

SECTOR IN-DEPTH

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Green Bonds - Global

Global municipal green bond issuance will continue to rise

Green bond issuance from municipal governments around the globe will continue to post record highs in coming years. Public sector issuers are drivers of public policy and are at the forefront of financing projects to adapt to climate change and transition to a low-carbon economy. Some issuers face material credit risks from both climate shocks and climate trends, and will increasingly turn to green bonds to finance projects addressing these risks. Investor demand for green bonds is strong and growing, fueling conditions for additional market growth. Though we expect strong growth in issuance to remain the dominant market trend, impediments exist that suggest green bonds will remain a small portion of municipalities' total financing.

- » **Global municipal green bond issuance will continue to post record highs in coming years.** Growth in issuance will be driven by market participants gaining increasing awareness of green bonds, as well as by strong and growing investor demand. We have already seen evidence of growth in the market with US municipal issuers bringing a record \$11.1 billion of green bonds to market in 2017, and regional and local governments outside the US issuing a record \$3.6 billion. Through the end of 2017, these entities had issued a cumulative \$25.4 billion and \$9.3 billion of green bonds, respectively.
- » **Municipal green bonds will finance a wide array of projects, led by transportation and water.** With growing awareness of the need to finance projects to mitigate and adapt to climate change and address other environmental concerns, municipal issuers globally will issue green bonds in greater quantities, with financed projects aligning with the missions of these entities. For municipal issuers in the US, 40% of green bond proceeds through 2017 were allocated to water projects, followed by transport at 33%. For regional and local governments outside the US, transport projects led at 32%. Municipal green bonds' use of proceeds stand in contrast to the broader market where renewable energy and energy efficiency projects have dominated, providing investors with greater diversification in terms of projects being financed.
- » **Green bonds will remain a small part of the overall market in the near term.** Despite the impressive growth of municipal green bonds over the past five years, we anticipate green bond financings will remain a small part of the municipal fixed income market globally. Through our conversations with various market participants, we believe there are a number of key factors holding back more rapid expansion of the municipal green bond market, including lack of a pricing benefit, reporting cost and complexity, limited issuer and other market participant awareness, current fixed income market conditions, and complex organizational structures and budgeting practices.

Global municipal green bond issuance will continue to post record highs in coming years

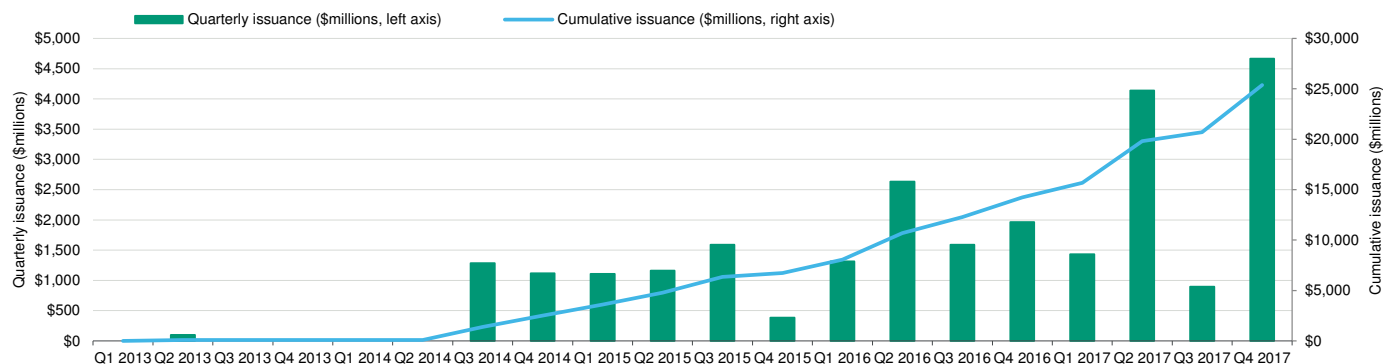
We believe municipal green bond issuance across the globe will continue to post record highs in coming years, driven by organic market growth as market participants gain increasing awareness of the green bond market, as well as strong and growing investor demand. Similar to the overall global green bond market, organic market growth will result from greater awareness among issuers and other market participants of the potential benefits of green bond issuance, including investor diversification and evidence of a commitment to sustainability. The latter benefit may be especially important for municipal issuers, as they may use green bond issuance as a tool to communicate their policy objectives to residents and other constituents.

Demand for green paper will remain buoyant and continue to outpace the supply of green bonds, as institutional investors seek to integrate sustainability into their asset allocation and risk management practices. Global assets managed using some form of sustainable investing strategy increased to \$22.9 trillion in 2016 from \$13.3 trillion in 2012, an increase of 73%.¹ While over half of these assets originate in Europe, the US has also seen assets under management more than double to \$8.7 trillion. With the number of signatories to the UN Principles for Responsible Investment now totaling approximately \$70 trillion in assets under management, the global sustainable investment pool will likely continue to deepen.² The upward trend of assets under management dedicated to sustainable investing strategies provides a clear indication of investor appetite for green securities, and we expect large institutional investors to consider creating additional explicit green or sustainable bond mandates in 2018 and beyond.

We have already seen global municipal green bond issuance grow in recent years as the trends of greater market awareness and continued strong investor demand accelerate. In the US, municipal green bond volumes have grown steadily since the [Commonwealth of Massachusetts](#) (Aa1 stable) issued the first US municipal green bond in June 2013. In the past three years, issuance has grown by 77%, 77% and 48%, respectively, culminating in record issuance of \$11.1 billion in 2017 (see Exhibit 1). Though an expected decline in overall US municipal issuance in 2018 may slow the green bond issuance growth rate this year, we expect total green bond volumes will continue to grow.³

Exhibit 1

US municipal green bond issuance growing every year

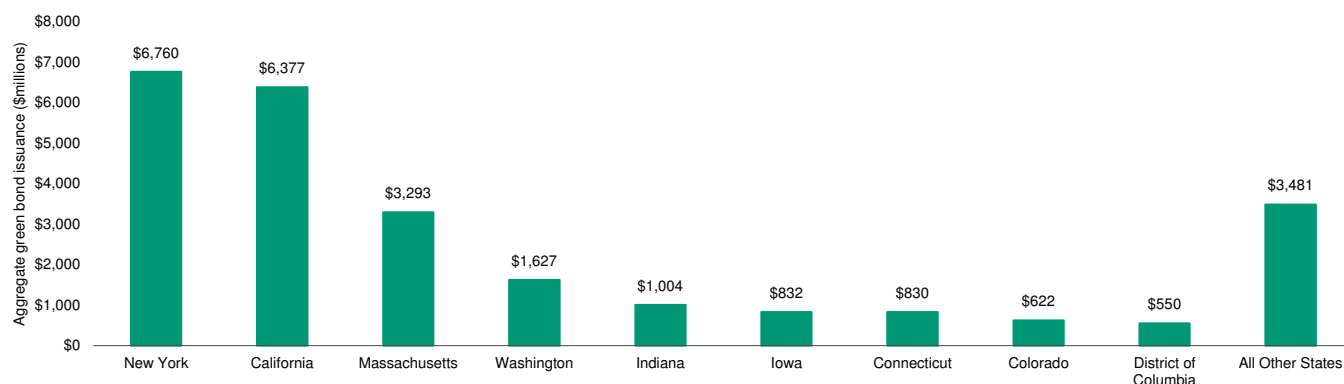


Sources: Municipal Securities Rulemaking Board's Electronic Municipal Market Access, Moody's Investors Service, DAC Bond

Between 2013 and 2017, US municipal issuers brought a cumulative \$25.4 billion of green bonds to market. This tops the cumulative green bond issuance from US financial and non-financial corporates combined. Issuers in these two sectors have been slow to enter the green bond market, and had only issued a combined \$15.1 billion of green bonds through the end of 2017, according to Climate Bonds Initiative data.

Issuers in a few states have dominated US municipal issuance to date. Through the end of 2017, issuers in New York, California and Massachusetts issued a combined \$16.4 billion of green bonds, or 65% of total US municipal issuance (see Exhibit 2). California leads the way in terms of number of transactions with its issuers accounting for 42 of 187 total green bond series, followed by New York issuers with 28 transactions. Although a few states have dominated issuance, there has been broadening diversity of issuance as the market expands. Municipal issuers from 28 different states, plus the District of Columbia, issued green bonds through the end of 2017, with issuers from nine different states accounting for at least \$500 million of cumulative issuance each.

