

GREEN BONDS IN BRIEF:

RISK, REWARD
AND OPPORTUNITY



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HOW CLIMATE CHANGE CREATES DEMAND FOR GREEN BONDS

To date, global atmospheric carbon is beyond the 350 ppm threshold of climate safety. Business as usual in our energy systems will only increase the magnitude of climate risk, with growing negative repercussions for people and economies across the world. Responding to climate change and its impacts demands that communities create new systems and infrastructure to replace those that produce greenhouse gas pollution. Sustainable energy sources must be planned, financed, developed, and brought online. These transitions require capital, and the International Energy Agency (IEA) estimates that approximately USD \$1.2tn in annual clean energy investments will be required to facilitate the transition from the current carbon intense economy to a low carbon economy.¹

Figure 1: Estimates of Environmental Financing Gap²

Financing Need	Capital Required (US\$)
Developed to developing country flows for climate change adaption and mitigation	\$100bn / year by 2020
Water infrastructure	\$800bn / year by 2015
Halving worldwide energy-related CO2 emission by 2050	\$300-\$400bn from 2011-2020; Up to \$750bn by 2030. Over \$1.6tn / year from 2030
Clean energy investments required to keep global warming under 2 degrees C	\$500bn / year by 2050
Investment required for energy transformation (business as usual + additional investment)	\$65tn by 2050 (\$1.6 tn / year)

Accessing capital at the massive scale needed to finance a transition to a low carbon, sustainable economy faces several challenges. Political obstacles continue to hinder public deployment of capital for low carbon infrastructure, with some stakeholders actively lobbying against clean energy mandates³ or spending at the state and federal levels. Public sector funds are not adequate to the task. Even if political issues were overcome, public finances are still recovering from the recession, as 2007-2009 debts are repaid and service cuts are restored.⁴ In the U.S., much of the financing for the transition to a sustainable, low carbon economy has so far come from bank lending.⁵ However, increasingly stringent bank regulation (responsive to the

1 International Energy Agency. Executive summary, "Energy Technology Perspectives 2014: Harnessing Electricity's Potential", 2012, p.1. Available at: <http://www.iea.org/Textbase/npsum/ETP2014SUM.pdf>.

2 Alexander, Gulati & McDonald, "Green Bonds: Victory Bonds for the Environment", TD Economics, November 2013. Available at: http://www.td.com/document/PDF/economics/special/GreenBonds_Canada.pdf.

3 Editorial Board, "The Koch Attack on Solar Energy", New York Times, April 27, 2014. Available at: <http://www.nytimes.com/2014/04/27/opinion/sunday/the-koch-attack-on-solar-energy.html>.

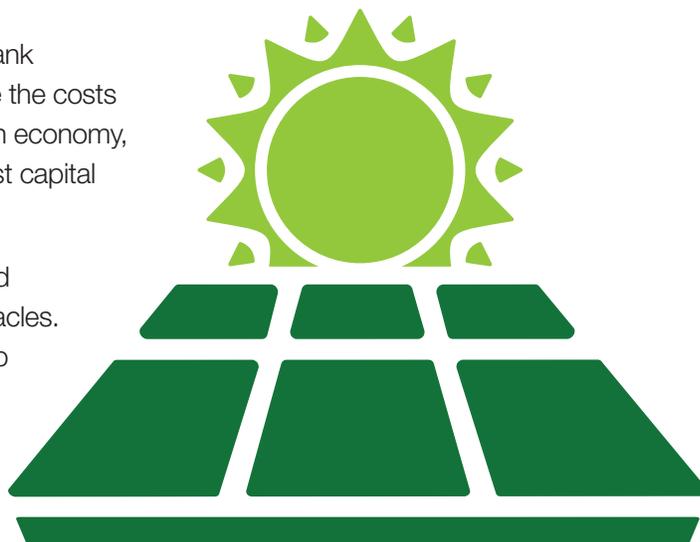
4 "Summary: Spring 2014 Fiscal Survey of States", NASBO, 2014. Available at: http://www.nasbo.org/sites/default/files/Summary_Spring2014%20Fiscal%20Survey%20of%20States.pdf. See also: Barb Rosewicz and Alex Boucher, "State Tax Revenue Grows, but a Full Recovery Eludes 26 States", Pew Charitable Trusts, May 2014. Available at: <http://www.pewtrusts.org/en/research-and-analysis/analysis/2014/05/19/state-tax-revenue-grows-but-a-full-recovery-eludes-26-states>.

5 D'Olier-Lees, "U.S. Infrastructure Looks Project Financing Looks to Capital Markets as Bank Lending Shrinks", Standard & Poors, 2012. Available at: http://static.ow.ly/docs/RatingsDirect_Commentary_1011107_09_14_2012_09_46_20_Ng3.pdf.

2007-2009 financial crisis), combined with ongoing bank downgrades, could reduce bank lending and increase the costs of long-term lending.⁶ In order to achieve a low carbon economy, private capital must be mobilized, especially the largest capital market — the \$100tn fixed income market.⁷

Green bonds, bonds issued to finance low carbon and environmental projects, can help eliminate these obstacles. Indeed, it is estimated that green bonds can supply up to 84% of the private, third-party capital required to finance the development needed to transition to a low carbon economy.⁸ Green bonds not only serve the goal of financing a low carbon economy, but also serve market needs. Green Bonds provide investors with a way of making environmentally-themed fixed income investments, a means for hedging against inflation, and a source of steady returns regardless of market fluctuation.⁹ Simultaneously, green bonds provide communities and companies with a flexible means of enabling a broad category of projects that may not have otherwise been economical. Bonds are also a better fit for financing capital-intensive clean energy infrastructure. Both bonds and clean energy projects generate modest, low risk, long-term cash flows, while private equity and venture capital have been a poor fit due to requirements for high, immediate returns in a short time frame.

This paper is designed to provide investors and those new to green bonds a clear introduction to the development and potential of the green bond market, with the intent of encouraging awareness, investment, and overall growth in the category.



6 *Id.*

7 Walker, Capo McCormick, “Unstoppable \$100 Trillion Bond Market Renders Models Useless”, Bloomberg, June 1, 2014.
Available at: <http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html>.

8 Whitehouse, Lacy, et al. “Carbon Capital: Financing the low carbon economy”, Accenture, February 2011, p.58.
Available at: http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_Barclays_Carbon_Capital.pdf.

9 “Fixing the Future: Green Bonds Primer”, Bank of America Merrill Lynch, September 2014, p18.
Available at: <http://www.merrilledge.com/publish/content/application/pdf/gwmol/ThematicInvesting-GreenBondsPrimer.pdf>.

GETTING TO KNOW GREEN BONDS

In the broadest sense, green bonds describe fixed income financial instruments that finance environmental and sustainable development projects. The Green Bond Principles, a guidance document crafted by a coalition of key stakeholder banks, describes green bonds as:

“...[I]nstruments in which the proceeds will be exclusively applied (either by specifying Use of Proceeds, Direct Project Exposure, or Securitization) towards new and existing Green Projects — defined here as projects and activities that promote climate or other environmental sustainability purposes.”¹⁰

To date, green bonds have been largely identical in structure, risk, and return to traditional bonds, except that capital raised from a green bond must fund environmental projects, including clean energy, energy efficiency, low carbon transport, smart grid, agriculture & forestry, or similar projects, initiatives, and programs.¹¹ Climate bonds are a variation on the green bonds theme, with the use of proceeds linked to projects that specifically address climate solutions. There is a need to distinguish between labeled green bonds and unlabeled green bonds. Unlabeled green bonds are those which have no intentional sustainable branding or marketing, but which do happen to fund projects that relate to environmental protection or sustainability, such as a mass transit bond. The size of the unlabeled climate bonds universe is estimated to be an order of magnitude larger than the labeled green bond market. As of June 2014, the labeled green bond market stood at \$35bn of outstanding issuance, while the unlabeled climate bonds outstanding issuance was \$503bn.¹²



10 “Green Bond Principles,” Ceres, 2014. Available at: <http://www.ceres.org/resources/reports/green-bond-principles-2014-voluntary-process-guidelines-for-issuing-green-bonds>.

