

SECTOR IN-DEPTH

20 April 2016

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Green Bonds - Global

China Bonds Drive Q1 Issuance Record; Global Market Set for New Full-Year High

Green bond issuance reached \$16.9 billion in the first quarter of 2016, lifted by the strong volume achieved by several transactions originated by three China-based financial institutions issuing into the local market. Assuming first quarter volume can be sustained throughout the year, total green bond issuance is likely to exceed our 2016 projection of \$50 billion, and potentially reach almost \$70 billion.

- » **The top transactions during the quarter, each at \$1 billion or greater, included five issues from four issuers that raised a total of \$9.4 billion, or 55% of total issuance.** These were [Shanghai Pudong Development Bank Co. \(Baa1 negative, ba1\)](#) which alone raised a combined total of about \$5 billion in two separate deals, followed by [China Industrial Bank \(A1 negative, baa2\)](#).¹ in the amount of about \$1.5 billion, [Apple, Inc. \(Aa1 stable\)](#) with a \$1.5 billion tranche and [NWB Bank \(Aaa stable, Aaa, a1\)](#) in the amount of \$1 billion. Apple, Inc. issued the largest non-financial corporate green bond in the US to date. Another noteworthy bond issue in the first quarter was the \$622 million green Schuldschein transaction issued by Nordex (unrated) to support renewable energy projects, the first transaction of its type.
- » **Renewable energy and energy efficiency are projects of choice.** That said, other eligible project categories, such as clean transportation and climate change adaptation, have made gains.
- » **China eclipses other issuers in first quarter.** In addition to lifting overall global volumes, green bonds issued in China reached \$7.9 billion for the quarter, accounting for nearly half of the quarter's total volume and placing China as the top issuer for the first time. US bond issuers ranked second, coming to market with \$3.4 billion in green bonds, or 20% of global volume.
- » **Financial institutions continue to be strong issuers.** Financial institutions (excluding the development banks) continued to issue the lion's share of green bonds in dollar terms, bringing to market \$9.7 billion, representing 57% of total issuance.

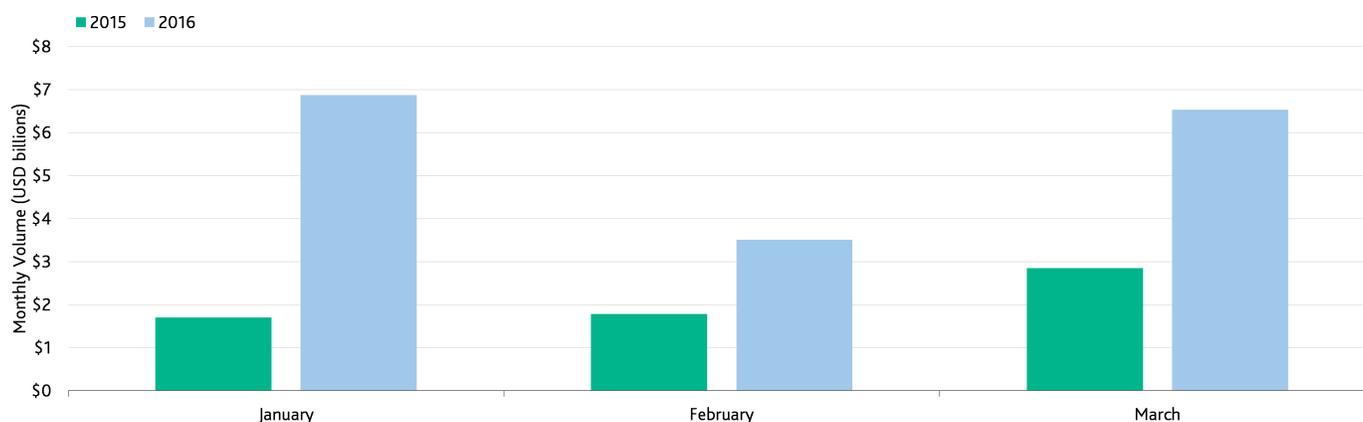
- » **All Moody's rated transactions in the quarter are investment grade.** Green bond transactions all fell within the investment-grade range, based on Moody's credit ratings assigned to green bonds in the first quarter. Non-investment grade issuance was absent for the second consecutive quarter, potentially a fallout from the late 2015 to first quarter 2016 financial distress experienced by three non-investment grade green bond issuers.
- » **Limited Canadian issuance to-date may be poised for an uptick.** While only two Canadian green bonds came to market in the first quarter, sentiment in Canada for issuing green bonds may be undergoing a positive shift in light of the ascension to power last October of the Liberal Party and its environmentally friendly policies.
- » **Signing of the Paris Agreement could spur additional green bond issuance.** The Paris Agreement, which aims to keep global warming well below 2°C above pre-industrialized average levels, is due to be signed by at least 80 countries on 22 April at the UN Headquarters in New York City. This may catalyze further green bond issuance.
- » **Moody's issues Green Bonds Assessment (GBA) methodology.** Moody's issued its Green Bonds Assessment (GBA) methodology. The methodology intends to provide an evaluation of the bond issuer's management, administration, allocation of proceeds to and reporting on environmental projects financed with the proceeds derived from green bond offerings.