Exhibit 2

New York and California issuers have accounted for more than half of total US municipal green bond issuance

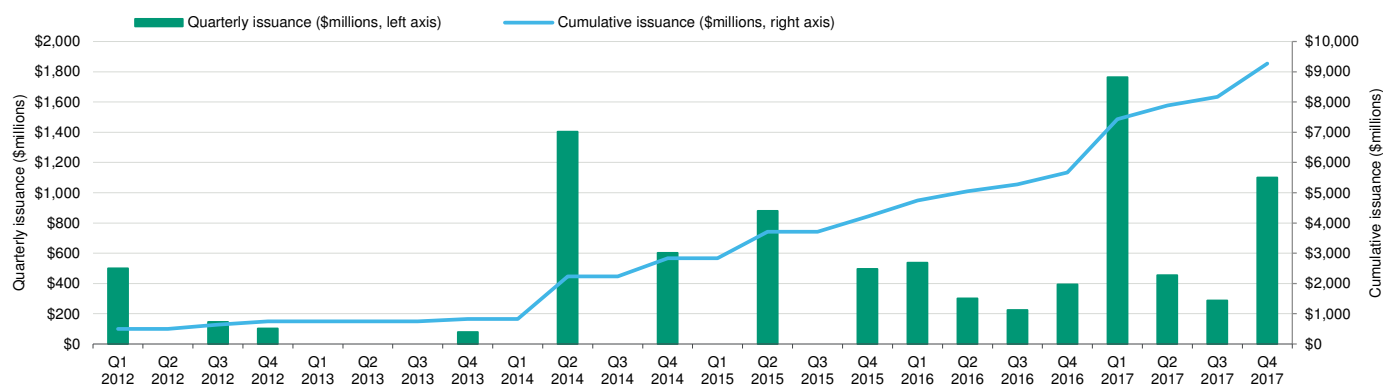
Data aggregate total green bond issuance from all green bond issuers in each state through year-end 2017

Sources: Municipal Securities Rulemaking Board's Electronic Municipal Market Access, Moody's Investors Service, DAC Bond

Across the US municipal market, 88 distinct issuers brought green bonds to market through year-end 2017, with 15 issuers accounting for at least \$500 million of green bonds. Four issuers have issued at least \$1 billion each, including the [Metropolitan Transportation Authority, NY](#) (A1 stable, \$5.4 billion cumulative issuance), the [Central Puget Sound Regional Transit Authority](#) (Aaa stable, \$1.3 billion cumulative issuance), the [Massachusetts Water Resources Authority](#) (Aa1 stable, \$1.0 billion cumulative issuance) and the [San Francisco Public Utilities Commission](#) (Aa3 stable, \$1.0 billion cumulative issuance). While the large issuers help expand and raise the profile of the green bond market, large transactions have driven much of the growth in the market to date, contributing to variability in issuance from quarter to quarter. For a full list of US municipal green bonds through the end of 2017, please see Appendix II.

Outside the US, there has also been growth in green bond issuance from regional and local governments, though the market is smaller and growth has been less steady. After topping \$2 billion of issuance in 2014, regional and local governments outside the US failed to issue more than \$1.5 billion of green bonds in either of the next two years until issuing a record \$3.6 billion in 2017 (see Exhibit 3). The smaller market shows a different pattern to that of the US in terms of sector of issuance. Whereas non-US regional and local governments issued a cumulative \$9.3 billion of green bonds through the end of 2017, financial and non-financial corporates issued nearly \$117 billion of green bonds over the same period.

Exhibit 3

Non-US local government green bond issuance set a new record in 2017

Data include non-US issuers classified as local government issuers by the Climate Bonds Initiative, and exclude some sub-sovereign issuers backed by their government such as Transport for London and Monash University

Sources: Climate Bonds Initiative, Moody's Investors Service

Regional and local governments in France, Sweden and Canada have dominated issuance to date with a combined \$6.8 billion of green bonds, or 73% of the total (see Exhibit 4). A total of 10 countries outside the US have seen regional and local governments bring green bonds to market. Swedish issuers have brought 19 green bond transactions to market, leading the way over France whose regional and

local governments brought seven green bond transactions to market through the end of 2017. The largest issuers through the end of 2017 were [Region Ile-de-France](#) (Aa2 stable, \$1.9 billion) and the [Province of Ontario](#) (Aa2 stable, \$1.6 billion). For a full list of non-US local government green bond transactions through the end of 2017, please see Appendix III.

Exhibit 4

Local governments in France, Sweden and Canada have been the largest non-US municipal green bond issuers



Data include non-US issuers classified as local government issuers by the Climate Bonds Initiative, and exclude some sub-sovereign issuers backed by their government such as Transport for London and Monash University

Data aggregate total green bond issuance from all local government green bond issuers in each country through year-end 2017

Sources: Climate Bonds Initiative, Moody's Investors Service

Beyond issuers classified as non-US local governments by the Climate Bonds Initiative and included in our dataset for purposes of this report, other sub-sovereign issuers have brought green bonds to market and will continue to be a driving force for green bond growth. For example, we have provided two GB1 Green Bond Assessments (GBAs) to [Monash University's](#) (GB1) two climate bonds issued to date. Other such government-related issuers that have brought green bonds to market include [Transport for London](#) (Aa3 stable), which issued a GBP400 million green bond in April 2015, and [Regie Autonome des Transports Parisiens](#) (RATP, Aa2 stable), which issued a €500 million green bond in June 2017.

Municipal green bonds will finance a wide array of projects, led by transportation and water

Public financing will be critical in facilitating the transition to a more climate-resilient economy, given that governments, both at a national and sub-national level, are typically the first line of defense in dealing with the aftermath of extreme weather events and/or natural disasters. At the same time, some issuers face material credit risks from both climate shocks and climate trends, and will increasingly turn to green bonds to finance projects addressing these risks. We therefore expect increasing diversity in and growth of green bond issuance from both US municipal and global sub-sovereign issuers in 2018 and beyond.

In November 2017, we published research discussing the [credit impacts on US state and local governments of climate change](#), which will likely result in a higher frequency and severity of extreme weather events, in turn heightening exposure and vulnerability to economic loss across industries and regions. Global climate change is forecast to increase the US' exposure and vulnerability to a range of factors such as severe heat, changes in precipitation patterns and rising sea levels. These changes may drive an increased frequency of extreme weather occurrences, or climate shocks, including heat waves, droughts, nuisance flooding, wildfires and increasingly severe coastal storm surges. As state and local governments seek to offset the adverse effects of these climate issues, we expect green bonds to increasingly serve as a relevant financing tool for various climate mitigation and adaptation projects.

Similarly, we published a report in December 2017 for European regional and local governments addressing the [increasing credit challenges from climate change](#). From flooding in the northern part of the continent to water scarcity in the south, changing climate patterns have the potential to alter European cities' economic and financial strength, which are key components of their credit profiles.

With growing awareness of the need to finance projects to mitigate and adapt to climate change and address other environmental concerns, municipal issuers globally will issue green bonds in greater quantities, with financed projects aligning with the missions of these entities. To this end we are expecting issuance to be focused largely on clean water and clean transportation projects.

As an example, the [City of Cape Town](#) (Baa3 review for downgrade, GB1) issued a ZAR1 billion green bond in July 2017, primarily to finance a series of water projects. This financing coincides with the city's need to address its water crisis, in response to which it has increased its capital budget. Cape Town's environmental challenges also have material credit implications, with [spending and borrowing set to increase](#) as the city battles the water crisis and introduces new initiatives to bolster supply.

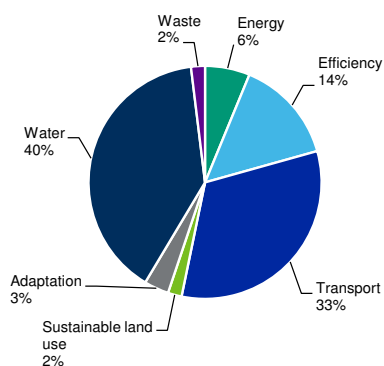
The projects financed with municipal green bond proceeds to date largely align with the projects for which public sector entities are responsible. For municipal issuers in the US through 2017, 40% of green bond proceeds were allocated to water projects, followed by transport at 33% and energy efficiency at 14% (see Exhibit 5). For regional and local governments outside the US, transport projects led at 32%, followed by energy efficiency at 24% and renewable energy at 19% (see Exhibit 6).