11 “Taxonomy”, Climate Bonds Initiative. Available at: <http://www.climatebonds.net/standards/taxonomy>.

12 “Climate Bonds Initiative (2014): Bonds & Climate Change: State of the Market”, Climate Bonds Initiative, July 2014. Available at: <http://www.climatebonds.net/files/files/-CB-HSBC-15July2014-A4-final.pdf>.

Green bonds typically fund large scale, capital-intensive, green infrastructure projects that can be repaid by steady, modest, long-term cash flows. Bonds, including green bonds, are less appropriate for funding new technologies with higher default risk. Likewise, bond investors tend to be more risk averse, opting for the low risk, low return vehicle of a bond. This is important as some types of sustainable technology are still experimental, and associated with higher volatility. Green bonds issued to date have been investment grade, safe, secure investments, and most of the projects financed have been in renewable energy or public transportation.

The requirements for green bond issuance, procedures, and definitions of the product are areas of current interest and debate. Issuers of green bonds are increasingly expected to provide third-party reviews of the green credentials of projects at the time of issuance in addition to post-project reporting or verification about how the funds were used. Work is underway as banks, stakeholders, investor groups, and civil society collaborate to better define and standardize green bond criteria, characteristics, and metrics. The importance of definition and standards will be discussed further in the Supply and Transparency and Reporting sections below. Below, Figure 2 describes the four primary types of green bonds that have been issued so far.

Figure 2: Four types of green bonds as defined by the Green Bonds Principles¹³

Bond Type	Definition
Green Use of Proceeds Bond	A standard recourse-to-the-issuer debt obligation for which the proceeds shall be moved to a sub-portfolio or otherwise tracked by the issuer and attested to by a formal internal process that will be linked to the issuer's lending and investment operations for projects. Pending such investment, it is recommended that the issuer make known to investors the intended types of eligible investments for the balance of unallocated proceeds.
Green Use of Proceeds Revenue Bond	A non-recourse-to-the-issuer debt obligation in which the credit exposure in the bond is to the pledged cash flows of the revenue streams, fees, taxes, etc., and the Use of Proceeds of the bond goes to related or unrelated Green Project(s). The proceeds shall be moved to a sub-portfolio or otherwise tracked by the issuer and attested to by a formal internal process that will be linked to the issuer's lending and investment operations for projects. Pending such investment, it is recommended that the issuer make known to investors the intended types of eligible investments for the balance of unallocated proceeds.
Green Project Bond	A project bond for a single or multiple Green Project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer.
Green Securitized Bond	A bond collateralized by one or more specific projects, including but not limited to covered bonds, Asset Backed Securities (ABS), and other structures. The first source of repayment is generally the cash flows of the assets. This type of bond covers, for example, asset-backed securitizations of rooftop solar PV and/or energy efficiency assets.

¹³ *Supra* note 10, p. 2.

case study

WORLD BANK

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (IBRD)

ISSUER: World Bank (IBRD)

ISSUER TYPE: Supranational

BACKGROUND: IBRD was one of the pioneers of the green bond market and is one of the largest green bond issuers with over \$6bn issued in green bonds issued to date since 2008, through 65 transactions and 17 different currencies.

This global development cooperative is owned by 188 member countries. IBRD works with its members to achieve equitable and sustainable economic growth in their national economies and to find solutions to pressing regional and global problems in economic development and other important areas, such as environmental sustainability. As the largest development bank in the world and part of the World Bank Group, it pursues its two main goals — to end extreme poverty and promote shared prosperity, primarily by providing loans, risk management products, and expertise on development-related disciplines, and by coordinating responses to regional and global challenges.

The Green Bond model that the World Bank developed with SEB (Stockholms Enskilda Bank) and the original investors has several steps that have been adopted and adapted by others to meet their particular situation.

The process is very transparent and includes:

- Defining specific eligibility criteria and getting a second, independent opinion;
- Establishing a process for selecting projects that meet these predefined eligibility criteria;
- Setting up a separate account and a process for ‘earmarking of proceeds’ — this was a concept that EIB (European Investment Bank) had already used for their structured Climate Awareness Bond that they launched for European retail investors in 2007;
- Reporting on the projects that are being financed including their climate and environmental impact; and
- Ensuring compliance.

Examples of the types of projects supported by World Bank Green Bonds include renewable energy installations, energy efficiency projects, new technologies in waste management and agriculture that reduce greenhouse gas emissions and help finance the transition to a low carbon economy, as well as financing for forest and watershed management, and infrastructure to prevent climate-related flood damage and build climate resilience.

DEAL STRUCTURE: IBRD has been rated AAA/Aaa (stable outlook) by Standard & Poor’s and Moody’s for over 50 years, and has a 0% risk weighting under the Basel framework.

On the following page is a select list of World Bank Green Bonds issued since 2011, with currencies of issue and values of each issue. A more complete list of the 65 green bonds issued since 2008 is available at: <http://treasury.worldbank.org/cmd/htm/GreenBondIssuancesToDate.html>.

INVESTORS: IBRD has a broad and diversified investor base — both in terms of geographic distribution as well as type of investors, including asset managers, banks, pension funds, corporations, and insurance companies in the US, Canada, Latin America, Europe, Australia, and Asia.

FACTORS DRIVING GREEN BOND GROWTH

The green bond market is growing rapidly, with a forecasted 400% increase in issuance between 2013 and 2014 and, by 2015, \$100bn of labeled green bond issuance is expected.¹⁴ Demand for green bonds has remained high regardless of coupon, maturity, and issuer.¹⁵ The clear investor demand for sustainable debt is a key factor driving the growth of the green bond market. Investors may seek sustainable debt for several reasons.

INVESTING MANDATE/POLICY

The World Bank's International Bank for Reconstruction and Development (IBRD) created green bonds in 2007 in response to demand from Scandinavian pension funds seeking environmentally-themed fixed income products.¹⁶ Other large, mission driven, institutional investors are increasingly seeking to combine financial and environmental goals into their investment decision making process. For instance, the California Public Employees' Retirement System (CalPERS) has mandated a standard for green investment:

"We have a strong track record of mobilizing financial capital in new and innovative ways, consistent with the highest fiduciary standards. We are just starting to explore ways in which it can marry the jet stream of finance and the capital markets with public purpose. Our goals are to achieve positive financial returns, while fostering energy savings, sustainable growth and sound environmental practices."¹⁷

Before the first green bond issuance in 2007, socially responsible investors lacked fixed income investment options, and were focused largely on equity investments. Though bonds have in practice funded green projects for decades, they were rarely identified as such, making the discovery process difficult for those investors who were interested in investing in sustainable fixed income. Green bonds also allow investors to balance the green exposure in their portfolios between equity investments and fixed income.¹⁸

For these reasons, the socially responsible investing community, whose assets under management have grown nearly 500% since 2007, has embraced green bonds.¹⁹ For example, much of the interest in Massachusetts' 2013 green bond issuance specifically related to its identification as a 'green' investment that was offered with comparable risk, rate, and terms as its regular general obligation bond. Indeed, Massachusetts' green bond was oversubscribed while another of its bond issuances, which was the same in all respects except the sustainable use of proceeds, was undersubscribed.²⁰

14 *Supra* note 12.

