City of Gothenburg, at the Climate KIC green finance workshop. See Climate KIC (2017).

⁵⁵ Comment by Magnus Borelius, email correspondence with the author, 13 December 2017.

⁵⁶ See Sustainia and C40 Climate Leadership Group (2015, 100).

⁵⁷ See <http://en.vasakronan.se/files/2011/09/GRI-summary-2015.pdf>

⁵⁸ UNEP (2016, 8).

⁵⁹ See <http://en.vasakronan.se/welcome-to-vasakronan/sustainability>

⁶⁰ Vasakronan (2013).

⁶¹ Vasakronan (2016).

⁶² See <http://en.vasakronan.se/files/2011/09/GRI-summary-2015.pdf>

⁶³ See <http://en.vasakronan.se/files/2011/09/GRI-summary-2015.pdf>

⁶⁴ Excerpt from Bondholders' Report 2013-12-31, included in the presentation by Anna Denell (2017).

is the largest lender to local governments in Sweden and the sixth-largest credit institution in Sweden.⁶⁵

As a local government-funding agency, Kommuninvest acts as an aggregator and conduit issuer to Swedish local governments as its members. This approach enables Kommuninvest to provide lower-cost funding to local governments than commercial banks “to obtain economies of scale by aggregating local government funding needs through a joint funding vehicle, supported by an unlimited, joint and several guarantee from the owners (Swedish local governments with tax-raising capabilities).”⁶⁶ Kommuninvest can access capital markets at a lower cost of debt than its members can, because its members offer a joint guarantee for its liabilities.⁶⁷

In May 2017, Kommuninvest issued its third green bond, for \$500 million, following its inaugural issuance in March 2016 for \$600 million and its second green bond, for SEK5 billion, the largest Nordic green bond to date,⁶⁸ in October 2016.⁶⁹ Kommuninvest uses the proceeds from its green bond capital raising to on-lend to Swedish municipalities in the form of green loans, which they then use for investment in environmental projects that meet approved criteria.

3.5 Kommunalbanken (Norway)

Kommunalbanken (KBN) is Norway’s largest lender to local governments and has an active green bond and green loan program.⁷⁰ It is Norway’s SPFM for municipal lending. As of the year-end 2016, KBN had raised over \$1 billion through three green bond issuances and had an outstanding portfolio of \$1.13 billion.⁷¹

KBN’s Impact Report details the environmental impact of its loans to projects in renewable energy, energy efficiency, new green buildings, low-carbon transportation, waste management, water and wastewater management, sustainable land use, and climate change adaptation.⁷² In June 2016, KBN updated its green bond framework based on the Green Bond Principles⁷³ as well as supplemental criteria for project selection and reporting.⁷⁴

3.6 KommuneKredit (Denmark)

KommuneKredit serves as a municipal credit aggregation agency in Denmark and is similar in function to Kommuninvest in Sweden and Kommunalbanken in Norway.⁷⁵ In May 2017, KommuneKredit launched its inaugural green bond, for EUR 500 million, to

⁶⁵ Kommuninvest (2017).

⁶⁶ OECD, ICMA, CBI, and GFC (2016, 35).

⁶⁷ For details on Kommuninvest’s model, see Schnitzler (2017).

⁶⁸ Kommuninvest (2016).

⁶⁹ Ibid.

⁷⁰ See Kommunalbanken (2017a). Also see <http://www.kommunalbanken.no/en/funding/green-bonds> and <http://www.kommunalbanken.no/en/funding/green-bonds/development-of-green-issuance>

⁷¹ Kommunalbanken (2017b).

⁷² Kommunalbanken (2017c).

⁷³ Kommunalbanken (2016a).

⁷⁴ Kommunalbanken (2016b).

⁷⁵ See http://kommunekredit.com/Files/Filer/KK_uk/pdf/act_on_kk.pdf

finance projects in water management, district heating, energy efficiency, and clean transportation.⁷⁶

Ahead of the issuance, KommuneKredit implemented a green bond framework.⁷⁷ In its second opinion of KommuneKredit's green bond framework, CICERO writes:

Overall, KommuneKredit's Green Bond Framework provides a clear and sound framework for climate-friendly investments. The framework lists eligible categories of projects that are supportive of the objective of promoting a transition to low-carbon and climate-resilient growth and is supported by a strong governance structure. However, the Green Bond framework would benefit from a clearer requirement of impact reporting against standard indicators and external review or verification. Also, partly due to the mandate and nature of KommuneKredit's activities, the eligible project categories are quite general and it is difficult to ascertain that only best available technologies and solutions will be selected.⁷⁸

3.7 MuniFin (Finland)

As Finland's municipal credit agency, MuniFin represents one of the largest financial institutions in Finland and the main provider of financial services to Finland's local government and public housing sectors. The Municipal Guarantee Board, which the owners of MuniFin – the municipalities, municipal federations, and municipality-owned companies, Keva, a local public sector pension fund, and the Finnish national government – jointly hold, guarantees MuniFin's debt.⁷⁹

In October 2016, following the development of the green bond framework and the second opinion from the Stockholm Environment Institute and CICERO,⁸⁰ MuniFin issued Finland's first green bond, for \$500 million. Eligible projects under the framework included renewable energy, sustainable buildings, public transportation, energy efficiency, water and wastewater management, waste management, and environmental management.⁸¹

Distinct among the Nordic issuers, MuniFin offers a margin discount to its borrowers depending on how "green" the project is, with projects qualified as "light/medium/darker green" qualifying for progressively larger margin discounts for municipal borrowers. These discounts provide a financial incentive to propose projects that help more with environmental sustainability. "The greener the project, the bigger the discount."⁸² In 2017, MuniFin won recognition from the Climate Bonds Initiative in the new country green bond issuance category.⁸³

⁷⁶ Kommunekredit (2017).