Green Bond Transactions Reach Record Volume in the First Quarter

Green bond issuance reached \$16.9 billion in the first quarter of 2016, nearly three times the volume issued in the first quarter of 2015 and in excess of the \$15.2 billion that came to market in the fourth and strongest quarter of last year during which the Paris Climate Agreement was being finalized (see Exhibit 1). Assuming first quarter volume can be sustained throughout the year, total green bond issuance is likely to exceed our 2016 projection of \$50 billion and reach almost \$70 billion.

Exhibit 1

2016 Q1 Volume Outpaces Similar Period in 2015



Source: Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; MSRB Electronic Municipal Market Access; various issuer websites; OANDA currency converter

The first quarter saw 31 distinct issuers come to market with a total of 56 transactions, the largest of which was launched by the Shanghai Pudong Development Bank, with its two green bonds of CNY 20 billion and CNY 15 billion (combined total \$5.4 billion). These deals offered into the local market helped propel Chinese issuance to new heights, pushing overall global volumes higher and significantly elevating China's issuance share to 47% of overall global volume. In February, Apple issued the largest non-financial corporate green bond in the United States to date, designating a \$1.5 billion tranche of notes placed in February as green. This high profile issuance may pave the way for additional corporate issuance in the US moving forward. Another notable issuance that came to market just before the close of the quarter to support renewable energy projects is the EUR 550 million Nordex Schuldschein, a loan agreement between two parties that is typically assigned by the lender to one or more investors.

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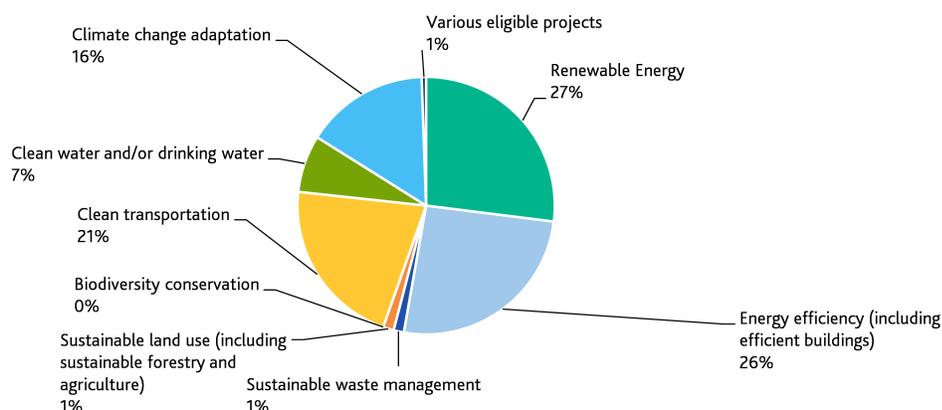
Renewable Energy and Energy Efficiency are Projects of Choice

The majority of first quarter green bond issuance was earmarked for renewable energy and energy efficiency projects (see Exhibit 2). This majority allocation remains unchanged since Moody's began tracking use of proceeds in the second quarter of 2015, but other eligible categories under the Green Bond Principles have begun to increase as a share of total issuance.