For a summary of municipal transactions globally that have received Moody's GBAs, as well as descriptions of the green projects financed by them, please see the highlight box on page 10 entitled "Summary of Moody's GBAs for global municipal transactions."

Exhibit 5

US municipal green bonds dominated by water and transport

Percent of green bond proceeds by project type, 2013-2017



Use of proceeds categories provided by Climate Bonds Initiative

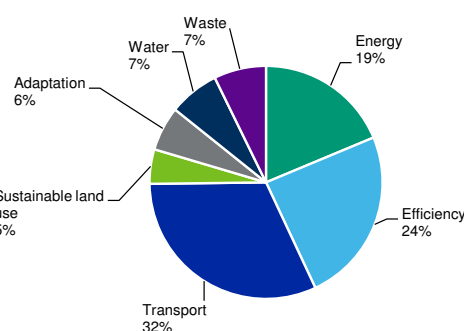
For purposes of this analysis, where there are multiple eligible projects financed by a single green bond, proceeds are split equally across the project types

Sources: Climate Bonds Initiative, Municipal Securities Rulemaking Board's Electronic Municipal Market Access, Moody's Investors Service, DAC Bond

Exhibit 6

Non-US local government green bonds led by transport

Percent of green bond proceeds by project type, 2012-2017



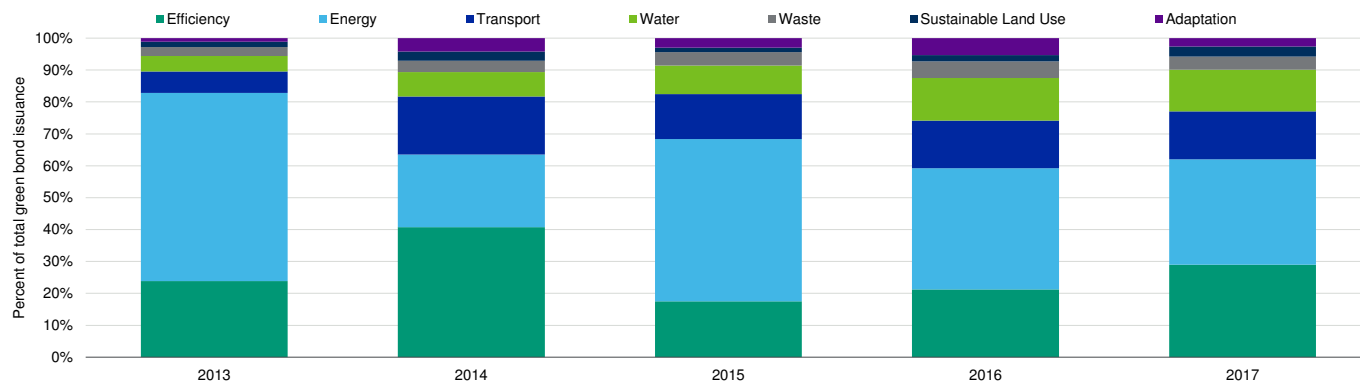
Use of proceeds categories provided by Climate Bonds Initiative

For purposes of this analysis, where there are multiple eligible projects financed by a single green bond, proceeds are split equally across the project types

Sources: Climate Bonds Initiative, Moody's Investors Service

Green bond projects from municipal issuers add diversity to the global set of projects financed by green bonds, which have been dominated by renewable energy and energy efficiency projects. Over the past five years, roughly two-thirds of green bond proceeds globally have gone to such projects (see Exhibit 7). The different composition of green bond projects being financed by municipal entities can provide additional appeal for investors who may be looking to diversify their green portfolios.

Exhibit 7

Use of green bond proceeds globally more oriented to energy efficiency and renewable energy

Use of proceeds breakdown is provided by the Climate Bonds Initiative

Sources: Climate Bonds Initiative, Moody's Investors Service

In the US, we do not expect the federal government's intention to withdraw from the Paris climate agreement to stall growth in US municipal green bond issuance given the role these entities play. Policymaking at a state and local government level will play an increasingly important role in fulfilling national climate commitments, including in the US. In the wake of President Donald Trump's announcement to withdraw from the Paris agreement, over 2,500 US cities and counties, states, universities, businesses and investors signed an open letter indicating that they remain committed to the goals of the Paris agreement.⁴ In a similar vein, the governors of New York, California and Washington announced the creation of the United States Climate Alliance, a coalition of 15 states and Puerto Rico seeking to uphold the tenets of the Paris agreement.⁵ Issuers in New York, California and Washington represented three of the top four states issuing green bonds through 2017, indicating a correlation between green bond issuance and states' policy intentions.

Globally, we see regional and local governments increasingly expressing an interest in supporting sovereign governments' efforts to combat climate change, or stepping up where national intentions may be limited. The Under2 Coalition, for example, brings together 205 jurisdictions representing 43 countries and six continents that have signed or endorsed a climate agreement known as the Under2 MOU (memorandum of understanding).⁶ These 205 jurisdictions represent more than 1.3 billion people and \$30 trillion in GDP, equivalent to 17% of the global population and nearly 40% of the global economy.⁷ Initiatives like the Under2 Coalition will likely result in new and innovative ways to combat climate change, including the issuance of green, social and sustainability bonds, and will help propel additional labeled debt issuance. For more information on social and sustainability bonds, please see the highlight box on the next page entitled, "What to watch for: social and sustainability bonds."

What to watch for: social and sustainability bonds

The factors motivating growth in green bond issuance will also likely precipitate growth in social bonds and sustainability bonds from municipal issuers globally. Similar to green bonds, social and sustainability bonds afford investors the opportunity to invest in companies and municipalities that are issuing debt to finance projects meeting a social and/or environmental goal.

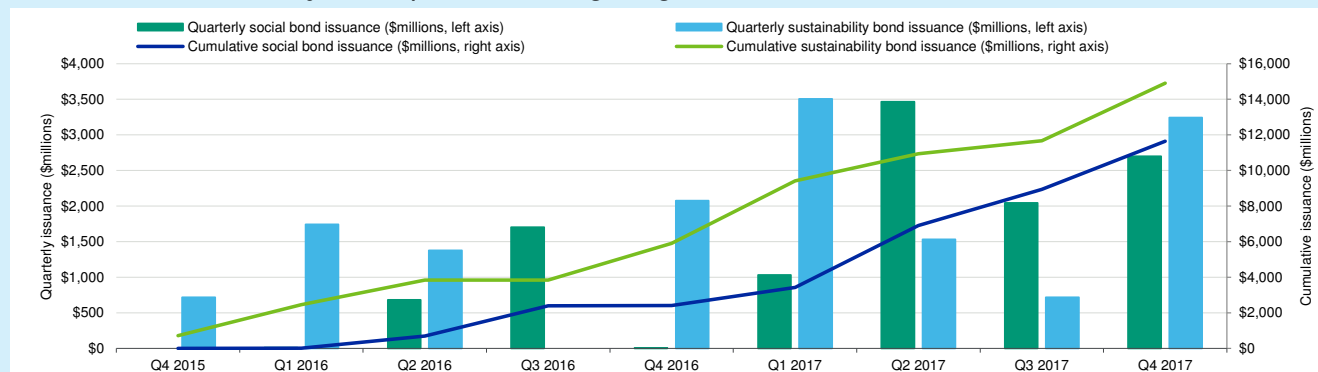
Social bonds are generally issued in accordance with the Social Bond Principles (SBPs) published by ICMA, the International Capital Market Association.⁸ Similar to the Green Bond Principles,⁹ the SBPs outline guidelines for issuers around use of proceeds, project evaluation and selection, management of proceeds and reporting. Under the SBPs, eligible project types include: affordable basic infrastructure, access to essential services, affordable housing, employment generation including through the potential effect of SME (small and medium-sized enterprise) financing and microfinance, food security and socioeconomic advancement and empowerment.