⁷⁷ See <https://www.kommunekredit.dk/en/green-bonds/green-bond-framework/>

⁷⁸ CICERO (2017).

⁷⁹ See https://www.munifin.fi/sites/default/files/page/field_file/munifin_presentation_2017_green_september_0.pdf

⁸⁰ See https://www.munifin.fi/sites/default/files/page/field_file/second_opinion_munifin_070917_0.pdf

⁸¹ See https://www.munifin.fi/sites/default/files/page/field_file/munifin_presentation_2017_green_september_0.pdf

⁸² See <https://www.munifin.fi/green-bond>

⁸³ See <https://www.munifin.fi/recents/news/2017/03/07/munifin-receives-climate-bonds-initiatives-2017-green-bond-pioneer-award>

4. CURRENT PRACTICE IN IMPACT REPORTING

The ongoing reporting of the post-issuance use of green bonds' proceeds is a key element of good practice in the green bond market under the Green Bond Principles, the Climate Bonds Initiative's Standard & Certification Scheme, and other evaluative assessments.

In 2017, Gothenburg issued its first Green Bond Impact Report, which states:

There are currently no established standards or models in regards to impact reporting of projects financed with Green Bonds. The City of Gothenburg is continuously working on developing and improving the methods of reporting the climate and environmental impacts of its projects financed with Green Bonds to its investors. The city is also actively contributing to harmonization efforts regarding impact reporting of Green Bonds.⁸⁴

The City of Gothenburg has also recently collaborated with other Nordic issuers to develop a harmonized approach to impact reporting.⁸⁵ The aim of this exercise was to develop a practical guide for public sector green bond issuers and to strike a balance between (a) a commitment to delivering impact reporting at a certain, manageable, level and (b) having detailed and correct numbers on the project level and in the local context.⁸⁶

In October 2017, a group of Nordic public sector issuers, including the City of Gothenburg, Kommunalbanken, Kommuninvest, MuniFin, the Swedish Export Credit Agency (SEK), and six Swedish municipal or regional issuers, including the municipalities of Lund, Norrköping, and Örebro, Region Skåne, and Stockholm County Council, issued a guide for impact reports regarding Nordic public sector green bond issuances. The paper, which took over a year to develop, provides key impact reporting principles regarding financial, environmental, and procedural aspects of green bonds issuance and thereby provides a common basis for reporting the environmental benefits of green bond issuance. It also potentially provides an opportunity for issuers in other parts of the world, including Asia, to leapfrog in terms of best practice on green bond reporting.

The key financial aspects include reporting on the basis of the share of the project's total investment cost that the issuer has financed with green bonds and reporting on the impact based on the amounts disbursed and outstanding as opposed to the amounts committed to a project. The environmental reporting aspects include statements that issuance should report on direct environmental impacts as well as indirect effects (such as avoided emissions), commit to reporting the expected impact calculated prior to issuance, describe the net benefits, and highlight the methodologies used and potential uncertainties. Under the guidelines the procedural aspects include annual reporting for issuers with dynamic portfolios.⁸⁷

⁸⁴ City of Gothenburg (2017, 3).

⁸⁵ Comment by Sara Pettersson, presentation at the Climate KIC green finance workshop, Gothenburg. See Climate KIC (2017).

⁸⁶ Sara Pettersson, Climate and Environment Coordinator, City of Gothenburg, communication with the author, 18 January 2017.

⁸⁷ Nordic Public Sector Issuers (2017).

According to Kommuninvest, the Nordic position paper “provides suggestions for metrics and indicators relevant to eight different project categories. This effort builds upon reporting approaches suggested by the Green Bond Principles and multilateral development banks, but adds indicators for categories such as clean transportation and green buildings, that have previously not been addressed.”⁸⁸

4.1 Role of Nordic Investors

In addition to their leading role as issuers, Nordic investors have taken a central position as investors in green bonds. As a recent report by the Nordic Council of Ministers (2017) notes:

... within the Nordic countries, Swedish institutions have been the most active in issuing green bonds ... and Swedish investors are among the pioneers in green bonds. Large scale institutional investors such as various Swedish pension funds have included green bonds in their financial strategy. For example, the Second AP Fund (Andra AP-fonden, AP2) has set a specific allocation of 1% of its total strategic portfolio for green bonds. ... AP4 also participated in the issuance of 14 new green bonds as part of its focus area of climate change and sustainability, representing around 1% of the global primary market. ... Local investors, such as Kommuninvest, the local governments’ credit provider, has also [issued] the largest Nordic green bond to date, focused on adaptation.

The strong engagement of both issuers and investors, as well as the SPFM financing structure demonstrated through several examples in the region, has made the Nordic green bond market a global benchmark for other countries and sub-national markets.