Issuance designated for clean transportation, for instance, increased to 21% of total issuance, driven by \$7.9 billion of Chinese green bonds that identified clean transportation for possible investment of proceeds. Additional large issuance increasing the share of clean transportation included \$782.5 million of green bonds issued by the [Metropolitan Transportation Authority \(A1 stable green bond rating\)](#) and a \$500 million green bond from [Hyundai \(Baa1 stable\)](#) intended to support loans for hybrid vehicles. The Hyundai deal follows a \$1.25 billion green bond issued by Toyota in June 2015 for similar projects but issued in the form of an ABS security.

Exhibit 2

Majority of Q1 Green Bond Proceeds are Earmarked for Renewable Energy or Energy Efficiency Projects



Projects qualifying under more than one eligible project category are accounted for in each of the respective project categories.

Source: Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; various issuer websites; OANDA currency converter; Moody's Investors Service analysis

Financial Institutions Continue to be Strong Issuers

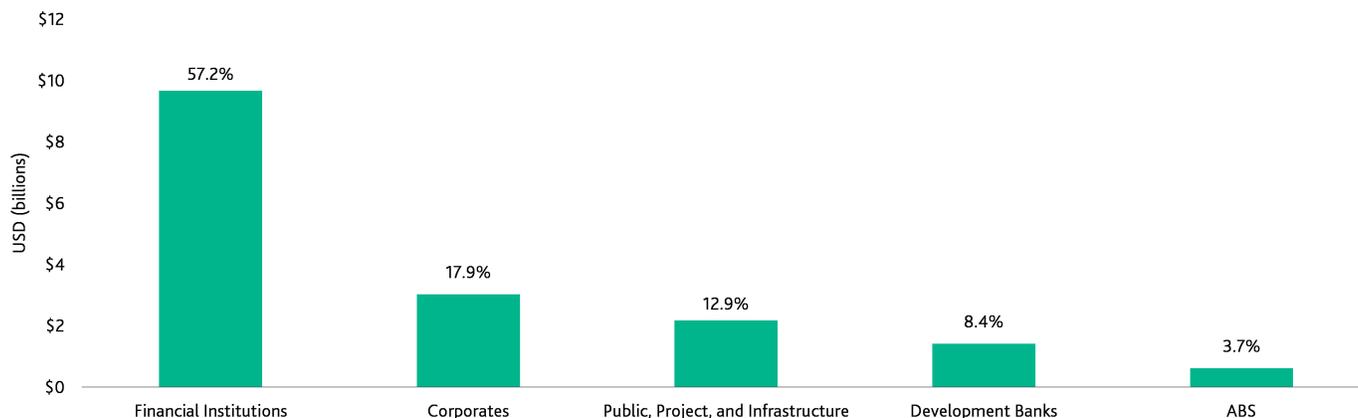
Financial institutions (excluding the development banks) continued to issue the lion's share of green bonds in dollar terms (see Exhibit 3). In the first quarter of 2016, almost 57% of issuance volume was attributable to financial institutions, compared to approximately 40% for the full year 2015 and 58% in the fourth quarter. This increase was driven by Chinese banks, which issued a combined total of \$7.5 billion in green bonds and accounted for 78% of the volume attributed to financial institutions. Netherlands-based NWB Bank was a distant second with its \$1 billion offering.

At the same time, the share of development banks continued to decline, reaching 8%. This compares to almost 19% of total issued throughout 2015.

Exhibit 3

Financial Institutions Account for Majority of Q1 Green Bond Volume

Issuance Volume (USD billions) and Percent of Total Q1 Issuance



Source: Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; MSRB Electronic Municipal Market Access; various issuer websites; OANDA currency converter; Moody's Investors Service analysis