Sustainability bonds combine projects with green and social elements and are generally issued in accordance with the Sustainability Bond Guidelines (SBGs). Per the SBGs, "it is understood that certain social projects may also have environmental co-benefits, and that certain green projects may have social co-benefits."¹⁰

According to Dealogic data, there have been a cumulative \$11.6 billion of social bonds and \$14.9 billion of sustainability bonds issued to date (see Exhibit 8). The markets are newer than the green bond market, which began in 2007.

Exhibit 8

Global social and sustainability bonds represent small but growing markets



Data represent global social and sustainability bond issuance for issuers across all sectors, not just municipal issuers

Sources: Dealogic, Moody's Investors Service

To date, there have been a handful of social and sustainability bonds from municipal issuers. For example, the [Massachusetts Bay Transportation Authority](#) (Aa2 stable) issued \$271 million of Series 2017 Subordinated Sales Tax Bond Anticipation Notes in October 2017 that were labeled as sustainability bonds given that the authority "has made a commitment to promoting projects that maximize and equitably distribute social benefits across the communities it serves and that maximize the environmental benefits of the transportation system."¹¹

The City of Paris similarly issued its first sustainability bond in November 2017 to finance an array of eligible environmental and social projects, including clean transportation, energy efficiency, renewable energy, adaptation to climate change, access to essential services for target populations, quality of life improvements in underprivileged areas and a social solidarity economy.¹² Other European issuers that have brought sustainability bonds to market include [Comunidad Autonoma de Madrid](#) (Baa2 stable) with a €700 million issuance in April 2017,¹³ and the [City of Barcelona](#) (Baa2 stable) with a €35 million issuance in December 2017.¹⁴

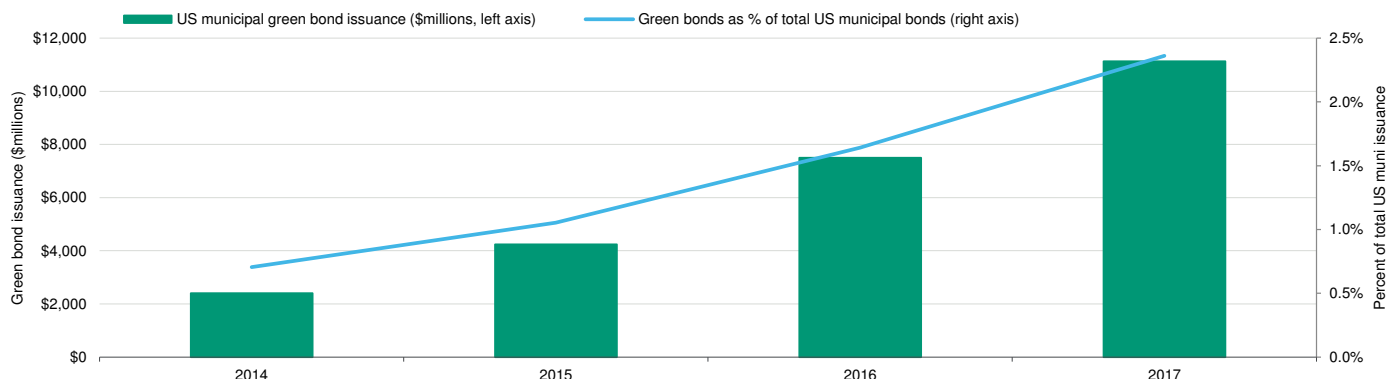
We expect many more municipal issuers across the globe to issue social and sustainability bonds in the coming years given the roles that these issuers play in promoting both environmentally and socially beneficial projects. The UN's Sustainable Development Goals (SDGs), which have become popular with socially responsible investors in recent years, also indicate a role for municipal issuers through SDG #11, "Sustainable Cities and Communities."¹⁵

Green bonds will remain a small part of the overall market in the near term

Despite the impressive growth of green bonds from municipal issuers globally over the past five years, we expect green bond financings to remain a small part of the municipal fixed income market globally. In the US, for example, municipal green bond issuance has grown steadily to over \$11 billion in 2017. However, this represents just 2.4% of the total \$471 billion of primary market municipal bond issuance last year, according to statistics provided by the Municipal Securities Rulemaking Board's Electronic Municipal Market Access (see Exhibit 9).¹⁶ Globally and across sectors, total green bonds as a proportion of total issuance is even smaller, with green bonds representing just 0.2% of total debt outstanding as of January 2017.¹⁷

Exhibit 9

US municipal green bond issuance is growing but represents a small share of total municipal issuance



Total municipal market issuances based off "[Primary Market Statistics](#)" on EMMA website

Sources: Municipal Securities Rulemaking Board's Electronic Municipal Market Access, Moody's Investors Service, DAC Bond

Through our conversations with various market participants, we believe there are a number of key factors holding back more rapid expansion of the municipal green bond market. These include:

- » **Lack of a pricing benefit:** The number one reason cited for what is holding back green bond issuance, including among municipal entities, is the lack of a primary market pricing benefit for issuers. While issuers often benefit from investor diversification and positive media coverage of a green bond transaction, they often have to take on additional costs with regards to reporting and disclosure commitments, making them hesitant to issue green bonds without a material pricing benefit. We have begun to hear anecdotal evidence of green bond pricing benefits for issuers, though these instances remain rare and are difficult to measure. A number of research reports have been published trying to discern differences in green bond pricing from unlabeled bonds, though we believe the results remain inconclusive.¹⁸
- » **Reporting cost and complexity:** The costs and complexities around green bond reporting, real and perceived, are often factors limiting issuance. Issuers who want to take on green bond issuance face the hurdle of additional costs related to disclosure on how green bond proceeds are being used, what environmental benefits the financed projects are expected to achieve, and what benefits they are actually achieving once operational. For issuers seeking an external review of a green bond's credentials, there may also be an additional incremental cost. For municipalities, especially smaller ones, these costs can be material given the backdrop of municipalities being responsible for public money. Some issuers may also be intimidated by the perceived complexities of reporting, often not knowing that the information investors are seeking is often already available.
- » **Limited issuer and other market participant awareness:** Given the relatively young age of the green bond market, some issuers and market participants are not aware of the nuances of issuing such bonds. As a result, the green bond market is many times smaller than it otherwise might be. As noted above, municipalities often already finance projects for clean transportation, clean water and energy efficiency without knowing that these projects may be eligible for a green label.

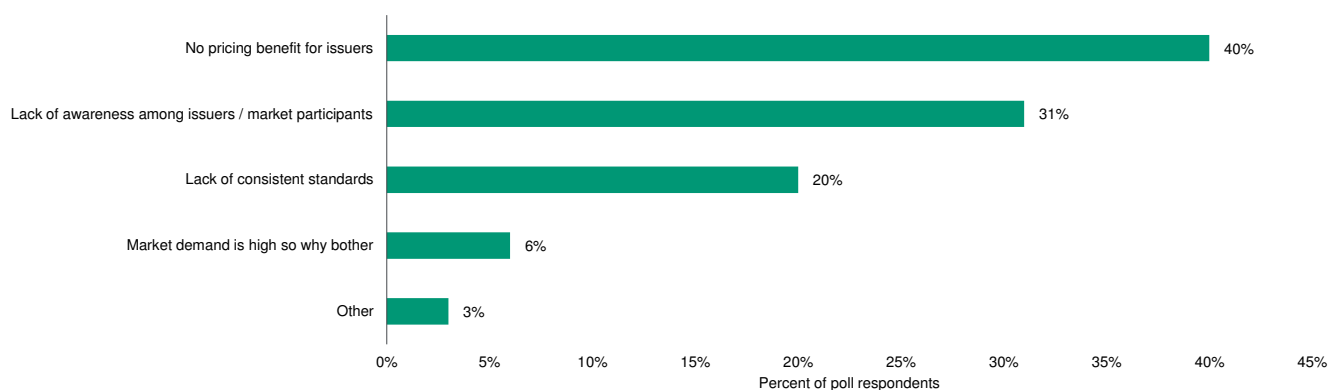
- » **Current fixed income market conditions:** Related to the lack of a pricing benefit, current fixed income market conditions may also be holding back green bond issuance. Issuers coming to market are largely benefiting from multiple times oversubscription on their normal debt issuances, making the incremental work of issuing a green bond seem superfluous. With green bonds almost always issued pari passu with traditional bonds, issuers are not finding that investors are willing to pay up for green bonds, especially in the current market. As market conditions change in the future, we may see a greater willingness among issuers to issue green bonds.
- » **Complex organizational structures and budgetary practices:** Some municipal issuers face the additional burden of issuing green bonds in the confines of complex organizational structures or budgetary practices. Green bond issuance often involves members of finance, sustainability, environmental, policy or other departments, and coordination among these groups may not always occur with regularity. Conversely, smaller municipalities that do not have robust departments across all functions may find that they do not have the expertise on staff to issue a green bond, and thus need to rely on external assistance, potentially adding cost and complexity to an issuance.