5. POTENTIAL OPPORTUNITIES FOR NEW ISSUERS IN ASIA AND THE PACIFIC

5.1 Preliminary Estimates of the Scale of the Opportunity

As noted above, the need to mobilize significant amounts of capital to finance the transition to a sustainable low-carbon economy will be significant. According to the Asian Development Bank (ADB), developing countries in Asia will need to invest an estimated \$26 trillion by 2030, or \$1.7 trillion per year, in infrastructure, including \$4.7 trillion for power and \$8.4 trillion for transportation, to maintain growth, eliminate poverty, and address climate change.⁸⁹

The OECD estimates the potential green bond contributions in a low-carbon transition from renewable energy, energy efficiency in buildings, and electric vehicles in the US, Europe, the PRC, and Japan, including a methodology to estimate how countries could finance these investments, including the use of green bonds.⁹⁰ Under the OECD’s methodology, it is possible to finance approximately half of the low-carbon investment needs with debt (\$1.16 billion annual low-carbon debt-financing needs out of

⁸⁸ <http://kommuninvest.se/2017/10/press-release-nordic-issuers-release-guide-on-green-bonds-impact-reporting/>

⁸⁹ See ADB (2017). According to DBS and UN Environment (2017), the “demand for additional ASEAN green investment from 2016 to 2030 is an estimated US\$3 trillion,” including “infrastructure (\$1,800 billion), renewable energy (\$400 billion), energy efficiency (\$400 billion) and food, agriculture and land use (\$400 billion).”

⁹⁰ OECD (2016, 17) and OECD (2017b)

\$2.26 billion in annual low-carbon investment needs in 2035), of which about 50%–60% can be financed using bonds (53%–62% or \$623–\$720 annual low-carbon bond issuance potential).

Applying this approach to Asia's infrastructure needs, the estimated green bond potential would be approximately \$425 billion per year in Asia (\$1.7 trillion, of which half is debt and half is bonds).⁹¹ This level of issuance would equate to roughly four times the current annual level of issuance of global green bonds, underscoring the significant potential for growth of green bonds in the region. The OECD's analysis makes different assumptions for different regions, and the development of the green bond market requires general market conditions in each jurisdiction. A more detailed analysis of the market environments of Asian countries would be an important topic for future research.

5.2 Recent Trends in the PRC

In September 2016, the People's Bank of China (PBOC), along with the ministries of finance and environmental protection, the National Development and Reform Commission (NDRC), and the banking, insurance, and securities commissions, released the *Guidelines for Establishing the Green Financial System*.⁹² The Guidelines emphasize the priority of establishing a green financial system, including "financial instruments such as green credit, green bonds, green stock indices and related products, green development funds, green insurance, and carbon finance, as well as relevant policy incentives to support the green transformation of the economy."⁹³

Further, the guidelines underscore the important role of creating market conditions supportive of green bonds as well as other green securities.⁹⁴ Studies have interpreted the significant emphasis placed on green finance, and green bonds in this context, as a strong signal of the government's commitment to aligning its economic and financial system with environmental sustainability goals in the context of the national planning objectives.⁹⁵

In 2016, the PRC issued seven of the 10 largest green bonds of the year and raised \$33.7 billion, over one-third of the year's issuance.⁹⁶ A number of factors have driven the rapid development of the PRC's green bond market by including political support for green finance as part of the country's Thirteenth Five-Year Plan, supportive regulatory policy around green bond issuance from the PBOC, NDRC, Shanghai Stock Exchange, Shenzhen Stock Exchange, and National Association of Financial Market Institutional Investors, and momentum following earlier green bond issuances.⁹⁷

⁹¹ Author's calculations.

⁹² People's Bank of China (2016).

⁹³ Ibid.

⁹⁴ See Annex C.

⁹⁵ For example, see Landesbank Baden-Württemberg (2017, 6).

⁹⁶ South China Morning Post (2017).

⁹⁷ Wang and Zhang (2017).

5.3 Issuance in India

India has experienced recent growth in its green bond market. India is among the top 10 green issuers in the world, with issuances of \$6.1 billion, a third of which came to the market in 2017, according to the Climate Bonds Initiative.⁹⁸ Regulatory support has helped to boost the market. Earlier in 2017 the Security and Exchange Board of India (SEBI) released guidelines for green bonds related to issuance, impact reporting, and mobilizing financial markets⁹⁹ as well as the disclosure of the environmental objectives of the green bond.¹⁰⁰

According to a law firm, following the development of the green bond market in India, “The Green Bond Guidelines will give an impetus and add immense credibility to an innovative financial product which has already established its success in both international and domestic markets.” In December, Indian Railways raised \$500 million through a green bond issuance that it listed on the London Stock Exchange.

6. CONCLUSION

The rapid ascent of the PRC to a leadership position in the global green bond market, the recent launch of green bond guidelines by the Ministry of Environment in Japan,¹⁰¹ the continued progress in India, and the ASEAN Capital Markets Forum's (ACMF) recent adoption of the green bond standards of the Association of Southeast Asian Nations (ASEAN) underscore the potential for future growth in green bond markets in Asia.¹⁰²

Given the momentum in favor of green bonds in Asia in the broader context of investors' interest in sustainable development as a theme, policymakers in Asia have a significant opportunity to build on the Nordic countries' experience with green bonds. The applicability of similar pooled funding approaches, including the feasibility of sub-national entities forming pooled financing mechanisms backed by joint guarantees as a way to access capital markets, requires further exploration in Asia. By establishing funding mechanisms, such as SPFMs, building on the example of local funding agencies in the Nordic countries, policymakers can tap into investors' appetite for green bonds at the local and regional levels as a way to mobilize capital for sustainability investments. SPFM structures can facilitate financial aggregation and on-lending to sub-national borrowers based on green investment criteria.