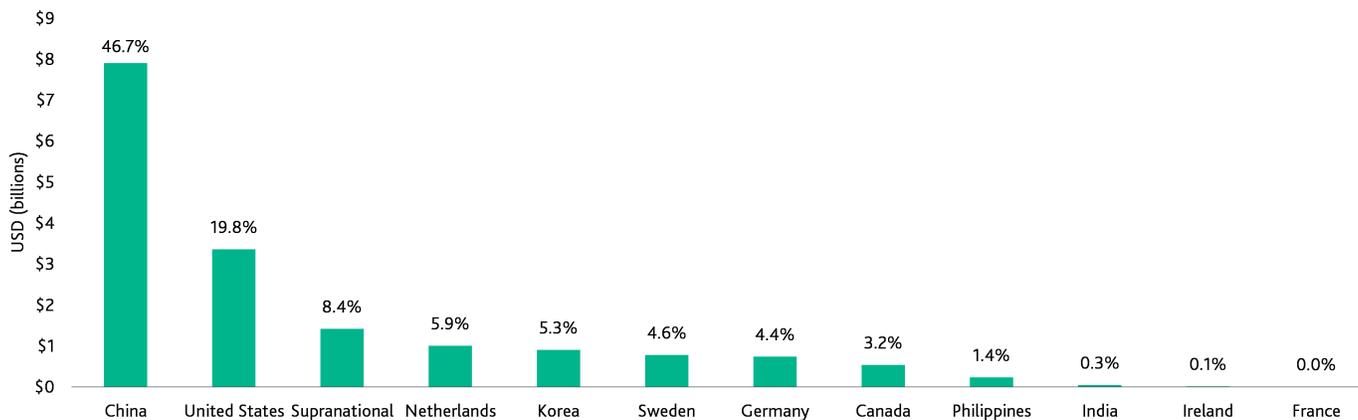
China Eclipses Other Issuers in the First Quarter

Green bonds from Chinese issuers totaled \$7.9 billion for the quarter, accounting for nearly half of the quarter's total volume (see Exhibit 4). The level marks roughly a 500% increase over 2015 calendar year, when Chinese issuers came to market with \$1.3 billion and accounted for just 3% of the year's total. Of the \$7.9 billion from Chinese issuers in the first quarter, \$5.4 billion was issued by Shanghai Pudong Development Bank in two separate deals during January and March, both intended to fund a variety of eligible green projects. With the Chinese government encouraging significant green investment, we expect Chinese issuers to continue to be prominent in the global green market throughout 2016 and beyond.

Exhibit 4

Chinese Issuers Represent Nearly Half of Q1 Green Bond Volume

Issuance Volume (USD billions) and Percent of Total Q1 Issuance



Source: Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; MSRB Electronic Municipal Market Access; various issuer websites; OANDA currency converter; Moody's Investors Service analysis

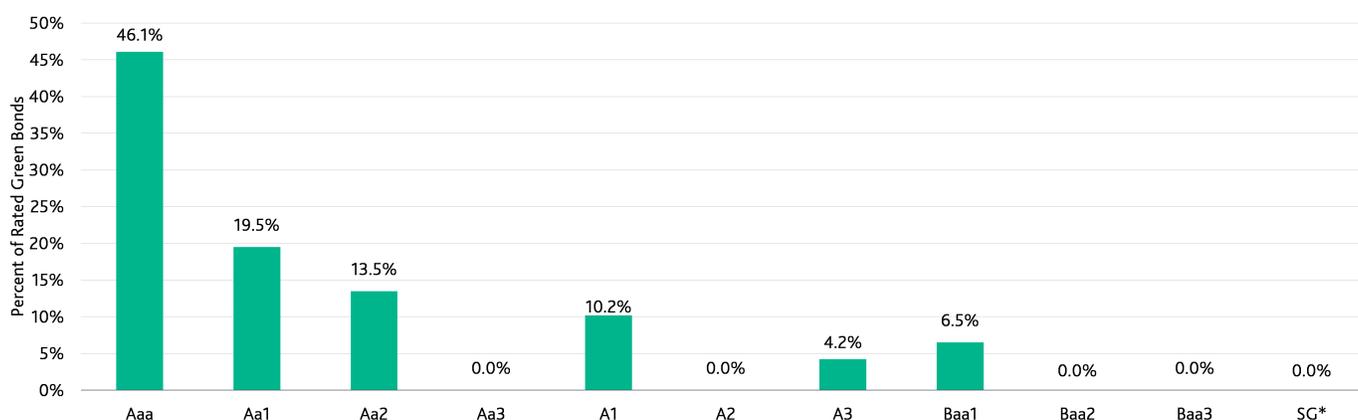
While displaced as the top issuer, US bond issuers came to market with \$3.4 billion in green bonds, or 20% of global volume. This is roughly in line with last year, in terms of share of market, when the US accounted for 22% of global green bond volume. By contrast, France dropped to last place with under 1% of total issuance in the first quarter after registering a 12% market share in 2015 and a strong \$3.4 billion in fourth quarter volume, or 22%.