We believe market participants feel these factors are limiting expansion of the municipal green bond market specifically and the broader green bond market more generally. On September 20, 2017, we hosted a briefing for Climate Week 2017 entitled, "Decarbonizing Municipal Infrastructure Using Green Bonds." Hosted in partnership with the Climate Bonds Initiative, the event focused on the risks that climate change poses to local governments at both state and city levels and the need to invest in the low-carbon economy. At this conference, a series of polling questions tackled key issues in the green bond and environmental, social and governance (ESG) spheres.

One poll question tackled the biggest factors holding back US municipal green bond issuance. In our poll, 40% of participants said a lack of pricing benefits for issuers was holding back the growth of the municipal green bond market, followed by 31% saying the main barrier was a lack of awareness (see Exhibit 10). While it is unsurprising to see the lack of the pricing benefit at the top of the list, it is perhaps encouraging for market growth that nearly one-third of poll respondents believed a lack of awareness among issuers and other market participants is the biggest factor holding back additional issuance. This perhaps suggests that market growth will occur as green bonds become more understood, despite other obstacles to issuance.

Exhibit 10

What is the biggest factor holding back municipal green bond issuance?



Polling conducted at the Moody's/Climate Bonds Initiative Climate Week briefing on September 20, 2017

Source: Moody's Investors Service

Summary of Moody's GBAs for global municipal transactions

US municipal and sub-sovereign issuers have accounted for 10 of the 32 Green Bond Assessments (GBAs) that we have assigned to date. Eight separate issuers across Australia, South Africa, Sweden and the US have brought green bond transactions receiving a GBA to market. These transactions may ultimately finance a wide array of projects, though nine of the 10 transactions have sustainable water management as a potential use of proceeds. See below for a description of these transactions, and please see Appendix I for a full list of GBAs that we have assigned to date.

- » City of Cape Town: In June 2017, we assigned a GB1 to the South African city's initial ZAR1 billion (\$74 million) green bond. Cape Town will use the green note proceeds to finance and refinance nine projects largely intended to adapt to, but also mitigate, climate change through investments in water and sanitation projects as well as transportation. These programs are intended to save water through reduced usage – especially critical given Cape Town's drought-induced water crisis – leakage and wastage, upgrading of sewage pipes and infrastructure to avoid storm-related damage, protection against future flooding, rehabilitation and restoration of Sir Lowry's Pass River, upgrading of various seawalls and the launch of a pilot project to introduce electric buses with the aim of reducing CO₂ emissions.
- » City of Gothenburg: We have assigned two GB1 assessments to transactions issued by the Aaa-rated Swedish city, with GBAs assigned in May 2016 for a June 2016 SEK1 billion (\$121 million) issuance and in November 2017 for a June 2017 SEK1.2 billion (\$138 million) issuance. Gothenburg green bonds finance environmentally friendly projects across a number of categories and include investments in tree planting, efficient traffic lights and new public transportation trams.
- » District of Columbia Water & Sewer Authority (DC Water): In January 2017, we assigned a GB1 to DC Water's (Aa1 stable) \$100 million Series 2017A green bonds. DC Water green bonds finance the DC Clean Rivers Project, a sustainable water construction project to reduce and control combined sewer overflow (CSO) discharges into the District of Columbia's waterways – including the Anacostia and Potomac rivers and Rock Creek – and make improvements in water quality.
- » East Bay Regional Park District: In November 2017, we assigned a GB1 to the Aaa-rated California park district's approximately \$50 million of Series 2017A-2 and Series 2017B-2 green bonds, with projects eligible for green bond funding including land acquisition, habitat protection, trail creation and sea level rise mitigation.
- » Ligonier Valley School District: In January 2018, we assigned a GB1 to the A1-rated Pennsylvania school district's \$10 million Series A of 2018 green bonds, an initial green bond offering for the district. Bond proceeds will finance a series of energy efficiency improvements for the district's facilities, including a high school, middle school and two elementary schools. These improvements are largely consistent with the energy efficiency and sustainable water and wastewater management categories of the Green Bond Principles.
- » Metropolitan Government of Nashville and Davidson County: In October 2017, we assigned a GB1 to Nashville's \$89 million Series 2017A water and sewer revenue green bonds (Aa3 stable), proceeds from which will be used to renew and rehabilitate water, wastewater and sewer management infrastructure pursuant to a March 2009 Consent Decree between the Metro Government, the EPA and the Tennessee Department of Environmental Conservation.
- » Monash University: We assigned two GB1 assessments to the Australian university's Climate Bond No. 1 (\$159 million US\$ equivalent) and Climate Bond No. 2 (\$51 million US\$ equivalent) in December 2016 and October 2017, respectively. The university's green bonds finance a number of projects around campus including low-carbon buildings, such as the new Chancellery Building, and solar panel installations.
- » Upper Mohawk Valley Regional Water Finance Authority: In August 2016, we assigned a GB1 to the A1-rated New York water authority's \$9 million of Series 2016 green bonds. Proceeds will be used exclusively for projects and activities that increase the water system's resiliency, provide greater operational continuity and further the authority's mission of providing safe drinking water to users within its service area.

Appendix I: List of Moody's GBAs as of March 16, 2018

Transaction	Region	Country	Sector	Amount (US\$ Equivalent, Millions)	Date GBA Assigned	Overall Assessment	Overall Weighted Score
Arise AB	EMEA	Sweden	Corporate	\$91	3/5/2018	GB1	1.30
Banco Nacional de Costa Rica	Americas	Costa Rica	Financial Institution	\$500	12/12/2017	GB2	1.75
Bank of Communications	APAC	China	Financial Institution	\$4,380	11/22/2016	GB1	1.50
Cape Town, City of	EMEA	South Africa	Municipal	\$74	6/19/2017	GB1	1.00
District of Columbia Water and Sewer Authority	Americas	United States	Municipal	\$100	1/20/2017	GB1	1.20
East Bay Regional Park District	Americas	United States	Municipal	\$50	11/6/2017	GB1	1.40
Fabege AB	EMEA	Sweden	Corporate	\$87	1/29/2018	GB1	1.20
Fransabank S.A.L.	EMEA	Lebanon	Financial Institution	\$60	2/26/2018	GB1	1.00
GoodGreen 2016-1 (Ygrene Energy Fund)	Americas	United States	Securitization	\$185	10/26/2016	GB1	1.40
GoodGreen 2017-1 (Ygrene Energy Fund)	Americas	United States	Securitization	\$176	4/19/2017	GB1	1.40
GoodGreen 2017-2 (Ygrene Energy Fund)	Americas	United States	Securitization	\$283	11/6/2017	GB1	1.50
Gothenburg, City of (June 2016 issuance)	EMEA	Sweden	Municipal	\$121	5/31/2016	GB1	1.00
Gothenburg, City of (June 2017 issuance)	EMEA	Sweden	Municipal	\$138	11/22/2017	GB1	1.00
Green STORM 2016 B.V. (Obvion/Rabobank)	EMEA	Netherlands	Securitization	\$598	5/25/2016	GB1	1.40
Green STORM 2017 B.V. (Obvion/Rabobank)	EMEA	Netherlands	Securitization	\$662	5/15/2017	GB1	1.40
Hannon Armstrong (2016-2 Pass-Through Notes)	Americas	United States	Securitization	\$84	3/22/2017	GB1	1.15
Hannon Armstrong (2017-1 Sustainable Yield Bonds)	Americas	United States	Securitization	\$164	10/26/2017	GB1	1.15
HERO Funding 2016-3 A1 and A2 Notes (Renovate America)	Americas	United States	Securitization	\$320	9/9/2016	GB1	1.40
Jacinta Solar Farm Finance, Ltd.	Americas	Uruguay	Corporate	\$65	12/18/2017	GB2	1.80
Latvenergo AS	EMEA	Latvia	Corporate	\$113	10/12/2016	GB1	1.00
Ligonier Valley School District	Americas	United States	Municipal	\$10	1/8/2018	GB1	1.35
Metropolitan Government of Nashville and Davidson County	Americas	United States	Municipal	\$89	10/11/2017	GB1	1.30
Mexico City Airport Trust (September 2016)	Americas	Mexico	Corporate	\$2,000	9/6/2016	GB1	1.35
Mexico City Airport Trust (September 2017)	Americas	Mexico	Corporate	\$4,000	9/1/2017	GB1	1.35
Monash University (Climate Bond No. 1)	APAC	Australia	Municipal	\$159	12/9/2016	GB1	1.00
Monash University (Climate Bond No. 2)	APAC	Australia	Municipal	\$51	10/24/2017	GB1	1.00
Nigeria, Government of	EMEA	Nigeria	Sovereign	\$30	12/13/2017	GB1	1.15
Renew 2017-1 (Renew Financial)	Americas	United States	Securitization	\$223	4/19/2017	GB1	1.40
Renew 2017-2 (Renew Financial)	Americas	United States	Securitization	\$207	10/16/2017	GB1	1.40
Svensk FastighetsFinansiering AB	EMEA	Sweden	Corporate	\$147	11/8/2017	GB1	1.35
TenneT Holding B.V.	EMEA	Netherlands	Corporate	\$1,120	5/30/2016	GB1	1.00
Upper Mohawk Valley Regional Water Finance Authority	Americas	United States	Municipal	\$9	8/10/2016	GB1	1.15