15 Gustke, "A growing appetite for green bonds, despite downsides", BBC Capital, 2013. Available at: <http://www.bbc.com/capital/story/20131204-eco-bonds-get-the-green-light>.

16 "Green Bonds: A Fast Growing Market", SEB, 2013. Available at: [http://webapp.sebgroup.com/mb/mbliib.nsf/a-w/C26DFBEFBBF9CEC7C1257981003627CA/\\$FILE/SEB_Green_Bonds_brochure_20140617.pdf](http://webapp.sebgroup.com/mb/mbliib.nsf/a-w/C26DFBEFBBF9CEC7C1257981003627CA/$FILE/SEB_Green_Bonds_brochure_20140617.pdf).

17 CalPERS Investments, Environmental Investment Initiatives, CalPERS, February 2013. Available at: <https://www.calpers.ca.gov/index.jsp?bc=/investments/environ-invest/home.xml>.

18 Evelyn Hartwick, Head, Socially Responsible Bond Programs, IFC, personal interview by CIPA, 2014.

19 Bernasek, "The Surge in Investing by Conscience", New York Times, June 1, 2014. Available at: <http://www.nytimes.com/2014/06/01/business/the-surge-in-investing-by-conscience.html>.

20 "Green Bonds: Trailblazing Issuers Accelerating the Low Carbon Economy", As You Sow 2014. Available at: <http://www.asyousow.org/our-work/energy/climate-change/fossil-free-investment/green-bonds/>. See also: Andrew Smith, personal interview by CIPA, 2014.

FAMILIARITY

One advantage green bonds have over other forms of ‘financial innovation’ is that they are a version of a financial instrument that investors already understand. This quality has accelerated market uptake beyond other innovative financial mechanisms. Christopher Flensburg, head of sustainable product and product development at SEB (a Swedish bank) notes:

“You could try and persuade investors to put their money into an ESG [environment, social and governance] strategy because it was going to outperform, but it would take too long to prove...If you want to attract the 98% of mainstream investment money that is benchmarked, you need to get them started without changing anything. Green Bonds are a beta product; they just replace an existing product with an identical one with a dedication to the climate.”²¹

HEDGING/RISK REDUCTION

Climate change creates risks that threaten traditional investment portfolios in which carbon-intensive companies will face increasing costs, losses, and operational challenges as climate change intensifies and carbon use is restricted.²² The value of carbon-intensive companies is projected to fall,²³ perhaps rapidly, possibly leading to outcomes such as stranded assets, write downs, insolvency, and liquidations²⁴ that may or may not be anticipated by the market. Green bonds serve as a way investors can move into sustainable investments without the risk historically associated with cleantech investments.

U.S. DEMOGRAPHIC SHIFTS

The aging membership of national pensions²⁵ will require ‘baby boomer’ investors to recalibrate to low risk investments with shorter-term payouts, creating demand for fixed income instruments to rise. At the same time, in order to replace aging plan participants and attract a younger generation of investors, 401(K) and pension providers are finding themselves needing to market to millennials. The millennial generation, in addition to representing the largest wealth opportunity since their parents’ ‘baby boomer’ generation,²⁶ have significant savings rates,²⁷ and are nearly 15% more concerned with socially responsible investing than their parents.²⁸ While millennials may not identify as environmentalists,²⁹ the group prioritizes resource scarcity, environmental protection, and climate change as

21 Hayes, “Can Green Bonds wake the sleeping dragon?” Global Capital, September 2013.
Available at: <http://www.globalcapital.com/article/jbxq20ys86zm/can-green-bonds-wake-the-sleeping-dragon>.

22 Burr, “Investors scrutinizing high carbon emissions risk,” Pensions & Investments, February 17, 2014.
Available at: <http://www.pionline.com/article/20140217/PRINT/302179983/investors-scrutinizing-high-carbon-emissions-risk#>.

23 “Unburnable Carbon”, Carbon Tracker, 2014.
Available at: <http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>.

24 Cooper, “How the Carbon Bubble will Pop”, Washington Post, October 30, 2013.
Available at: <http://www.washingtonpost.com/blogs/plum-line/wp/2013/10/30/how-the-carbon-bubble-will-pop/>.

25 “Pensions at a Glance: 2013 OECD and G20 indicators”, OECD, 2013.
Available at: <http://www.oecd.org/pensions/public-pensions/OECDPensionsAtAGlance2013.pdf>.

26 *Supra* note 8.

27 Wang, “Millennials (With Jobs) Are Super Saving Their Way to Retirement”, Money, July 14, 2014.
Available at: <http://time.com/money/2983272/millennials-with-jobs-are-super-saving-their-way-to-retirement/>.

28 “Millennial Investors More Socially Responsible With Investment Choices”, Spectrum.
Available at: <http://spectrem.com/Content/Millennial-Investors-Have-Greater-Concern-Over-Social-Responsibility.aspx>.

29 “Millennials in Adulthood: Detached from Institutions, Networked with Friends”, Pew Research Center, March 2014.
Available at: <http://www.pewsocialtrends.org/2014/03/07/millennials-in-adulthood/>.

second only to unemployment.³⁰ Subsequently, green bonds are an ideal product for millennials who wish to see their investments used to make a positive impact in the world. HIP Investor, an impact investment manager, writes that:

“[B]y 2025, millennials will make up 75% of the global workforce, which makes engagement of this demographic crucially important for business. In addition, a Deloitte survey of millennials published in January 2013 revealed that millennials believe the primary purpose of business is to ‘improve society,’ rating above ‘making profit.’ . . . The national average for millennial participation in 401(k) plans is a mere 21%, which presents a new opportunity to engage millennials in retirement planning that creates a net benefit for society – dubbed the ‘impact generation’ by Forbes – and move beyond passive participation in 401(k) plans that do not necessarily align with their values.”³¹

Figure 3: Total Green Bond Issuances in 2013³²

Issuer	Issuance Date	LCL	USD Amt Issued	S&P	Moody's	Coupon	% SRI/ESG Investors
NRW Bank	Nov-13	EUR 250mm	340mm	AA-	Aa1	0.75	
Electricite de France	Nov-13	EUR 1.4mm	1.9bn	A+	Aa3	2.25	60%
Vasakronan	Nov-13	SEK1bn	152mm	–	–	1.501	90%
Vasakronan	Nov-13	SEK300mm	43mm	–	–	1.774	90%
Bank of America Merrill Lynch	Nov-13	USD500mm	500mm	A-	Baa2	1.35	
Kommunalbanken	Nov-13	USD500mm	500mm	AAA	Aaa	0.75	58%
IFC	Nov-13	USD1bn	1bn	AAA	Aaae	0.625	
FMO	Nov-13	Eur500mm	674mm	AA+	–	1.25	75%
EIB	Nov-13	ZAR500mm	49mm	AAA	Aaae	6.75	
AfDB	Oct-13	USD500mm	500mm	AAA	Aaa	0.75	84%
IFC	Oct-13	USD439mm	201mm	–	–	8.14	
IFC	Oct-13	AUD21.9mm	20mm	–	–	3.51	
City of Gothenburg	Oct-13	SEK250mm	39mm	AA+	Aaae	2.915	
City of Gothenburg	Oct-13	SEK250mm	39mm	AA+	Aaae	1.704	
EBRD	Sep-13	USD250mm	250mm	AAA	NR	1.625	
World (IBRD)	Aug-13	USD550mm	550mm	AAA	Aaa	0.375	
EBRD	Aug-13	BRL155mm	67mm	–	–	8.01	
EIB	Jul-13	SEK1.15bn	176mm	AAA	Aaa	1.642	
EIB	Jul-13	EUR1.15bn	1.5bn	AAA	Aaa	1.375	60%
Massachusetts	Jun-13	USD100mm	100mm	–	–		
World (IBRD)	Jun-13	RUB529.2mm	16mm	AAA	Aaa	6.75	
Export-Import BK Korea	Feb-13	USD500mm	500mm	A+	Aa3	1.75	70%
IFC	Feb-13	USD1bn	1bn	AAA	Aaa	0.5	
World (IBRD)	Jan-13	ZAR83mm	9mm	AAA	Aaa	0.5	