All Moody's Rated Transactions in the Quarter are Investment Grade

First quarter green bond transactions all fell within the investment-grade range, based on Moody's credit ratings assigned to green bonds in the first quarter. These accounted for 45% of total issuance by dollar volume, or 61% by number of transactions. The large variance in coverage is attributable to \$7.9 billion in Chinese bonds that sold in the local market but were not explicitly rated by Moody's (see Exhibit 5).

Exhibit 5

Q1 Moody's-Rated Green Bonds Were All Investment Grade



*SG represents all Moody's rated below investment grade ratings. Ratings represent ratings at time of issuance.

Source: Moody's Investors Service; Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; MSRB Electronic Municipal Market Access; various issuer websites; OANDA currency converter

For the second quarter in a row, non-investment grade transactions were absent versus 8% that were issued in 2015. This may be attributable to fallout from the late 2015 to first quarter 2016 financial distress experienced by three non-investment grade green bond issuers, described further on in this report.

Sixty-One Percent of Bonds Secured an Assurance

Thirty-four transactions, or 61% based on the number of issues and a similar percentage based on dollar volume, received assurances, either in the form of second party opinions, audits, or third-party certifications. This is in line with 59% of transactions in 2015. CICERO led based on number of transactions but Ernst & Young coverage extended to \$6 billion of China green bonds whose reviews ensure that the bonds meets the requirement of the Peoples Bank of China (PBoC) guidelines and the projects are aligned with the catalogue of projects developed by the Green Finance Committee.

In the US Apple, Inc. secured an assurance in the form of a second opinion from Sustainalytics to develop project eligibility criteria and processes for compliance with the Green Bond Principles. At the same time, Apple intends to secure and distribute annual reports prepared by a registered public accounting firm on its examination of management's assertions. In this way, Apple eclipsed assurance practices adopted by other US green bond issuers.

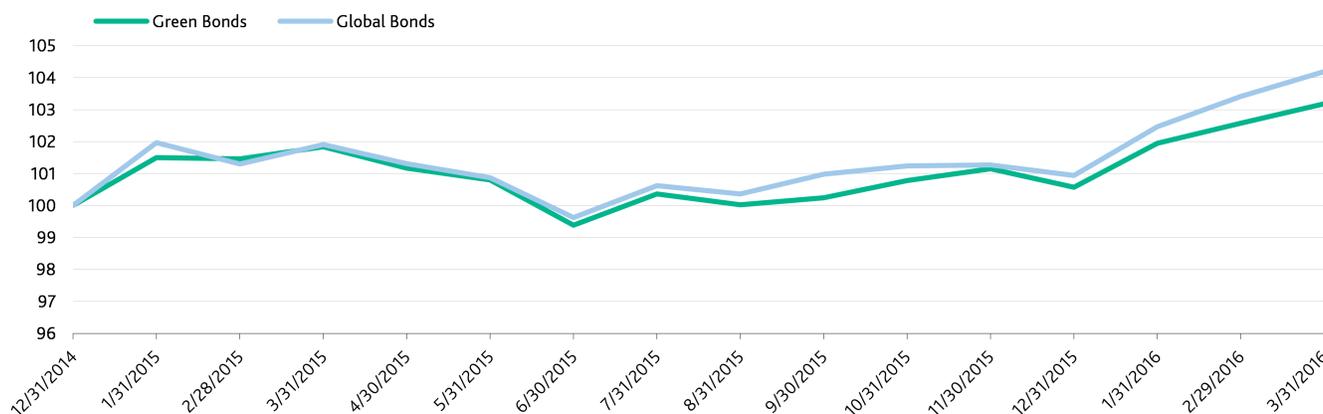
Broad Market and Green Bonds Produce Strong First Quarter Returns

Although concerns about economic growth and lower near-term expectations for interest rates hit financial equity prices broadly in the first quarter, bonds performed well. In the US, in particular, declining 10-year Treasury yields, which dropped from 2.27% to 1.78% at the end of the quarter, lifted bond prices. The BofA Merrill Lynch Global Bond Index registered successive monthly gains and ended the quarter up a strong 3.2% on a total rate of return basis. Green bonds were not far behind, gaining 2.6% (see Exhibit 6).