Moody's Green Bond Assessment (GBA)

Moody's GBA represents a forward-looking, transaction-oriented opinion on the relative effectiveness of the issuer's approach to manage, administer and allocate assets to, and report on, environmental projects financed by proceeds from green bond offerings. GBAs are expressed using a five-point relative scale, ranging from GB1 (Excellent) to GB5 (Poor). A GBA does not constitute a credit rating.

Appendix II: US municipal green bond issuances through year-end 2017

Issuer/Obligor	State	Amount (US\$)	Month issued
Arizona State University	Arizona	182,645,000	Apr-15
Arizona State University	Arizona	130,485,000	Sep-16
University of Arizona	Arizona	142,390,000	Nov-16
California Infrastructure and Economic Development Bank	California	410,735,000	Apr-16
California Infrastructure and Economic Development Bank	California	450,000,000	Mar-17
California Pollution Control Financing Authority	California	228,165,000	Jun-17
City and County of San Francisco Community Facilities District No. 2014-1	California	171,405,000	Nov-17
City of Long Beach	California	25,985,000	Jun-17
City of Los Angeles	California	188,755,000	Jun-15
City of Los Angeles	California	100,835,000	Jun-15
City of Los Angeles	California	227,540,000	May-17
City of Los Angeles	California	115,455,000	May-17
City of Los Angeles	California	107,155,000	May-17
City of Napa	California	12,500,000	Oct-16
East Bay Municipal Utility District	California	74,335,000	Jun-15
East Bay Municipal Utility District	California	185,355,000	Jun-17
East Bay Regional Park District	California	30,000,000	Dec-17
East Bay Regional Park District	California	20,045,000	Dec-17
Fremont Union High School District	California	31,170,000	Jul-17
Harbor Department of the City of Los Angeles	California	35,205,000	Oct-16
Kaiser Permanente	California	575,000,000	May-17
Kaiser Permanente	California	408,390,000	May-17
Los Angeles County Metropolitan Transportation Authority	California	471,395,000	Oct-17
Los Angeles County Sanitation Districts Financing Authority	California	170,265,000	Nov-16
Midpeninsula Regional Open Space District	California	54,490,000	Sep-16
Midpeninsula Regional Open Space District	California	2,920,000	Sep-16
Midpeninsula Regional Open Space District	California	25,025,000	Dec-17
San Diego County Water Authority	California	98,945,000	Jun-16
San Diego Unified School District	California	100,000,000	Jan-16
San Diego Unified School District	California	59,000,000	Nov-17
San Francisco Bay Area Rapid Transit District	California	271,600,000	Jun-17
San Francisco Bay Area Rapid Transit District	California	84,735,000	Jun-17
San Francisco Bay Area Rapid Transit District	California	28,400,000	Jun-17
San Francisco Bay Area Rapid Transit District	California	118,260,000	Dec-17
San Francisco Bay Area Rapid Transit District	California	67,245,000	Dec-17
San Francisco Public Utilities Commission	California	32,025,000	May-15
San Francisco Public Utilities Commission	California	240,580,000	May-16
San Francisco Public Utilities Commission	California	259,350,000	Dec-16
San Francisco Public Utilities Commission	California	350,305,000	Dec-17
San Francisco Public Utilities Commission	California	121,140,000	Dec-17
San Francisco Public Utilities Commission	California	34,280,000	Dec-17
Santa Monica Public Financing Authority	California	68,565,000	Sep-17
State of California	California	300,000,000	Oct-14
Trinity Public Utilities District	California	20,370,000	Nov-17
Trinity Public Utilities District	California	465,000	Nov-17
City of Aurora	Colorado	437,025,000	Aug-16
Colorado State University System	Colorado	42,125,000	Sep-15
Denver Board of Water Commissioners	Colorado	142,665,000	May-17
Hartford County Metropolitan District	Connecticut	140,000,000	Nov-14
State of Connecticut	Connecticut	60,000,000	Dec-14
State of Connecticut	Connecticut	250,000,000	May-15
State of Connecticut	Connecticut	65,000,000	Dec-15
State of Connecticut	Connecticut	65,000,000	Oct-16
State of Connecticut	Connecticut	250,000,000	Jun-17

Issuer/Obligor	State	Amount (US\$)	Month issued
District of Columbia Water & Sewer Authority	District of Columbia	350,000,000	Jul-14
District of Columbia Water & Sewer Authority	District of Columbia	100,000,000	Oct-15
District of Columbia Water & Sewer Authority	District of Columbia	100,000,000	Feb-17
City of Tamarac	Florida	17,760,000	Nov-16
City of Tamarac	Florida	4,105,000	Nov-16
City of Venice	Florida	15,355,000	Mar-15
East Central Regional Wastewater Treatment Facilities Operation Board	Florida	86,590,000	Nov-14
City and County of Honolulu	Hawaii	143,815,000	Oct-16
City and County of Honolulu	Hawaii	20,060,000	Sep-17
State of Hawaii	Hawaii	150,000,000	Nov-14
State of Hawaii	Hawaii	35,000,000	Oct-15
Board of Education of the City of Chicago	Illinois	20,000,000	Apr-15
City of Decatur	Illinois	22,205,000	Nov-16
Metropolitan Water Reclamation District of Greater Chicago	Illinois	100,000,000	Jan-15
Metropolitan Water Reclamation District of Greater Chicago	Illinois	75,000,000	Jan-15
Metropolitan Water Reclamation District of Greater Chicago	Illinois	50,000,000	Jan-15
Metropolitan Water Reclamation District of Greater Chicago	Illinois	50,000,000	Jul-16
Metropolitan Water Reclamation District of Greater Chicago	Illinois	30,000,000	Jul-16
Metropolitan Water Reclamation District of Greater Chicago	Illinois	20,000,000	Jul-16
Metropolitan Water Reclamation District of Greater Chicago	Illinois	4,000,000	Jul-16
Indiana Finance Authority	Indiana	100,000,000	Feb-15
Indiana Finance Authority	Indiana	139,715,000	Mar-15
Indiana Finance Authority	Indiana	62,675,000	Apr-16
Indiana Finance Authority	Indiana	53,115,000	Apr-16
Indiana Finance Authority	Indiana	193,270,000	Sep-16
Indiana Finance Authority	Indiana	164,445,000	Oct-16
Indiana Finance Authority	Indiana	85,930,000	Oct-16
Indiana Finance Authority	Indiana	124,495,000	Nov-17
Indiana Finance Authority	Indiana	21,045,000	Nov-17
Indiana University	Indiana	58,960,000	Jan-15
Iowa Finance Authority	Iowa	321,530,000	Feb-15
Iowa Finance Authority	Iowa	163,275,000	Oct-16
Iowa Finance Authority	Iowa	347,460,000	Dec-17
City of Lawrence	Kansas	11,375,000	May-17
Finance Authority of Maine	Maine	45,000,000	Dec-17
Maryland Economic Development Corporation (Purple Line Light Rail Project)	Maryland	162,235,000	Jun-16
Maryland Economic Development Corporation (Purple Line Light Rail Project)	Maryland	100,000,000	Jun-16
Maryland Economic Development Corporation (Purple Line Light Rail Project)	Maryland	27,480,000	Jun-16
Maryland Economic Development Corporation (Purple Line Light Rail Project)	Maryland	23,320,000	Jun-16
Berkshire Wind Power Cooperative Corporation	Massachusetts	40,210,000	Dec-17
Boston Medical Center	Massachusetts	158,155,000	Apr-15
Boston Medical Center	Massachusetts	43,500,000	Dec-17
Commonwealth of Massachusetts	Massachusetts	100,000,000	Jun-13
Commonwealth of Massachusetts	Massachusetts	350,000,000	Sep-14
Commonwealth of Massachusetts	Massachusetts	250,000,000	Jul-16
Commonwealth of Massachusetts	Massachusetts	100,000,000	Apr-17
Emmanuel College	Massachusetts	50,265,000	Jun-16
Martha's Vineyard Land Bank	Massachusetts	35,025,000	Nov-14
Martha's Vineyard Land Bank	Massachusetts	20,105,000	Mar-17
Massachusetts Clean Water Trust	Massachusetts	228,155,000	Jan-15
Massachusetts Clean Water Trust	Massachusetts	207,805,000	Feb-16
Massachusetts Clean Water Trust	Massachusetts	207,350,000	Apr-17