To assess the feasibility of such an approach, it will be important to determine whether legal, regulatory, and financial conditions are present that would allow the replication of a pooled financing model similar to that in the Nordic region. Prospective members of such a vehicle would need to be able to borrow, be part of a larger organization that can access capital markets (i.e., a pooled vehicle), and be able to form joint and several guarantees. The technical capacity to identify, manage, and monitor green investments within a larger set of investments will also be important. In addition, sound

⁹⁸ See <https://www.climatebonds.net/2017/08/india-events-focus-green-finance-regulation-adds-fillip-munis-get-reboot-look-more-bond>

⁹⁹ See <https://economictimes.indiatimes.com/markets/stocks/news/sebi-finalises-norms-for-listing-of-green-bonds/articleshow/58444005.cms>

¹⁰⁰ See <https://economictimes.indiatimes.com/markets/stocks/news/sebi-finalises-norms-for-listing-of-green-bonds/articleshow/58444005.cms>

¹⁰¹ MOEJ (2017).

¹⁰² ASEAN (2017a, 2017b).

underlying fundamentals, such as stable and supportive relationships with national-level institutions and reliable and effective tax collection, will be critical.

As regional capital markets deepen, policymakers have an opportunity to foster a supportive regulatory environment supportive of green bond issuance. Growth in dedicated Asian funds that invest in green bonds, bolstered by the increased interest in green finance, will also accelerate the market development.¹⁰³ Importing approaches from northern Europe, where countries have proven that they work and that positive systemic externalities accompany them, such as broader investor engagement in sustainability, offers the potential to help bring developing Asia closer to meeting its significant needs for investment in a low-carbon, sustainable infrastructure.

¹⁰³ See <https://www.globalcapital.com/article/b160gl6z8hsd9r/asian-green-bonds-more-catching-up-needed>

REFERENCES

- ASEAN. 2017a. "Capital Market Regulators Launch ASEAN Green Bond Standards to Drive Sustainable Investments." 8 November. http://www.theacmf.org/ACMF/upload/media_release_asean_green_bond.pdf
- . 2017b. "ASEAN Green Bond Standards." http://www.theacmf.org/ACMF/upload/ASEAN_Green_Bond_Standards.pdf
- Asian Development Bank (ADB). 2017. *Meeting Asia's Infrastructure Needs*. Manila: Asian Development Bank. <https://www.adb.org/sites/default/files/publication/227496/special-report-infrastructure.pdf>
- Bhattacharya, A., J.P. Meltzer, J. Oppenheim, Z. Qureshi, and Lord N. Stern. 2016. *Delivering on Sustainable Infrastructure for Better Development and Better Climate*. Washington, DC: Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/12/global_122316_delivering-on-sustainable-infrastructure.pdf
- Bielenberg, A., M. Roberts, M. Kerlin, and J. Oppenheim. 2016. *Financing Change: How to Mobilize Private-Sector Financing for Sustainable Infrastructure*. New York: McKinsey & Co. <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/next-generation-of-infrastructure>
- C40 Climate Leadership Group. 2016. "Deadline 2020." <http://www.c40.org/researches/deadline-2020>
- CICERO. 2015. "CICERO Grades Second Opinions with Shades of Green." 30 April 2015. <http://www.cicero.uio.no/en/posts/single/cicero-grades-climate-friendly-bonds-with-shades-of-green>
- . 2016. "CICERO Expands Work with Green Bonds." 12 February 2016. <http://www.cicero.uio.no/en/posts/news/cicero-expands-work-with-green-bonds>
- . 2017. "Second Opinion on KommuneKredit's Green Bond Framework." 7 April 2017. <https://www.kommunekredit.dk/wp-content/uploads/2017/09/KommuneKredit-SecondOpinionfromCicero-7April2017.pdf>
- Cities Climate Finance Leadership Alliance (CCFLA). 2015. "The State of City Climate Finance 2015." <http://www.citiesclimatefinance.org/wp-content/uploads/2015/12/CCFLA-State-of-City-Climate-Finance-2015.pdf>
- City of Gothenburg. 2015. "Green Bond Framework." <http://finans.goteborg.se/en/greenbonds/green-bond-framework/>
- . 2016. "Market Update 2016." <http://finans.goteborg.se/wpui/wp-content/uploads/2013/03/Market-update-2016.pdf>
- . 2017. "Impact Report 2016." <http://finans.goteborg.se/en/greenbonds/investor-reporting/impact-report/> and <http://finans.goteborg.se/wpui/wp-content/uploads/2016/06/Impact-Report-20161.pdf>
- Climate Bonds Initiative. 2015. "Institutional Investors Issue Paris Green Bonds Statement." <https://www.climatebonds.net/resources/press-releases/institutional-investors-paris-green-bonds-statement>
- . 2016. "Spotlight on France: Leading on Green Finance and Sustainable Investment." 1 December 2016. <https://www.climatebonds.net/2017/02/spotlight-france-leading-green-finance-and-sustainable-investment>