Exhibit 6

Green Bond Performance Continues to Largely Mirror Global Investment Grade Bond Performance

BofA Merrill Lynch Green Bond and Global Bond Indices: 31 December 2014 – 31 March 2016



Source: BofA Merrill Lynch Green Bond Index (Ticker = GREN), consisting of 101 issues as of 31 March 2016, with a total of \$66.425 billion in assets. BofA Merrill Lynch Global Broad Market Index (Ticker = GBMI), consisting of 23,561 issues as of 31 March 2016, with a total of \$47.484 trillion in assets. Both indices recalibrated 31 December 2014=100, with local currency used for indexing purposes to limit the effects of currency conversion rates on bond returns.

Further Credit Stress Experienced by Three Below Investment Grade Green Bond Issuers

Green bond issuance in the non-investment grade sphere has been limited, but at the same time higher than the proportionate share of high yield bonds worldwide. For example, non-investment grade bonds accounted for 8.3% of 2015 green bonds volume versus just 4.6% for the market as a whole based on the BofA/Merrill Lynch Global Index.² Yet this segment has experienced significant stress through the end of the first quarter due to developments affecting three non-investment grade issuers that raised capital for investments in alternative energy. This may limit future appetite for below investment grade debt in the sector.

In 2015, five issuers raised a total of \$3.0 billion in non-investment grade debt. Of this total, [TerraForm Power Operating LLC \(TERP, Caa1 negative\)](#) and [TerraForm Global Operating LLC \(GLBL, Caa1 negative\)](#), both YieldCo subsidiaries of SunEdison, Inc. (unrated), raised \$2.1 billion, or 69% of the total.

We downgraded the senior unsecured regular bond ratings of both TerraForm Power and TerraForm Global, both from B3, on 24 February 2016, owing to heightened concerns around the solvency of their sponsor, SunEdison, as well as liquidity considerations. Recent published reports suggest that SunEdison is nearing bankruptcy.

The third issuer, [Abengoa Greenfield, S.A. \(Ca negative\)](#), a subsidiary of Spain's construction company [Abengoa S.A. \(Ca negative\)](#), issued green bonds in 2014 to finance projects in the renewable energy, energy transmission and distribution, energy efficiency, water transmission and distribution, water management, bioenergy, and waste to energy spheres. Abengoa's senior unsecured rating was last downgraded on 2 March to Ca with its outlook remaining negative. The company avoided bankruptcy on 28 March when more than 75% of its lenders agreed to continue talks for as many as seven months on a proposed restructuring plan involving the firm's €9.3 billion financial debt, including a swap of 70% of its debt into equity. That said, this is considered a distressed exchange and a default under Moody's definitions.

Focus on Canada

Two Canadian green bonds came to market in the first quarter. The [Province of Ontario \(Aa2 negative\)](#), the first – and so far the only – Canadian province to issue green bonds, came to market on 16 January with its second green bond offering, this time upsized to about \$536 million. This follows its original October 2014 green bond offering in the amount of C\$500 million, both to help finance transit and other environmentally friendly projects across the Province. These include clean transportation, energy efficiency and conservation, clean energy and technology, forestry, agriculture and land management as well as climate adaptation and resilience. The second, a much smaller offering, was brought to market by CoPower (unrated), an online investment portal that offers retail investors environmental/social impact investments.

Canada's green bonds accounted for just a fraction of global issuance in 2015. Only two Canadian entities issued green bonds in 2015, for a total of \$473 million, approximately 1% of global issuance. With this, Canada ranked third from the bottom last year among 17 issuing countries, excluding the development banks. But sentiment in Canada for issuing green bonds may be undergoing a positive shift in light of the ascension to power last October of the Liberal Party's Justin Trudeau and the removal of the Conservative government, which was not considered environmentally friendly. This may lead to an increase in green bond offerings from Canada in the future.

Even before taking office, Premier Trudeau, according to published reports, emphasized the very real danger of climate change and pledged his support for what he called a "pan-Canadian" approach to the issue. In February, Premier Trudeau and the Liberal Party released their proposed climate policy plan which calls for a national carbon pricing policy and promises to work with Canadian provincial leaders to create a climate action plan following the treaty talks in Paris. He has also called for more stringent environmental reviews of pipeline applications, specifically to factor in a project's climate impact. The plan also calls for phasing out fossil fuel subsidies, expanding renewable energy and establishing a \$2 billion fund for clean energy projects.