Issuer/Obligor	State	Amount (US\$)	Month issued
Massachusetts Institute of Technology	Massachusetts	370,000,000	Sep-14
Massachusetts State College Building Authority	Massachusetts	91,375,000	Dec-14
Massachusetts Water Resources Authority	Massachusetts	681,615,000	May-16
Massachusetts Water Resources Authority	Massachusetts	104,260,000	Aug-16
Massachusetts Water Resources Authority	Massachusetts	254,745,000	May-17
City of Saint Paul	Minnesota	8,700,000	May-15
City of Saint Paul	Minnesota	7,715,000	Apr-16
City of Saint Paul	Minnesota	7,975,000	Apr-17
Ramsey County	Minnesota	17,900,000	Feb-16
State of Nevada Department of Business and Industry	Nevada	150,000,000	Oct-17
State of Nevada Department of Business and Industry	Nevada	21,960,000	Dec-17
New Jersey Environmental Infrastructure Trust	New Jersey	9,555,000	Nov-15
New Jersey Environmental Infrastructure Trust	New Jersey	23,925,000	May-16
New Jersey Environmental Infrastructure Trust	New Jersey	7,200,000	Dec-16
New Jersey Environmental Infrastructure Trust	New Jersey	72,830,000	Jan-17
New Jersey Environmental Infrastructure Trust	New Jersey	33,525,000	Jan-17
New Jersey Environmental Infrastructure Trust	New Jersey	31,610,000	May-17
New Jersey Environmental Infrastructure Trust	New Jersey	18,840,000	Nov-17
New Jersey Environmental Infrastructure Trust	New Jersey	3,860,000	Nov-17
Columbia University	New York	50,000,000	Apr-16
Jefferson County Industrial Development Agency	New York	20,100,000	Nov-14
Metropolitan Transportation Authority	New York	444,560,000	Feb-16
Metropolitan Transportation Authority	New York	337,960,000	Feb-16
Metropolitan Transportation Authority	New York	413,415,000	May-16
Metropolitan Transportation Authority	New York	174,890,000	May-16
Metropolitan Transportation Authority	New York	312,825,000	Feb-17
Metropolitan Transportation Authority	New York	188,950,000	Mar-17
Metropolitan Transportation Authority	New York	136,635,000	Mar-17
Metropolitan Transportation Authority	New York	371,040,000	May-17
Metropolitan Transportation Authority	New York	309,225,000	May-17
Metropolitan Transportation Authority	New York	662,025,000	Sep-17
Metropolitan Transportation Authority	New York	1,821,460,000	Dec-17
Metropolitan Transportation Authority	New York	200,001,605	Dec-17
New York State Environmental Facilities Corporation	New York	213,635,000	Jul-14
New York State Environmental Facilities Corporation	New York	367,455,000	Aug-15
New York State Environmental Facilities Corporation	New York	80,520,000	Aug-15
New York State Environmental Facilities Corporation	New York	31,370,000	Aug-15
New York State Environmental Facilities Corporation	New York	104,415,000	Sep-16
New York State Environmental Facilities Corporation	New York	29,260,000	Sep-16
New York State Environmental Facilities Corporation	New York	91,580,000	Nov-17
New York State Housing Finance Agency	New York	45,125,000	Dec-16
New York State Housing Finance Agency	New York	53,995,000	Jan-17
New York State Housing Finance Agency	New York	56,285,000	Mar-17
New York State Housing Finance Agency	New York	78,420,000	Jun-17
New York State Housing Finance Agency	New York	40,915,000	Sep-17
New York State Housing Finance Agency	New York	115,215,000	Nov-17
Upper Mohawk Valley Regional Water Finance Authority	New York	8,770,000	Aug-16
City of Asheville	North Carolina	50,625,000	Jun-15
City of Greensboro	North Carolina	25,990,000	Aug-17
American Municipal Power	Ohio	80,050,000	Jul-16
American Municipal Power	Ohio	209,530,000	Oct-16
City of Cleveland	Ohio	32,390,000	Apr-16
University of Cincinnati	Ohio	30,415,000	Dec-14

Issuer/Obligor	State	Amount (US\$)	Month issued
City of Portland	Oregon	16,220,000	Nov-16
Rhode Island Clean Water Finance Agency	Rhode Island	56,275,000	Jul-15
Rhode Island Infrastructure Bank	Rhode Island	22,640,000	Dec-15
Rhode Island Infrastructure Bank	Rhode Island	18,790,000	Jun-16
Rhode Island Infrastructure Bank	Rhode Island	28,130,000	Apr-17
Rhode Island Infrastructure Bank	Rhode Island	11,350,000	May-17
South Carolina Jobs - Economic Development Authority	South Carolina	43,850,000	Dec-17
Metropolitan Government of Nashville and Davidson County	Tennessee	89,420,000	Nov-17
Fort Bend Independent School District	Texas	47,505,000	Apr-17
Fort Bend Independent School District	Texas	45,000,000	Sep-17
Mission Economic Development Corporation	Texas	48,000,000	Dec-15
University of Texas System	Texas	206,040,000	Jan-16
Utah Associated Municipal Power Systems	Utah	21,390,000	Dec-14
Saint Michael's College	Vermont	18,465,000	Nov-15
State of Vermont	Vermont	28,515,000	Oct-15
University of Vermont Health Network	Vermont	89,000,000	Jul-16
Vermont Municipal Bond Bank	Vermont	6,115,000	Mar-17
Marymount University	Virginia	66,815,000	Jul-15
Town of Vienna	Virginia	6,180,000	Dec-15
University of Virginia	Virginia	97,735,000	Apr-15
Central Puget Sound Regional Transit Authority	Washington	792,840,000	Sep-15
Central Puget Sound Regional Transit Authority	Washington	75,000,000	Sep-15
Central Puget Sound Regional Transit Authority	Washington	75,000,000	Sep-15
Central Puget Sound Regional Transit Authority	Washington	400,000,000	Dec-16
City of Spokane	Washington	181,225,000	Dec-14
City of Tacoma	Washington	21,095,000	Mar-15
King County	Washington	31,230,000	Jun-17
State of Washington	Washington	51,085,000	Oct-15

Sources: Municipal Securities Rulemaking Board's Electronic Municipal Market Access, Moody's Investors Service, DAC Bond