30 “Big demands and high expectations: The Deloitte Millennial Survey”, Deloitte, 2014. Available at: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/gx-dttl-2014-millennial-survey-report.pdf>.

31 Herman, et al., “Engaging Employees via Sustainable 401(k) Investing”, Corporate Responsibility Magazine, 2014. Available at: <http://www.thecro.com/content/engaging-employees-sustainable-401k-investing>.

32 Boule, “2013 Overview: the Dawn of an Age of Green Bonds?”, Climate Bonds Initiative, February 2014. Available at: <http://www.climatebonds.net/2014/05/2013-overview-dawn-age-green-bonds>.

case study

MASSACHUSETTS

ISSUER: The Commonwealth of Massachusetts

COUNTRY: United States

BACKGROUND: On May 31-June 4, 2013, Massachusetts issued \$100 million in general obligation green bonds as part of an overall \$670 million bond sale to fund projects outlined within the Commonwealth's 2013 capital plan that fell into one of four categories:

- Clean water and drinking water projects
- Energy Efficiency and Conservation Projects in State Buildings
- Land Acquisition, Open Space Protection and Environmental Remediation Projects
- River Revitalization and Preservation and Habitat Restoration Projects

Massachusetts' methodology in selecting projects included consultation with the World Bank on their definition of green, as well as the Climate Bond Initiative's Climate Bond Standard. When deciding to issue Green Bonds, the Commonwealth saw an opportunity to carve out space in the green market by evaluating projects that were already in the state's capital plan and fund them with specifically designated Green Bonds. Massachusetts has been able to maintain their commitment to transparency while expanding their investor base.

DEAL STRUCTURE:

Maturity	Amount	Coupon Rate
August 1, 2033	\$20,000,000	3.75%
August 1, 2033	\$15,000,000	4.00%
August 1, 2033	\$65,000,000	5.00%

CREDIT RATINGS: Fitch: AA+; Moody's: Aa1; Standard & Poor's: AA+

INVESTORS: Massachusetts received \$130 million in orders from 154 retail investors, 10 unique institutional orders, seven new institutional and professional retail investors, and attracted a significant amount of national attention with this new issuance.

The State Office of the Treasurer published a follow-up document to detail the projects they were undertaking with the funds from the green bonds and some of the progress, cited in this report as *Mass Green Bonds*. Some investors who showed interest in the Green Bonds but did not end up investing were not sure of the future of the bonds — not because they were not secure investments, but because a robust secondary market does not yet exist. However, especially for investors with ESG or SRI mandates in their portfolios, these investments can be perfect as buy-and-hold investments because they meet the ESG threshold, are very low risk investments, and a secondary sale of these assets would likely track Massachusetts bond sale price since they are very stable and transparent investments.

ADDENDUM: In September 2014, the Massachusetts State Treasury issued a second green bond, this time \$350 million worth of bonds with a 10 year maturity and 2.45% yield. The state received over a billion dollars in orders for the bonds, making it nearly triple oversubscribed.

GREEN BOND MARKET FUNDAMENTALS

The green bond market is rapidly developing through creative financial innovation, including securitization of climate-themed bonds, green bonds indices, green bond products, the creation of eligibility criteria, and the formal publication of Green Bond Principles to guide issuance.

INVESTOR PROFILE

Green bonds are well suited for bond investors with a long-term investing horizon and a low to moderate risk appetite. In 2007 when the first green bonds were issued, central banks were the primary investors, purchasing 80% of all the World Bank's issuances.³³ However, since then, both the green bond issuer and investor bases have diversified. In 2012, 95% of investors in Green Bonds were asset owners. Two years later, in March 2014, a little more than half of investors were asset managers.³⁴ The first American investors in green bonds were institutions including California Public Employees' Retirement System (CalPERS) and the California State Teachers' Retirement System (CalSTRS). Similarly, insurers have moved into green bonds. Zurich invested \$1bn in green bonds through Blackrock,³⁵ and Zurich's Chief Investment Officer, Cecilia Reyes, described Zurich's green bond purchases as "an opportunity to invest both with impact and at a return fully compensating for the risk."³⁶ The green bonds market will benefit from the increasing diversity of institutional and retail investors, which, in turn, is likely to encourage the development of a liquid secondary market.

CREDIT RATINGS

Credit ratings are an important tool to facilitate lending by allowing investors to compare risk and return metrics on an 'apples to apples' basis. Several leading credit agencies, such as Standard & Poor's, Moody's, Fitch, and Kroll, have begun to review and rate green bonds using the same credit ratings used to rate regular bonds, making the financial credibility of the underlying asset and/or institution directly comparable. Labeled green bonds, with the exception of a few green securitizations, carry the rating of the issuing entity. This has allowed many green bonds issued by established supranational development banks, corporates, and municipalities to receive double or triple A ratings. In addition, credit ratings have helped validate new, creative bond products. For example, S&P and Kroll have issued credit ratings for bonds representing a securitized pool of renewable energy projects (in the case of S&P) and energy efficiency projects (in the case of Kroll). These ratings have helped bolster investor confidence in new, and otherwise untested, green securities. See Figure 4 below for credit ratings and maturities through 2014.

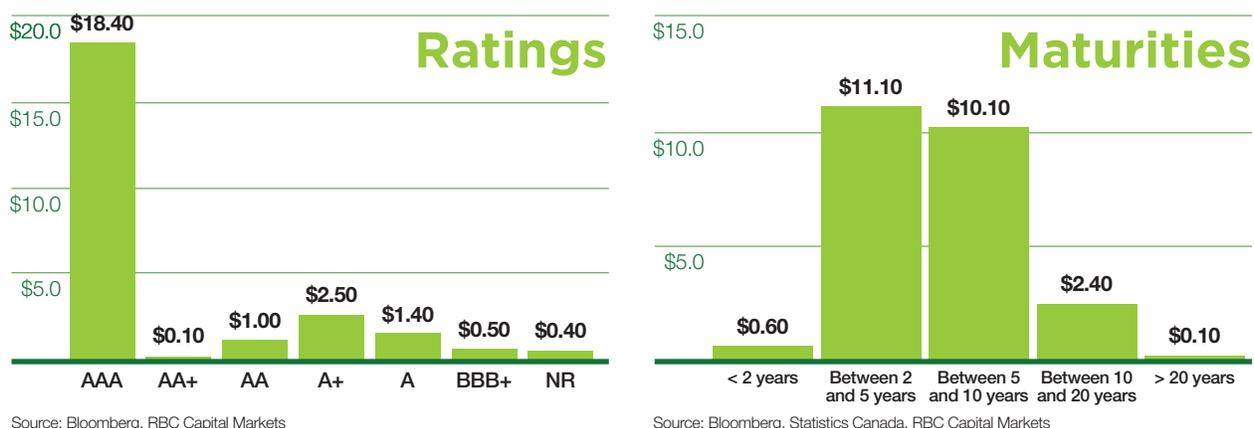
33 Heike Reichelt, Head of Investor Relations and New Products, World Bank, personal interview by CIPA, 2014.