Trudeau and the Liberal Party released their proposed climate policy in February. The plan calls for a national carbon pricing policy and promises to work with Canadian provincial leaders to create a climate action plan following the treaty talks in Paris. He has also called for more stringent environmental reviews of pipeline applications, specifically to factor in a project's climate impact, although Trudeau supports the Keystone XL pipeline project. The plan also calls for phasing out fossil fuel subsidies, in line with plans to fulfil a G20 pledge, expanding renewable energy and establishing a \$2 billion fund for clean energy projects.³

Canada is the world's ninth most carbon emitting nation, releasing over 550 million metric tons of carbon into the atmosphere in 2011, according to the Union of Concerned Scientists. The country has committed, pursuant to its Intended National Determined Contribution under the Paris Climate Agreement, to reduce its 2005 level of GHG emissions by 30% by the year 2030. While this was not considered an ambitious target for Canada, Trudeau's actions marks a shift in Canada's engagement on climate change, and this may in turn spur more green bond issuances.

Climate Agreement to be Signed in NYC on April 22

The Paris Agreement, which aims to keep global warming well below 2°C above pre-industrialized average levels and to pursue efforts to keep it from rising more than about 1.5°C, is due to be signed by at least 80 countries on 22 April 2016 at the UN Headquarters in NYC. But the submitted Intended Nationally Determined Contributions (INDCs) still fall short of the actions needed to achieve the higher 2°C target. Yet even to achieve a somewhat higher level could prove to be challenging. For example, in February the US Supreme Court, in a 5-4 ruling, temporarily delayed the Environmental Protection Agency from enforcing its Clean Power Plan rules until pending court challenges have been resolved. That said, operators of power plants are moving ahead to limit greenhouse gas emissions while preliminary data published by the International Energy Agency show that the amount of carbon dioxide released in 2015 is about the same as was released in 2014 and 2013.

Notwithstanding the aforementioned legal setback, momentum for tackling climate change continues to build and the signing of the Paris Agreement will likely serve as a further catalyst for additional green bond issuance.

Moody's Issued Green Bonds Assessment (GBA) Methodology

On 14 January 2016 Moody's proposed a new methodology for assessing green bonds in the form of a Request for Comment (RFC). We received various comments submitted via the Request for Comment Page on Moodys.com as well as other feedback (Summary of Responses to Request for Comment). Some of these were supplemented and informed by additional conversations with the respondents. Further material changes to the proposed methodology were made during the consultation period that extended to 12 February 2016, and these changes were reflected in the final version of the [Green Bonds Assessment \(GBA\) methodology](#) published by Moody's on 30 March 2016.

Appendix: Green Bond Issues in 2016 Q1

Issuer	Amount Issued (millions)	Currency	US Dollar Equivalent (\$M)	Month of Issue
China Industrial Bank	10,000	CNY	1,520	Jan-16
China Industrial Bank	900	CNY	137	Jan-16
China Industrial Bank	530	CNY	81	Jan-16
China Industrial Bank	520	CNY	79	Jan-16
China Industrial Bank	365	CNY	56	Jan-16
China Industrial Bank	331	CNY	50	Jan-16
Credit Agricole CIB	110	INR	2	Jan-16
EIB	1,000	SEK	116	Jan-16
EIB	500	EUR	541	Jan-16
Gaelectric	10	EUR	11	Jan-16
IFC	7	TRY	2	Jan-16
KfW	1,000	SEK	116	Jan-16
NIB	1,000	SEK	116	Jan-16
OPIC	5	USD	5	Jan-16
Province of Ontario	750	CAD	536	Jan-16
San Diego Unified School District	100	USD	100	Jan-16
Shanghai Pudong Development Bank Co.	20,000	CNY	3,040	Jan-16
University of Texas System	206	USD	206	Jan-16
World Bank	607	INR	9	Jan-16
World Bank	150	USD	150	Jan-16
Apple	1,500	USD	1,500	Feb-16
EBRD	180,000	IDR	13	Feb-16
EIB	300	SEK	35	Feb-16
EIB	250	EUR	273	Feb-16
Export-Import Bank of Korea	400	USD	400	Feb-16
Hero Future Energies	3,000	INR	44	Feb-16
Massachusetts Clean Water Trust	208	USD	208	Feb-16
MTA	445	USD	445	Feb-16
MTA	338	USD	338	Feb-16
OPIC	9	USD	9	Feb-16
Ramsey County (MN)	18	USD	18	Feb-16
Renovate America	218	USD	218	Feb-16
World Bank	379	INR	5	Feb-16
AP Renewables Inc	10,700	PHP	232	Mar-16
Bank of Qingdao	3,500	CNY	541	Mar-16
Bank of Qingdao	500	CNY	77	Mar-16
CoPower	0.3	CAD	0.2	Mar-16
EBRD	264,000	IDR	20	Mar-16
EBRD	886	INR	13	Mar-16
EIB	375	SEK	46	Mar-16
Georgia Power Company	325	USD	325	Mar-16
Hyundai	500	USD	500	Mar-16
IFC	7	TRY	2	Mar-16
IFC	1	USD	1	Mar-16
Kommuninvest	600	USD	600	Mar-16
Nordex	550	EUR	622	Mar-16