- . 2017a. “Bonds and Climate Change: State of the Market 2017.” <https://www.climatebonds.net/resources/reports/bonds-and-climate-change-state-market-2017>
- . 2017b. Green Bond Pricing in the Primary Market: January 2016–March 2017. https://www.climatebonds.net/files/files/Greenbond_Pricing_Jan_16-March_17.pdf
- . 2018. Nordic and Baltic Public Sector Green Bonds. <https://www.climatebonds.net/resources/reports/nordic-and-baltic-public-sector-green-bonds>
- Climate KIC. 2017. “Green Finance Workshop, 21–22 March 2017.” <http://www.climate-kic.org/events/green-finance-workshop/>
- Cripps, P. 2016. 50 Shades of Green Bonds – And 50 Ways of Assessing Them.” *Environmental Finance*, 29 December 2016. <https://www.environmental-finance.com/content/analysis/50-shades-of-green-bonds-and-50-ways-of-assessing-them.html>
- DBS and UN Environment. 2017. “Green Finance Opportunities in ASEAN.” <https://www.dbs.com/sustainability/responsible-banking/sustainable-finance/green-finance-opportunities-in-asean/default.page>
- Denell, A. (2017). Bonds and Green Investments in Cities. Presentation by the Sustainability Director at Vasakronan given at Climate-KIC green bonds workshop in Gothenburg, 21-22 March 2017. <http://www.climate-kic.org/events/green-finance-workshop/>
- Ellsworth, P. 2016. “A Response to the Article: 50 Shades of Green Bonds – And 50 Ways of Assessing Them.” *Environmental Finance*, 9 January 2017. <https://www.environmental-finance.com/content/analysis/a-response-to-the-article-50-shades-of-green-bonds-and-50-ways-of-assessing-them.html>
- EU High Level Expert Group. 2017. “Financing a Sustainable European Economy.” Interim Report by the High-Level Expert Group on Sustainable Finance, July 2017. https://ec.europa.eu/info/sites/info/files/170713-sustainable-finance-report_en.pdf
- Flood, C. 2017. “Green Bonds Need Global Standards.” *Financial Times*, 8 May 2017. <https://www.ft.com/content/ef9a02d6-28fe-11e7-bc4b-5528796fe35c>
- FMDV. 2015. *The Potential Catalytic Role of Subnational Pooled Financing Mechanisms*. July. Paris: FMDV/AFD. <https://collaboration.worldbank.org/docs/DOC-14805> and http://www.urbanet.info/wp-content/uploads/2016/08/FMDV_Policy-Paper_-SPFM-ENG.pdf
- French Ministry of Environment, Energy and the Sea. 2016. “Energy and Ecological Transition for the Climate Label, Criteria Guidelines.” http://www.novethic.com/fileadmin/user_upload/divers/labels/1605-LabelTEEC_Referentiel-ENG.pdf
- G20 Green Finance Study Group. 2017. “Recommendations by G20 Green Finance Study Group.” <http://bit.ly/2AhwehZ> and http://unepinquiry.org/wp-content/uploads/2017/07/2017_Synthesis_Report_Summary_EN.pdf
- Global Commission on the Economy and Climate. 2014. “Better Growth, Better Climate: The New Climate Economy Report, The Synthesis Report.” http://static.newclimateeconomy.report/wp-content/uploads/2014/08/NCE_SynthesisReport.pdf

- HSBC. 2017. "Sustainable Financing Newsletter, Edition 4 – April 2017." London: HSBC. <http://www.gbm.hsbc.com/solutions/sustainable-financing/edition4-newsletter-april-2017>
- Hirtenstein, A. 2017. "Green Bond Giant Awakened by Countries Spending to Save Climate." *Bloomberg*, 20 January 2017. <https://www.bloomberg.com/news/articles/2017-01-20/green-bond-giant-awakened-by-countries-spending-to-save-climate>
- Kommunalbanken. 2016a. "KBN Green Bonds Framework." June 2016. <http://www.kommunalbanken.no/en/funding/green-bonds/framework-and-selection-criteria> and <http://www.kommunalbanken.no/media/231470/kbn-green-bond-framework.pdf>
- . 2016b. "Green Lending Program – Criteria Document (KBN Green Bonds: Supplementary Guidelines for Project Selection, Documentation and Reporting)." <http://www.kommunalbanken.no/media/231471/kbn-supplement-document-for-project-selection-documentation-and-reporting.pdf>
- . 2017a. "Annual Report 2016." http://www.kommunalbanken.no/media/231809/annual-report-2016_kbn.pdf
- . 2017b. "Our Green Bond Impact." 31 March 2017. <http://www.kommunalbanken.no/en/news-media/news-and-press-releases/2017/our-green-bond-impact>
- . 2017c. "Environmental Impact Report 2016." <http://www.kommunalbanken.no/media/231800/environmentalimpactreport2016-web.pdf>
- Kommuninvest. 2017. "Kommuninvest Now Behind the Three Largest Green Bonds Ever Issued out of Sweden." 17 May 2017. <http://kommuninvest.se/2017/05/press-release-kommuninvest-now-behind-the-three-largest-green-bonds-ever-issued-out-of-sweden/>
- . 2016. "Kommuninvest Issues Largest Nordic Green Bond to Date." 15 March 2016. <http://kommuninvest.se/2016/03/kommuninvest-issues-largest-nordic-green-bond-to-date/>
- . 2017. "KommuneKredit Launches Inaugural Green Bond." 24 May. <http://kommunekredit.com/News/News/News.aspx?Action=1&NewsId=930&M=NewsV2&PID=1685>
- Landesbank Baden-Württemberg. 2017. "Sustainable Action. Everything You Need To Know about Green Bonds." 3 January. <http://bit.ly/2AiGR41>
- March, R. 2017. "6 Benefits to Companies that Issue Green Bonds." *Eco-business*. <http://www.eco-business.com/opinion/6-benefits-to-companies-that-issue-green-bonds/>
- McCormick, K., J.L. Richter, and M. Pantzar. 2015. *Greening the Scandinavian Economy*. Lund: Lund University. http://portal.research.lu.se/ws/files/7509153/201604_Course_Compendium.pdf
- Ministry of Environment, Japan (MOEJ). 2017. "Green Bond Guidelines, Summary." 28 March 2017. <https://www.env.go.jp/en/policy/economy/gb/summary2017.pdf>
- Moody's. 2016. "Moody's Launches New Green Bond Assessment Service." 30 March 2016. https://www.moody's.com/research/Moodys-launches-new-Green-Bond-Assessment-service--PR_346590 and https://www.moody's.com/research/Moodys-publishes-methodology-on-Green-Bonds-Assessment--PR_346585