34 "Green Bonds: Spring is in the air, bonds tied to green investments are booming", The Economist, 2014. Available at: <http://www.economist.com/news/finance-and-economics/21599400-bonds-tied-green-investments-are-booming-spring-air>.

35 Bandel, "Zurich Insurance to spend up to \$1 Billion in Green Bonds", Bloomberg, 2013. Available at: <http://www.bloomberg.com/news/2013-11-18/zurich-insurance-to-spend-up-to-1-billion-in-green-bonds.html>.

36 *Id.*

Figure 4: Green Bond Ratings & Maturities³⁷



SUPPLY

Until late 2013, supply in the green bond market came mainly from supranational banks, such as the World Bank, International Finance Corporation (IFC), the African Development Bank (ADB), and the European Investment Bank (EIB). These supranational banks provided critical leadership by priming the market with low risk issuance, educating investors, and providing precedent transactions for prospective private sector issuers.³⁸ Based on the success of supranational issuances, private companies and government entities have begun to tap the green bond market to finance their own green projects and operations. The number and type of new entrants is growing, and issuance is expected to almost quadruple from \$11bn in 2013, to \$40bn in 2014, and \$100bn in 2015.³⁹ Such an increase in green bond issuances will help address the frequent oversubscription seen in recent years resulting from demand that outstrips supply. For example, not only was Massachusetts' first \$100 million green bond 30% oversubscribed,⁴⁰ but its more recent, second green bond issuance was oversubscribed by 185%⁴¹ Similarly, Bank of America's \$500 million green bond was oversubscribed⁴², as was Unilever's \$411 million green bond, which was 200% oversubscribed in less than 3 hours.⁴³ In the same pattern, Toyota's green bond was increased from \$750 million to \$1.75bn as a result of strong investor demand.⁴⁴ This trend is hard to ignore, indicating both intense investor demand, and insufficient supply to meet that demand.

37 Nanji, et al., "Green Bonds: Fifty shades of green", RBC, March 2014, p.14.

Available at: http://www.rbc.com/community-sustainability/_assets-custom/pdf/Green-Bonds-Fifty-Shades-of-Green.pdf.

38 *Supra* note 34, 35.

39 Critchley, Barry, "Green bonds expected to be a \$100-billion business in 2015", Financial Post, July 23, 2014.

Available at: <http://business.financialpost.com/2014/07/23/green-bonds-expected-to-be-a-100-billion-business-in-2015/>.

40 Daigneau, "Massachusetts Uses Popularity of Environmental Stewardship to Pad Its Bottom Line", Governing, July 2013.

Available at: <http://www.governing.com/topics/transportation-infrastructure/gov-massachusetts-green-bonds-a-first.html>.

41 "Investors gobble up Mass. 'green bonds'", Statehouse News Service, Worcester Business Journal, September 2014.

Available at: <http://www.wbjournal.com/article/20140923/NEWS01/140929987/investors-gobble-up-mass-green-bonds>.

42 Bazy, Herlands, Prince., "Green Bonds: A sharp instrument in the renewable energy financing toolkit", Karbone Research, July 2014.

Available at: <http://www.karbone.com/wp-content/uploads/2014/07/Karbone-Green-Bond-Research-July-2014.pdf>.

43 Buolle. "Unilever opens up Sterling green bonds with 4 yr, £250m (\$411m) 'sustainability' bond for CO2 & water improvements in manufacturing plants: 3x over-subscribed!", Climate Bonds Initiative, March 2014. Available at:

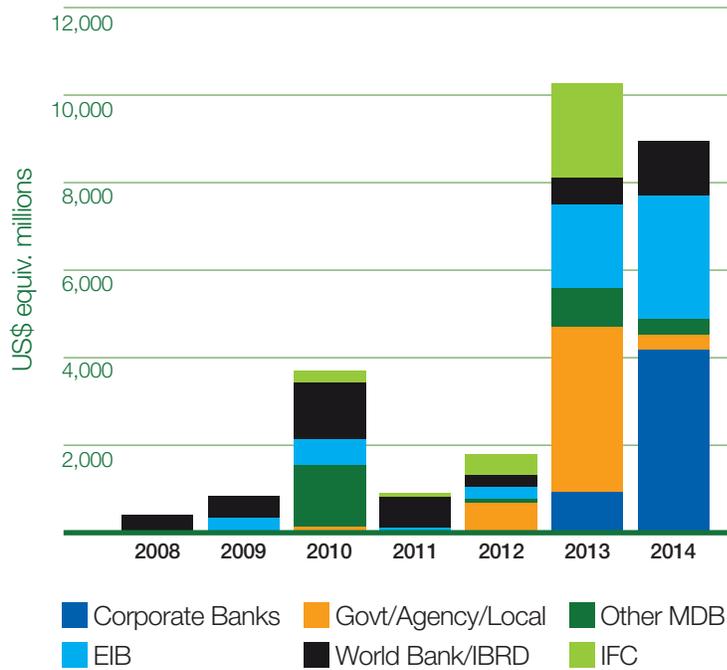
<http://www.climatebonds.net/2014/05/unilever-opens-sterling-green-bonds-4-yr-%C2%A3250m-411m-sustainability-bond-co2-water#sthash.kPi2TvyB.dpuf>.

44 Boule & Kidney, "Record-breaking Q1: \$9bn labelled Green Bonds issued, new issuers, new currencies and finally an index!"

Climate Bonds Initiative, 2014. Available at:

<http://www.climatebonds.net/2014/05/record-breaking-q1-9bn-labelled-green-bonds-issued-new-issuers-new-currencies-and>.

Figure 5: Annual Issuance by Issuer Type⁴⁵



Source: IFC

Green bond issuances can come from any organization with bond issuance authority, whether or not the issuing organization has a history of ‘green’. Such bonds are tied to green projects, products, or other assets, rather than to the ‘greenness’ of the company. Although investors might distrust or avoid green bonds from companies or organizations that are not known for their environmental practices, or which do not have a strong record of sustainability, large organizations that are not ‘100% green’ often have the scale to manage projects with significant environmental benefits. For example, Berkshire Hathaway’s MidAmerican Energy Holdings Company, whose core business is in coal, issued \$1bn in bonds to finance solar power plants in California, including Topaz Solar, which is the largest solar plant in the world as of 2014.⁴⁶ Correspondingly, investors supporting issuances by such organizations may facilitate quicker adoption of sustainable

operations. Companies and organizations may be more inclined to increase sustainable operations if capital is readily available. Finally, companies and organizations issuing green bonds that strictly conform to non-controversial, widely accepted green bond criteria⁴⁷ may be able to improve their reputation for sustainability.

⁴⁵ *Supra* note 9, p.33.

⁴⁶ Lowder, “MidAmerican Takes Solar Out to Wall Street”, NREL, 2013. Available at: <https://financere.nrel.gov/finance/content/midamerican-solar-thin-film-utility-scale-project-Topaz-550-MW-megawatt-bond-financing>.