Appendix III: Non-US local government green bond issuances through year-end 2017

Issuer	Country	Amount	Currency	US\$ equivalent	Month issued
Province of Jujuy	Argentina	210,000,000	USD	210,000,000	Sep-17
Province of La Rioja	Argentina	200,000,000	USD	200,000,000	Feb-17
Province of La Rioja	Argentina	100,000,000	USD	100,000,000	Dec-17
Queensland Treasury Corporation	Australia	750,000,000	AUD	575,850,000	Mar-17
Treasury Corporation of Victoria	Australia	300,000,000	AUD	223,800,000	Jul-16
City of Ottawa	Canada	102,000,000	CAD	80,335,200	Nov-17
Province of Ontario	Canada	500,000,000	CAD	448,150,000	Oct-14
Province of Ontario	Canada	750,000,000	CAD	536,850,000	Jan-16
Province of Ontario	Canada	800,000,000	CAD	614,160,000	Feb-17
Province of Québec	Canada	500,000,000	CAD	372,900,000	Mar-17
City of Paris	France	300,000,000	EUR	319,800,000	Nov-15
Department de L'essonne	France	40,000,000	EUR	50,184,000	Nov-14
Hauts-de-France	France	80,000,000	EUR	103,104,000	Oct-12
Provence-Alpes-Côte d'Azur	France	119,500,000	EUR	145,825,850	Jul-12
Region Ile-de-France	France	375,000,000	EUR	499,237,500	Mar-12
Region Ile-de-France	France	600,000,000	EUR	829,860,000	Apr-14
Region Ile-de-France	France	500,000,000	EUR	541,200,000	Apr-15
Tokyo Metropolitan Government	Japan	10,000,000,000	JPY	88,230,000	Oct-17
Mexico City	Mexico	1,000,000,000	MXN	50,000,000	Dec-16
City of Oslo	Norway	1,500,000,000	NOK	176,550,000	Dec-15
City of Cape Town	South Africa	1,000,000,000	ZAR	77,229,000	Jul-17
City of Johannesburg	South Africa	1,458,000,000	ZAR	136,419,228	Jun-14
City of Gothenburg	Sweden	500,000,000	SEK	78,792,000	Oct-13
City of Gothenburg	Sweden	1,500,000,000	SEK	224,559,000	Jun-14
City of Gothenburg	Sweden	310,000,000	SEK	46,408,860	Jun-14
City of Gothenburg	Sweden	1,050,000,000	SEK	126,622,650	Jun-15
City of Gothenburg	Sweden	1,000,000,000	SEK	120,323,000	Jun-16
City of Gothenburg	Sweden	1,200,000,000	SEK	138,302,400	Jun-17
City of Lunds	Sweden	750,000,000	SEK	85,160,250	May-17
City of Malmo	Sweden	1,300,000,000	SEK	153,193,300	Dec-17
City of Norrköping	Sweden	600,000,000	SEK	68,259,000	Oct-16
City of Västerås	Sweden	750,000,000	SEK	81,247,500	Nov-16
Orebro Kommun	Sweden	550,000,000	SEK	76,162,350	Oct-14
Orebro Kommun	Sweden	200,000,000	SEK	27,647,200	Oct-14
Orebro Kommun	Sweden	500,000,000	SEK	57,964,000	Oct-16
Orebro Kommun	Sweden	500,000,000	SEK	59,210,000	Dec-17
Region Skåne	Sweden	1,200,000,000	SEK	136,182,000	Oct-16
Stockholms Lans Landsting	Sweden	1,100,000,000	SEK	166,928,300	May-14
Stockholms Lans Landsting	Sweden	1,800,000,000	SEK	212,576,400	May-15
Stockholms Lans Landsting	Sweden	1,500,000,000	SEK	180,571,500	May-16
Stockholms Lans Landsting	Sweden	2,000,000,000	SEK	230,504,000	Jun-17
Canton of Geneva	Switzerland	620,000,000	CHF	620,000,000	Nov-17

Data include non-US issuers classified as local government issuers by the Climate Bonds Initiative, and exclude some sub-sovereign issuers backed by their government such as Transport for London and Monash University

Sources: Climate Bonds Initiative, Moody's Investors Service

Moody's related publications

Methodology:

- » [Green Bonds Assessment \(GBA\)](#), March 30, 2016

Green Bond Assessment:

- » [Ligonier Valley School District, PA: Green Bond Assessment - General Obligation Bonds, Series A of 2018 \(Green Bonds\)](#), January 12, 2018
- » [Gothenburg, City of: Green Bond Assessment - Euro Medium Term Note Programme, June 2017 issuance](#), November 27, 2017
- » [East Bay Regional Park District, CA: Green Bond Assessment - Series 2017A-2 and Series 2017B-2 General Obligation Bonds](#), November 9, 2017
- » [Monash University: Green Bond Assessment - Climate Bond No. 2](#), October 24, 2017
- » [Metro. Gov't. of Nashville & Davidson Cnty., TN Water & Sewer Enterprise: Green Bond Assessment](#), October 16, 2017
- » [Monash University: Green Bond Assessment](#), July 12, 2017
- » [Cape Town, City of: Green Bond Assessment](#), June 30, 2017
- » [Upper Mohawk Valley Regional Water Finance Authority - New York: Green Bond Assessment](#), June 30, 2017
- » [District of Columbia Water and Sewer Authority \(DC Water\): Green Bond Assessment](#), January 27, 2017
- » [Gothenburg, City of: Green Bond Assessment](#), September 13, 2016

Update to Green Bond Assessment:

- » [District of Columbia Water & Sewer Authority: Update to Green Bond Assessment - Series 2017A Public Utility Senior Lien Revenue Bonds](#), March 16, 2018
- » [Gothenburg, City of: Update to Green Bond Assessment - Euro Medium Term Note Programme, June 2016 issuance](#), January 18, 2018

Sector In-Depth:

- » [Green Bonds - Global: Global green bond issuance set to eclipse \\$250 billion in 2018](#), January 31, 2018
- » [Regional & Local Governments – Europe: Climate change will pose increasing credit challenges for cities](#), December 12, 2017
- » [Cross-sector - Global: FAQ: The green bond market and Moody's Green Bonds Assessment](#), November 29, 2017
- » [Environmental risks: Evaluating the impact of climate change on US state and local issuers](#), November 28, 2017
- » [Green Bond Assessments - Global: Issuers exhibit strong organizational frameworks but differ on disclosure](#), September 19, 2017
- » [Regional and Local Governments - EMEA: Sub-sovereign green bond issuance has growth potential](#), September 21, 2016
- » [Green Bonds - US: Survey of Municipal Issuers: Disclosure Practices Differ Widely](#), April 26, 2016

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Endnotes

- 1 See [Global Sustainable Investment Review 2016](#), Global Sustainable Investment Alliance.
- 2 See ["About the PRI,"](#) UN Principles for Responsible Investment.
- 3 According to ["Primary Market Statistics"](#) on EMMA website, total municipal issuance was \$22.3 billion in January 2018 and \$18.4 billion in February 2018, down from \$35.2 billion and \$24.9 billion in January and February 2017, respectively.
- 4 See ["We Are Still In"](#) website.
- 5 See [United States Climate Alliance](#) website.
- 6 See [Under2 Coalition](#) website.
- 7 See [Under2 Coalition](#) website.
- 8 See ICMA, [The Social Bond Principles 2017](#).
- 9 See ICMA, [The Green Bond Principles 2017](#).
- 10 See ICMA, [The Sustainability Bond Guidelines 2017](#).
- 11 See [Official Statement](#) for Massachusetts Bay Transportation Authority Series 2017 Subordinated Sales Tax Bond Anticipation Notes.
- 12 See the City of Paris [Sustainability Bond Framework](#).
- 13 See Madrid's [Investor Relations](#) website.
- 14 See ["First issue of green and social bonds for municipal funding"](#) on Barcelona's website.
- 15 See the United Nations, [Sustainable Development Goals](#).
- 16 Total municipal market issuances based off ["Primary Market Statistics"](#) on the EMMA website.
- 17 See Reuters, ["Climate changing for 'green bonds' even in face of Trump scepticism."](#)
- 18 See, for example: Climate Bonds Initiative, 2018, ["Green Bond Pricing in the Primary Market: July - September 2017"](#); NN Investment Partners, January 26, 2018, ["Unravelling the Green Bond Premium"](#); and Financial Times Alphaville, January 30, 2018, ["I can see your \(green\) halo."](#)

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