Issuer	Amount Issued (millions)	Currency	US Dollar Equivalent (\$M)	Month of Issue
NWB Bank	1,000	USD	1,000	Mar-16
Nya SFF	420	SEK	51	Mar-16
OPIC	6	USD	6	Mar-16
Shanghai Pudong Development Bank Co.	15,000	CNY	2,320	Mar-16
Sveaskog	700	SEK	86	Mar-16
Sveaskog	300	SEK	37	Mar-16
World Bank	45	USD	45	Mar-16
World Bank	16	BRL	4	Mar-16
World Bank	7	BRL	2	Mar-16
World Bank	6	BRL	2	Mar-16

Currency conversions use an exchange rate as of the last day of the issue month (e.g. March 31 for all March 2016 issues).

Source: Climate Bonds Initiative; Environmental Finance; Dealogic; Bloomberg; MSRB Electronic Municipal Market Access; various issuer websites; OANDA currency converter

Moody's Related Research

Methodology:

- » [Green Bonds Assessment \(GBA\), March 2016 \(188333\)](#)

Sector In-Depth:

- » [Green Bonds - Global: Green Bonds Assessment \(GBA\)-Summary of Responses to Request for Comment, April 2016 \(1022002\)](#)
- » [Environmental Risks and Developments: FSB Task Force Could Begin to Clear Fog on Climate Risk Disclosures, April 2016 \(1022814\)](#)
- » [Green Bonds - Global: Issuance Achieves Record Volume in 2015, Could Exceed \\$50 billion in 2016, February 2016 \(1012678\)](#)
- » [Environmental Risks and Developments: Paris Agreement Advances Adoption of Carbon Regulations; Credit Impact to Rise, December 2015 \(1011009\)](#)
- » [Cross Sector - Global: Moody's Approach to Assessing the Credit Impacts of Environmental Risks, November 2015 \(1010009\)](#)
- » [Environmental Risks: Heat Map Shows Wide Variations in Credit Impact Across Sectors, November 2015 \(1009845\)](#)
- » [Environmental, Social and Governance \(ESG\) Risks - Global: Moody's Approach to Assessing ESG Risks in Ratings and Research, September 2015 \(1007087\)](#)

Sector Comment:

- » [US Green Bonds: Municipal Green Bond Issuance Set to Exceed Fourth Quarter with Early 2016 Activity, January 2016 \(1012863\)](#)

Issuer Comment:

- » [Apple's First Green Bond Includes Rigorous Voluntary Verification Guidelines, February 2016 \(187811\)](#)

Endnotes

- [1](#) The bank ratings shown in this report are the bank's deposit rating, senior unsecured rating, if assigned, and the baseline credit assessment. The green bonds issued by Shanghai Pudong Development Bank Co. and China Industrial Bank (Industrial & Commercial Bank of China) were not rated by Moody's as they were issued in the domestic market.
- [2](#) BofA/ML. Total investment grade fixed income assets as of 4/8/2016 = \$47.9 trillion (sovereign, quasi and foreign government, corporates and cash). Non-investment grade and emerging markets rated below investment grade adds another \$2.4 trillion, based on the same Index data set.
- [3](#) Inside Climate News, 20 October 2015

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