⁴⁷ See “Standardization of Terms & Concepts” section below.

case study

TOYOTA

ISSUER: Toyota Financial Services

COUNTRY: Japan

BACKGROUND: Toyota issued the auto industry's first ever asset backed green bond issuance, totaling \$1.75bn (increased from \$750 million due to strong investor demand). The bonds are backed by Toyota's auto loan portfolio. The approximately \$1bn in proceeds from the deal have been ring fenced to finance sales and leases of new Toyota and Lexus gas-electric hybrid or alternative fuel powertrain vehicles.

DEAL STRUCTURE:

Tranche	Maturity	Amount	Coupon Rate
A-2	1.0 year	\$560 million	0.41%
A-3	2.06 years	\$480 million	0.67%
A-4	3.17 years	\$165.25 million	1.18%

The bond was issued in three tranches, each with a different rating but all investment grade. Toyota retained the class A-1 money market and the subordinated class B notes. It also retained approximately 10% of each of class A-2 notes, the class A-3 notes, and the class A-4 notes.

CREDIT RATINGS: Moody's: Aaa; Standard & Poor's: AAA

INVESTORS: "Most of the investors we saw are traditional buyers of ABS, of Toyota deals, but we but did see some new investors as well as existing investors that expressed a preference for this transaction because it is green," said Adam Stam, manager of ABS and structured finance at Toyota Financial Services. While it's hard to say whether existing investors bid for more than they would have for a conventional deal, "[W]e got some pretty good sized orders. There are some investors that have substantial portfolios of social responsible funds, and that could lead to bigger orders in some cases."

UNDERWRITER: Citigroup structured the bond issuance while Bank of America Merrill Lynch and Morgan Stanley acted as joint book runners.

MARKET ACCESS

In addition to liquidity, supply, and credit rating data, investors must be able to access new products in order to invest in them. Until such products are integrated into mainstream funds, indices, and other products, retail investment will be limited.

Indices

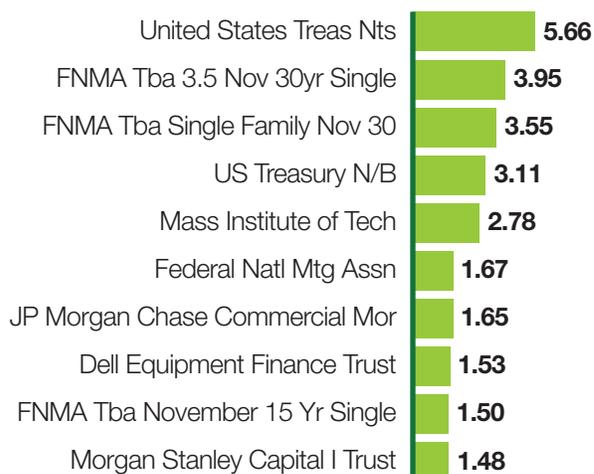
Mechanisms for green bond investment are emerging. In March of 2014, Solactive, which provides indices, launched its Solactive Green Bond Index (SGBI),⁴⁸ which allows investors to more easily track and participate in the green bonds market through increased transparency and availability of information. The SGBI is composed of all bonds that are categorized as green bonds, according to the Climate Bonds Initiative. To be included in the index, bonds must have at least \$100 million in outstanding bonds and a minimum of six months remaining until maturity. Solactive has also announced that it will launch a Climate Themed Bond Index later this year.⁴⁹ MSCI Barclays has also announced the expansion of their ESG services to include a green bonds index in coming years.⁵⁰

Funds & Other Bond Products

As the green bond market develops, investors will also benefit from the creation of other green-themed investment options that provide access to green bonds. Most frequently, green bonds will be incorporated into balanced and core funds such as Green Century's Balanced Portfolio, which invests a portion of its portfolio in holdings that support emissions reductions or energy efficiency projects,⁵¹ or State Street's "High Quality Green Bond Strategy".⁵² Less frequent, but likely to multiply, are bond funds focused on green bonds, such as the Calvert Green Bonds Fund, launched in October of 2013,⁵³ or the Nikko Asset Management's World Bank Green Bonds Funds, out of Japan, which are 80% invested in green bonds. Figure 6 details the primary holdings of the Calvert Green Bonds fund as of February 28, 2014.⁵⁴

Figure 6: Calvert Green Bond Fund Holdings⁵⁵

as of 9/30/2014



As innovative Green Bond products are developed, a broader group of investors will be able to access this market in a manner that reflects their investment mandate, risk appetite, and minimum investment size.

48 An index is a basket of assets aggregated by theme; equity examples include the S&P 500 and the Dow Jones Index. Not only do investors use these indexes as economic indicators or benchmarks against which other strategies are compared, but they can invest in the index itself.

49 Solactive Green Bond Index, Solactive. Available at: <http://www.solactive.com/?s=financi&index=DE000SLA0FS4>.

50 "Barclays and MSCI to offer Green Bond Index as part of ESG Fixed Income Index Family", Barclays, 2014. Available at: <http://www.newsroom.barclays.com/Press-releases/Barclays-and-MSCI-to-offer-Green-Bond-Index-as-part-of-ESG-Fixed-Income-Index-Family-b8c.aspx>.

51 See Green Century, Balanced Fund. Available at: <http://greencentury.com/our-funds/balanced-fund/>.

52 Rohrbrein, "SSgA launches green bond investment strategy as market grows", Pensions & Investments, Oct 2011. Available at: <http://www.ipe.com/ssga-launches-green-bond-investment-strategy-as-market-grows/42545.fullarticle>.

53 "Calvert Green Bond Fund (CGAFX)", Calvert, Feb 2014. Available at: <http://www.calvert.com/fundProfile.html?fund=898&fundOwner=C>.

54 *Id.* The Calvert "Green Bond" fund has a high proportion of Treasury notes, which has raised questions among green bonds stakeholders as to whether the fund is sufficiently "green".

55 *Supra* note 53.

GREEN BOND MARKET OBSTACLES & CHALLENGES

The remarkable growth of the green bond market has not come about without a number of challenges, many of which are not resolved.

STANDARDIZATION OF TERMS & CONCEPTS

The most significant obstacle facing the green bond market is gaining consensus regarding what constitutes a green bond. For the green bonds market to grow, standardization of terms is paramount. Investors must be able to understand what they are buying, compare products, and ensure that products meet their financial and environmental investment goals and mandates. Similarly, issuers will benefit from clarity, so that investors understand what products they are investing in and do not have unmet expectations. Critical unanswered questions include how a green project should be evaluated, who is responsible for measuring 'greenness', the metrics used to measure 'greenness', what information is provided to investors, and the relevance of whether a project would have been funded without a green bond.