- . 2017a. “Global Green Bond Issuance in 2017 Eclipses 2016 Record.” 9 November. https://www.moodys.com/research/Moodys-Global-green-bond-issuance-in-2017-eclipses-2016-record--PR_375206
- . 2017b. “Global Green Bond Issuance Could Rise to USD206B in 2017 after Record in 2016.” 18 January. https://www.moodys.com/research/Moodys-Global-green-bond-issuance-could-rise-to-USD206B-in--PR_360880
- . 2017c. “Credit Opinion, Kommuninvest i Sverige Aktiebolag, Semiannual Update.” 28 September. <http://kommuninvest.se/wp-content/uploads/2017/10/Moodys-Credit-Opinion-September-2017.pdf>
- Morgado, N.C., and J. Casado-Asensio. 2015. “Build More, Build Right: Development Finance, Infrastructure and Climate Change.” OECD Observer No. 304. November 2015. http://oecdobserver.org/news/fullstory.php/aid/5360/Build_more,_build_right:_Development_finance,_infrastructure_and_climate_change.html
- Mullin, K. 2017. “Time the Green Bond Market Grew Up.” *Environmental Finance*, 5 June 2017. <https://www.environmental-finance.com/content/analysis/time-the-green-bond-market-grew-up.html>
- Munro, P. 2016. “What is a Green Bond?” *Environmental Finance*, 8 November. <https://www.environmental-finance.com/content/the-green-bond-hub/what-is-a-green-bond.html>
- Nordic Council of Ministers. 2017. “Mobilizing Climate Finance Flows: Nordic Approaches and Opportunities.” <https://newclimate.org/2017/04/04/mobilizing-climate-finance-flows-nordic-approaches-and-opportunities/> and <http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A1086204&dswid=4959>
- Nordic Public Sector Issuers. 2017. “Position Paper on Green Bonds Impact Reporting.” October 2017. http://kommuninvest.se/wp-content/uploads/2017/10/NPSI_Position_paper_2017.pdf
- OECD. 2015. *Green Bonds: Mobilising the Debt Capital Markets for a Low-Carbon Transition. Policy Perspectives*. Paris: OECD Publishing. <https://www.oecd.org/environment/cc/Green%20bonds%20PP%20%5Bf3%5D%20%5Blr%5D.pdf>
- . 2016. “A Quantitative Framework for Analysing Potential Bond Contributions in a Low-Carbon Transition.” http://unepinquiry.org/wp-content/uploads/2016/10/8_Analysing_Potential_Bond_Contributions_in_a_Low-carbon_Transition.pdf
- . 2017a. *Investing in Climate, Investing in Growth*. Synthesis report. Paris: OECD Publishing. <http://www.oecd.org/environment/cc/g20-climate/synthesis-investing-in-climate-investing-in-growth.pdf>
- . 2017b. *Mobilising Bond Markets for a Low-Carbon Transition, Green Finance and Investment*. Paris: OECD Publishing. http://www.oecd-ilibrary.org/environment/mobilising-bond-markets-for-a-low-carbon-transition_9789264272323-en and <http://dx.doi.org/10.1787/9789264272323-en>
- OECD, International Capital Markets Association (ICMA), Climate Bonds Initiative (CBI), and the Green Finance Committee (GFC) of China Society for Finance and Banking. 2016. “Green Bonds: Country Experiences, Barriers And Options.” http://unepinquiry.org/wp-content/uploads/2016/09/6_Green_Bonds_Country_Experiences_Barriers_and_Options.pdf