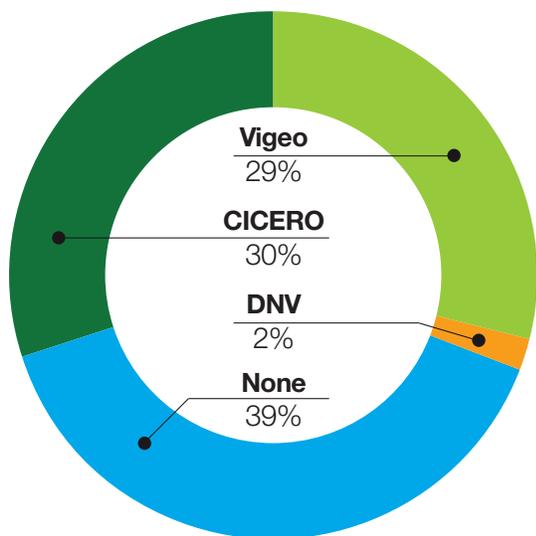
There is a wide range of technology and infrastructure whose green credentials are controversial. While some would consider these projects 'green', if a green bond were issued to finance these types of projects, it could face a range of consequences — from scrutiny and negative reviews to allegations of 'greenwashing'⁵⁶ that could undermine the product. Controversial project categories may include, but are not limited to:

- Waste to energy via incineration
- Nuclear power
- Projects related to genetically modified organisms
- Tree plantations and carbon offset projects
- Carbon capture and storage
- Biofuels and biomass
- Aquaculture
- Hydropower
- Natural gas extraction and generation
- Improvements, retrofits, and efficiency projects at fossil fuel extracting and generating facilities
- Climate mitigation

⁵⁶ "Greenwashing" is the unjustified appropriation of environmental attributes by a company, an industry, a government, a politician or even a non-government organization to create a pro-environmental image. "Definition of Greenwashing", Investopedia. Available at: <http://www.investopedia.com/terms/g/greenwashing.asp>.

In the absence of agreement on what is a 'green bond', when funding potentially controversial projects such as those listed above, issuers should be very clear about the type of project(s) they are funding to enable purchasers to choose whether they support the proposed projects or not. Currently, issuers of labeled green bonds often rely on third-party verification to evaluate the green credentials of the bond issuance (see Figure 7, below).

Figure 7: Proportion of Bonds with Third-Party Review (Specifying Company) 2013-2014⁵⁷



To scale the green bonds market to the level required to adequately respond to climate change, a more standardized approach to defining what can be marketed as 'green' is necessary. Work is underway on this issue. For example, the Climate Bonds Initiative, a leading non-governmental nonprofit in the space, is establishing science-based criteria and standards for what constitutes green for various project types. Standards on wind and solar have been fully developed, with standards on energy-efficient buildings, low carbon transportation, water, and agriculture in the pipeline. Potential green bond issuances can be submitted for certification under these standards.

Some investors have responded to the lack of standardization around what constitutes a green bond by relying on manager-specific criteria based on internal research. For example, as described above, Calvert has created custom criteria for its Green Bonds Fund. Similarly, State Street Global Advisors applies the same ESG screen to all potential investments, labeled green or not, and makes an investment decision based on how the bond stands up to the ESG screen.

⁵⁷ *Supra* note 12, p.6.

case study

MIDAMERICAN TOPAZ SOLAR

ISSUER: MidAmerican Energy Holdings

COUNTRY: United States

BACKGROUND: MidAmerican Energy, a subsidiary of Berkshire Hathaway, purchased the 550 MW Topaz solar PV farm in San Luis Obispo, California from First Solar in 2011. It has since issued \$850 million in green bonds to finance construction costs. This was the first renewable project to be rated by Standard & Poor's, Moody's, and Fitch, deeming the bond 'investment grade'. In addition, this issuance marked the first time in several years that a renewable energy project tapped the capital markets for project finance.

DEAL STRUCTURE: The Topaz issue was for a series of senior-secured, 144A regulation S bonds. The initial \$700 million issuance was oversubscribed by more than \$1.2bn in under two weeks, which prompted MidAmerican to raise the amount to \$850 million, speaking to the high caliber of this investment and the high demand for the product. Standard & Poor's identified the following factors as being beneficial to this project: Berkshire Hathaway doubtlessly inspires investor confidence, First Solar is considered the most experienced engineering, procurement, and construction (EPC) firm for a project of this size, construction risk mitigation measures were present in the EPC contract, First Solar has a heavy stake in the O&M contract, and cost caps were built into the O&M contract.

Project Name	Size	PPA with	Technology	Location	Estimated Capital Costs	EPC Contractor (and original owner)	Expected Completion Date
Topaz Solar Farm	550 MW	PG&E (25 years for ~ \$150/MWh)	Cadmium Telluride thin-film PV	San Luis, Obispo, CA	\$2.4bn	First Solar Inc.	2015

Topaz has no tax equity partner; MidAmerican will internalize ITC and issue 50% debt to supplement its 50% equity stake

Amount	Maturity Date	Coupon Rate	Underwriters	Ratings
\$850 million (upped from \$700 at first issuance). Second tranche of around \$400 million planned for future date.	September 30, 2039	5.75%	Royal Bank of Scotland, Barclays Capital, Citi	Fitch: BBB- S&P: BBB- Moody's: Baa3

INVESTORS: At the time of issuance, with 30-year treasuries yielding about 3.4%, many investors were seeking a longer-term investment at a higher return. Solar fits this need, with predictable cash flows guaranteed by power purchase agreements for over two decades. "After tax, you're looking at returns in the 10% to 15% range" for solar projects, said Dan Reicher, director of Stanford University's center for energy and project finance. "The beauty of solar is once you make the capital investment, you've got free fuel and very low operating costs."

TRANSPARENCY & REPORTING

In the U.S., anything beyond the statement of information is a voluntary disclosure. So far, investors have purchased green bonds mainly based on credit ratings and the issue prospectus; questions about bond 'greenness' have not hindered the market's growth.⁵⁸ Green bonds offer investors greater transparency on use of proceeds, and issuers have responded by voluntarily publishing reports describing the use of the proceeds from green bond issuances. For instance, the State of Massachusetts issues a quarterly report updating investors on the status of green bond financed projects whose spending categories included areas such as water conservation, energy efficiency, and land restoration, among others. Similarly, IFC reports total issuances data, project requirements, and briefly describes funded projects.⁵⁹ Looking forward, as the U.S. Securities Exchange Commission fulfills its promise to increase transparency in bond markets,⁶⁰ it is unclear whether the issue prospectus will be sufficient reporting for green bonds.

While green bonds have been successful to date with voluntary reporting mechanisms, as the market grows, transparency and clarity is becoming an increasingly important issue. Non-governmental organizations have convened stakeholder groups to establish frameworks for green bond definitions and governance. Importantly, a consortium of eleven investment banks⁶¹ (a group which later grew to 25+) produced the Green Bonds Principles, which are a key step toward the adoption of uniform assurance procedures. The Green Bonds Principles suggest issuers use a clear and well-understood methodology for project selection,⁶² which can be accomplished by third-party verification of project 'greenness' at the time of issuance. The Green Bonds Principles also recommend accounting methods for outstanding green bonds, and annual third-party audits of green bonds use of proceeds.⁶³

58 Wood & Grace, "A Brief Note on the Global Green Bond Market", Initiative for Responsible Investment at Harvard University, 2012. Available at: <http://hausercenter.org/iri/wp-content/uploads/2010/05/IRI-Green-Bonds-note.pdf>.

59 "Green Bonds", IFC, 2014. Available at: <http://www.ifc.org/wps/wcm/connect/353c8f004325cabfa308ef384c61d9f7/Green+Bonds+March+2014+final.pdf?MOD=AJPERES>. See also: "IFC Thematic Bonds", IFC, 2013. Available at: <http://www.ifc.org/wps/wcm/connect/40d57a004851d833b735ffc046daa89/Green+Bond+April+2013.pdf?MOD=AJPERES>.