- Oliver, P. 2016a. "Helping Cities in Developing Countries Benefit from the Green Bond Market." *Environmental Finance*, 5 September 2016. <https://www.environmental-finance.com/content/analysis/helping-cities-in-developing-countries-benefit-from-the-green-bond-market.html>
- . 2016b. *Green Bonds for Cities: A Strategic Guide for City-Level Policymakers in Developing Countries*. San Francisco: Climate Policy Initiative. <https://climatepolicyinitiative.org/wp-content/uploads/2016/12/Green-Bonds-for-Cities-A-Strategic-Guide-for-City-level-Policymakers-in-Developing-Countries.pdf>
- People's Bank of China. 2016. "Guidelines for Establishing the Green Financial System." <http://www.pbc.gov.cn/english/130721/3133045/index.html>
- S&P Global. 2017. "Green Evaluation Analytical Approach." https://www.globalcreditportal.com/ratingsdirect/renderArticle.do?articleId=1837890&SctArtId=423568&from=CM&nsi_code=LIME&sourceObjectId=9947811&sourceRevId=1&fee_ind=N&exp_date=20270426-14:09:23
- . 2016. "Updated Proposal for a Green Bond Evaluation." 14 November. <https://www.spglobal.com/our-insights/Proposal-For-A-Green-Bond-Evaluation-Tool.html>
- S&P Global Ratings Direct. 2017. "Research Update: Swedish Local Government Funding Agency Kommuninvest i Sverige AB Ratings Affirmed At 'AAA/A-1+'; Outlook Stable." http://kommuninvest.se/wp-content/uploads/2017/05/RatingsDirect_Research-Update_1855225_May-24-2017_17_02.pdf
- Schmidt-Traub, G. 2015. *Investment Needs to Achieve the Sustainable Development Goals, Understanding the Billions and Trillions*. New York: Sustainable Development Solutions Network. <http://unsdsn.org/wp-content/uploads/2015/09/151112-SDG-Financing-Needs.pdf>
- Schmidt-Traub, G., and J. Sachs. 2015. *Financing Sustainable Development: Implementing the SDGs through Effective Investment Strategies and Partnerships*. New York: Sustainable Development Solutions Network. <http://unsdsn.org/wp-content/uploads/2015/04/150408-SDSN-Financing-Sustainable-Development-Paper.pdf>
- Schnitzler, J. 2017. "Cooperative Lending and Municipal Finance in Sweden." 1 May 2017. Available at SSRN: <https://ssrn.com/abstract=2926880> or <http://dx.doi.org/10.2139/ssrn.2926880> and https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2926880
- SEB. 2013. "SEB: Gothenburg City First in Nordics To Issue 'Green' Bonds." <https://sebgroup.com/press/press-releases/2013/seb-gothenburg-city-first-in-nordics-to-issue-green-bonds>
- . 2017. "The Green Bond." May 2017. https://sebgroup.com/siteassets/large_corporates_and_institutions/our_services/markets/fixed_income/green_bonds/seb_green_bond_2017_05.pdf
- South China Morning Post. 2017. "China is Shifting the Green Bond Market with 'Green Financing.'" 30 October. <http://www.scmp.com/business/banking-finance/article/2117507/china-shifting-green-bond-market-green-financing>
- Sustainia and C40 Climate Leadership Group. 2015. "Cities 100." http://sustainia.me/resources/publications/Cities100_2015.pdf

- Takada, H., and R. Youngman. 2017. *Can Green Bonds Fuel the Low-Carbon Transition?* 19 April. Paris: OECD. <http://oecdinsights.org/2017/04/19/can-green-bonds-fuel-the-low-carbon-transition/>
- UNCTAD. 2014. *World Investment Report 2014, Investing in the SDGs: An Action Plan*. New York and Geneva: United Nations. http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf
- UNEP. 2016. "Towards Zero-Emission Efficient and Resilient Buildings, Global Status Report 2016." <https://wedocs.unep.org/rest/bitstreams/45611/retrieve>
- Vasakronan. 2013. "Vasakronan Issues the World's First Green Corporate Bond." <http://vasakronan.se/pressmeddelande/vasakronan-issues-the-worlds-first-green-corporate-bond>
- . 2016. "Bondholder's Report on Green Bonds, 2016-12-3." http://vasakronan.se/wp-content/uploads/Vasakronan_bondholders_report_on_green_bonds_2016.pdf
- Wang, Y., and R. Zhang. 2017. "China's Green Bond Market." International Capital Markets Association, First Quarter 2017. https://www.icmagroup.org/assets/documents/About-ICMA/APAC/China's-Green-Bond-Market-Jan-2017_110117.pdf.
- World Bank. 2013. *Financing Sustainable Cities: How We're Helping Africa's Cities Raise Their Credit Ratings*. Washington, DC: World Bank. 24 October 2013. <http://www.worldbank.org/en/news/feature/2013/10/24/financing-sustainable-cities-africa-creditworthy>
- World Economic Forum. 2013. *The Green Investment Report*. Davos: World Economic Forum. <http://reports.weforum.org/green-investing-2013/> and <http://reports.weforum.org/green-investing-2013/required-infrastructure-needs/#read>

ANNEX A. PROJECTIONS FOR THE VOLUME OF GREEN BOND ISSUANCE IN 2017

Source	Estimated Range (\$ billion)
HSBC Fixed Income Research	90–120
Bloomberg New Energy Finance	123
ABN Amro	90–110
Natixis	144
Climate Bonds Initiative	130–150
Credit Agricole	100
Moody's*	120
SEB**	125–150

Sources: HSBC (2017); * Moody's (2017a); ** SEB (2017).