60 Alden, "S.E.C.'s Mary Jo White Seeks to Shine Light Into Opaque Bond Markets", New York Times, June 20, 2014. Available at: http://dealbook.nytimes.com/2014/06/20/s-e-c-chief-seeks-to-enhance-disclosure-in-bond-markets/?_php=true&_type=blogs&_r=0. See also: Halas, "Green Bonds Boom Needs a Regulatory Lasso", Reuters, July 29, 2014. Available at: <http://www.reuters.com/article/2014/07/29/green-bonds-idUSL6N0PR50K20140729>.

61 Green Bond Principle signing banks include: Bank of America, Citi, Credit Agricole CIB, JP Morgan & Chase, BNP Paribas, Daiwa, Deutsche Bank, Goldman Sachs, HSBC, Mizuho, Barclays, Mitsubishi, Morgan Stanley, Rabobank, SEB, and others. "Green Bond Principles Governance Established", 2014. Available at: <http://mediacommun.ca-cib.com/sitegenic/medias/DOC/94509/2014-04-14-green-bonds-principles-governance-gb.pdf>.

62 *Supra* note 10.

63 *Id.*

Though reporting is currently voluntary, follow-up use of proceeds reporting and similar transparency tools are likely to become standard in the near future, which will help encourage the market's growth.

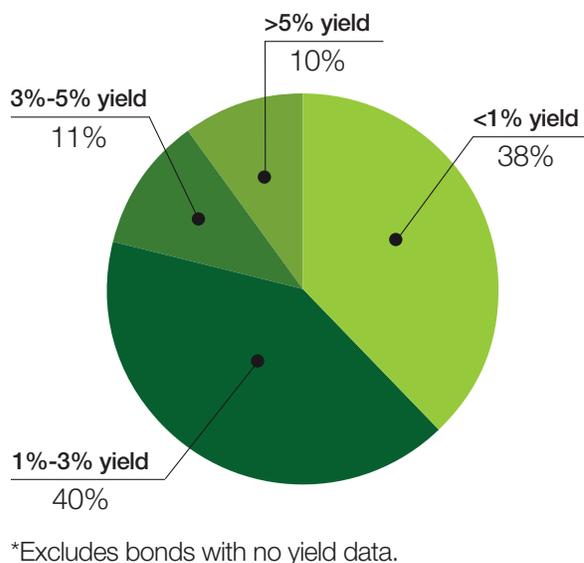
Figure 8: Transparency & Reporting Guidance Recommended by Green Bond Principles

Component	Description
1. Use of Proceeds	The issuer should declare the eligible green project categories (including indirect investments) in the Use of Proceeds section of legal documentations for the security. Environmental benefits should be described and quantified where feasible.
2. Process for Project Evaluation and Selection	The issuer should establish a process for determining how the investment fits within eligible green project categories and establish impact objectives from the selected projects. It is recommended that all issuers engage in similar environmental reviews of projects as those conducted by Multilateral institutions (e.g. World Bank).
3. Management of Proceeds	The net proceeds should be moved to a sub-portfolio or tracked by the issuer and attested to by an internal process that will link the issuer's lending to the project operations. The management process tracking proceeds should be publicly disclosed, with the integrity of projects being enhanced by a third-party auditor.
4. Reporting	In addition to reporting the Use of Proceeds, the issuers should report annually or semi-annually updates on the specific investments made from Green Bond proceeds with quantitative and/or qualitative performance indicators. Standardization in this regard has been made in the last several years.

YIELD

Yields on green bonds are comparable to yields on non-green bonds, and the usual market forces determine green bond yields: issuer's credit rating, savings rates, inflation, and interest rates. The apparent popularity of green bonds also means that going forward, issuers may have the opportunity to trade increased transparency on use of proceeds to investors for offering a lower coupon, a tradeoff many purchasers seem to be inclined to accept. This trend would provide issuers with the potential to fund projects at a lower cost of capital than existing alternative financing options, thus incentivizing issuance and enabling projects that would have otherwise been uneconomic. It is unclear whether green bonds with lower yields would hold their value relative to other bonds as interest rates rise, and whether investors will be interested in accepting a lower yield for the environmental and transparency benefits green bonds offer. As issuers with lower credit ratings issue green bonds, though, investors can expect more comparatively higher yielding green bonds, which can better compete with non-green bonds in a higher interest rate environment.

Figure 9: Yield on Outstanding labeled Green Bonds⁶⁴



Source: Bloomberg, TD Economics

64 *Supra* note 2.

NEED FOR SECONDARY MARKET

The near absence of a secondary market for green bonds has led to supply and liquidity challenges. As noted, there is currently an insufficient volume of green bond issuances to meet investor demand—many green bond issuances to date have either been oversubscribed or increased due to high demand. Without new issuances, prices may increase and yields can remain artificially low. This scarcity benefits issuers, but not consumers.

There have been few sizeable bond issuances in the U.S., and fewer yet in dollars, with most issuances so far concentrated in Europe. A minimum benchmark issuance size of \$250 to \$300 million is commonly thought to be the ‘low end’ of institutional bond issuances,⁶⁵ yet many U.S. green bond issuances have been smaller than this threshold. The relatively small size of the U.S. green bonds market and the absence of a robust secondary market creates liquidity risk for investors, although, so far, many of the green bond customers comprising the limited secondary market are retail investors who prefer to buy and hold.⁶⁶ To address supply, U.S. issuers must increase in size, number, and diversity financial offerings at an array of ratings, yields, coupons, and maturities. Similarly, investors, intermediaries, and other stakeholders must continue to expand the market infrastructure underlying these bonds, increase the number and type of participants, and grow the awareness of the green bonds among investors.



⁶⁵ *Supra* note 34.

CONCLUSION

Though burgeoning, the green bond market shows tremendous promise and is growing at a remarkable rate. The market will continue to grow as asset-backed products and corporate bond offerings build off the momentum generated in the past several years. We anticipate that the development of this market will be iterative, as new financial products and their investors interact with advocates and policy makers who collectively contribute to what defines a green bond. Standardization of process, project descriptions, and reporting requirements will also accelerate adoption. In the interim, the Green Bond Principles will provide issuers with guidance and encourage transparency and disclosure for investors in this rapidly evolving market.

Though the U.S. has so far produced a limited number of domestic issuers, growing publicity and the booming investor demand will help generate more supply and liquidity. Constant oversubscriptions of issuances are indicative of this trend. Investor appetite for green bonds will likely increase over time, driven by greater public awareness regarding sustainability issues, demographic shifts in wealth, and growing shareholder demand for integration of ESG criteria into long-term portfolios. Moreover, pressure from climate change and environmental constraints will create intense, ongoing demand for low carbon and green infrastructure financing.

While green bonds are not a panacea for closing the tremendous financing gap needed for sustainable projects, they can provide a significant proportion of the needed capital. Green bonds also offer an opportunity to advance important environmental projects while sidestepping the U.S.' paralyzed national political processes, thus moving the economy in a cleaner more sustainable direction without legislation.

To continue the growth of the green bond market, issuers of green bonds must carry on work with investors and intermediaries to improve transparency around green bonds and encourage complementary products, such as indices, funds, and standard rating criteria. Trailblazing issuers have provided models for increased green bond use of proceeds transparency, as they publish reports on their bond offerings and trace their use of proceeds. Additionally, the Climate Bonds Initiative has begun to publish information for consumers and the public, which will help push the green bonds market into a more recognizable and well-established product with clear standards. Finally, time and maturity will add to the attractiveness of this asset class. As more organizations issue green bonds in the U.S., the market infrastructure necessary to establish green bonds as a viable mainstream product will emerge.



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