ANNEX B. CITY OF GOTHENBURG – GREEN BOND FRAMEWORK

Special Account

An amount equal to the net proceeds of the issue of the notes will be credited to a special budget account that will support the City of Gothenburg's lending for Eligible Projects. So long as the notes are outstanding and the special account has a positive balance, at the end of every fiscal quarter, funds will be deducted from the special account and added to the City of Gothenburg's lending pool in an amount equal to all the disbursements from that pool made during such a quarter in respect of eligible projects.

Eligible Projects

"Eligible projects" means a selected pool of projects funded, in whole or in part, by the City of Gothenburg that promote the transition to low-carbon and climate-resilient growth in line with the City's Environmental Program and Climate Strategy and as determined by the City of Gothenburg. The Environmental Program includes quantified environmental targets and key measures to meet the targets and lists the responsible committees and bodies.

Eligible projects may include projects that target:

- (a) the mitigation of climate change, including investments in low-carbon and clean technologies, such as energy efficiency and renewable energy programs and projects ("mitigation projects");
- (b) adaptation to climate change, including investments in climate-resilient growth ("adaptation projects"); or
- (c) to a lesser extent (max. 20%), projects that are related to a sustainable environment rather than being directly climate related.

Eligible projects include:

- Renewable energy (solar, wind, wave, bio, waste, and hydro)
- Energy efficiency
- Waste management
- Water management
- Biofuel
- Smart grids
- Sustainable transportation (e.g. public transport, cycling, and shipping infrastructure)
- Sustainable housing (e.g. infrastructure and construction)
- Environmental (max. 20%)
- Biodiversity (e.g. the development of new or restoration of existing nature conservation areas)
- Water-clearing facilities
- Air pollution

Selection of Eligible Projects

- 1) The City Council decides on the City's Environmental Program and Climate Strategy. The City Council also decides on companies/administrations' project investments.
- 2) The City Office (Urban Development and Treasury Departments) jointly selects projects in accordance with the Environmental Program and/or Climate Strategy. The Urban Development Department possesses strategic knowledge on environmental issues.
- 3) Then, the Environment Administration, with its expertise in environmental issues, verifies the City Office's selection.
- 4) Finally, the City Office (Treasury) presents the selected and verified projects for funding through the green bonds to the City Executive Board for final approval.

Follow-up

The Environment Administration monitors and reports on the implementation of the Environmental Program and the Climate Strategy. Companies/departments regularly report on the project status in relation to the Environmental Program and Climate Strategy to the City Office (Urban Development/Treasury). The City Office will also monitor every project's economic development as well as using suitable environmental indicators. The City Office (Treasury) reports back to investors through investor letters and annual reports.

Transparency

To enable investors to follow the development and provide insights into prioritized areas, the City of Gothenburg will send an annual investor letter to investors, including:

- 1) a list of projects financed
- 2) a selection of project examples, and
- 3) a summary of the City of Gothenburg's green bond development.

The City of Gothenburg will make the investor letter publicly available on its home page. In addition, the principle of free access to public records applies.

Last updated: 30 April 2015

Source: City of Gothenburg (2015).

ANNEX C. EXCERPT FROM THE GUIDELINES FOR ESTABLISHING THE GREEN FINANCIAL SYSTEM

The PRC is at a crucial stage of economic structural adjustment and transformation for its development model. The demand for green finance to support green industries and sustainable development is constantly expanding. To implement fully the “Opinions of China’s Central Party Committee and the State Council on Accelerating the Development of Ecological Civilization”...and the “Overall Plan for the Structural Reform for Ecological Civilization”..., as well as to promote the development concepts of innovation, harmony, greenness, openness, and sharing, the PRC has developed the following guidelines with the approval of the State Council. These guidelines strive to accomplish many essential goals – they will execute the tasks of the Government Work Report, promote the sustainable development of the economy, establish a sound green financial system, improve the function of the capital market in allocating resources and servicing the real economy, and support and promote the development of an ecological civilization.

...

3. Enhance the Role of the Securities Market in Supporting Green Investment

(12) Improve the rules and regulations for green bonds and unify the green bond definitions. Research and improve the relevant regulations and self-discipline rules for the issuance of green bonds. Clarify that the funds raised from the issuance of green bonds must be fully (or mainly) used for green projects. Strengthen inter-departmental coordination and unify the definitions of green bonds. Clarify the requirements of information disclosure and other regulatory arrangements or green bond issuance. Support qualified institutions to issue green bonds and related products, and enhance the efficiency of approval or registration for green bond issuance.

(13) Take measures to reduce the financing cost of green bonds. Local governments can support green bond issuance through specialized guarantees and credit enhancement mechanisms. Study and formulate other measures to reduce the financing costs of green bonds.

(14) Explore ways to formulate standards for third-party verification of green bonds and green credit rating. Standardize the quality requirements for third-party verification of green bonds. Encourage institutional investors to make use of green verification reports in investment decision making. Encourage rating agencies to evaluate, in their rating exercises, the green performance of the issuers and the “greenness” of the projects, as well as the impact of environmental costs on creditworthiness, and to disclose such information separately in credit rating reports.

(15) Actively support the qualified green enterprises to obtain financing via initial public offerings and secondary offerings. Actively assist qualified green enterprises in their efforts for IPOs, and help listed green enterprises to issue additional shares via secondary offerings according to legal procedures.

(16) Support the development of green bond indices, green equity indices, and related products. Encourage financial institutions to develop green index-based financial products, such as mutual fund products or private equity fund products, to meet the diverse needs of investors.

Source: PBOC (2016).