

Fixed Income Investing for Sustainability: The Blossoming Green Bond Market

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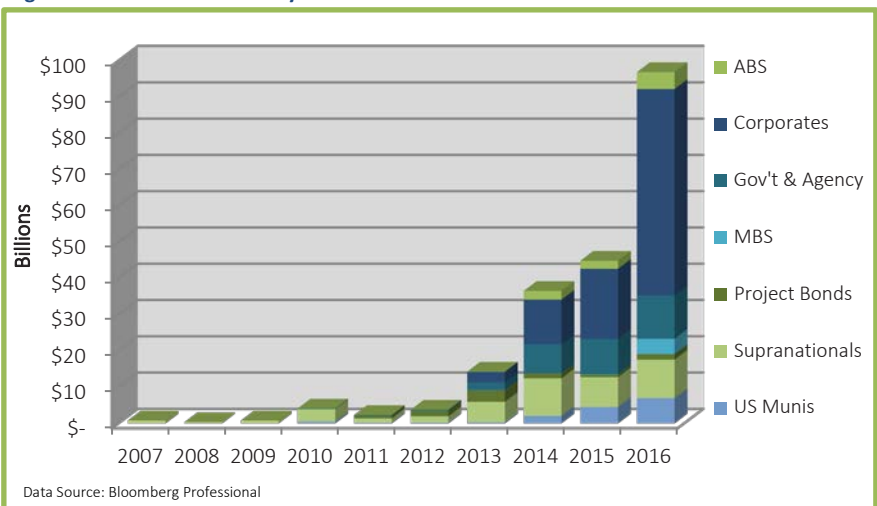
A decade ago the European Investment Bank (EIB) issued €600 million of what was then labeled a Climate Awareness Bond (CAB). In the time since that issuance the green bond market has grown exponentially, with over \$96 billion issued in 2016 and nearly \$200 billion outstanding across multiple fixed income security types at the end of last year. Given that 2017 began with an announcement that a fissure along the Larsen C Ice Shelf in Antarctica had expanded significantly during December and an iceberg roughly the size of the State of Delaware will likely break off in the near future¹, combined with a statement from the National Oceanic and Atmospheric Administration (NOAA) that 2016 replaced 2015 as the hottest year in recorded history², the increased growth rate of this market is aptly timed.

Following the EIB’s issuance of the first ever CAB, the World Bank through its International Bank for Reconstruction and Development (IBRD) became the second issuer of green bonds in 2008, offering kr2.7 billion to Swedish investors and coining the term ‘green bond’. The proceeds from the sale of both the EIB and IBRD green bonds were used to fund projects focused on carbon mitigation such as renewable energy, as well as climate change adaptation projects through deforestation, watershed management, and stress resilient agricultural systems.

The Evolution of the Green Bond Market

The first significant increase in the size of the green bond market came in 2010 with currency-adjusted issuance of over \$4.0 billion; an increase of more than 5 times compared to 2009 issuance – shown in Figure 1. While supranational issuers continued to dominate the market with over 80% of new supply, the Grant County Public Utility District located in Washington State became the first US municipal to issue a green bond. The proceeds from this \$90 million

Figure 1: Historical Issuance by Sector



bond were used to fund the Priest Rapids Hydroelectric project. Grant County was the first of many municipalities to begin issuing green bonds in 2010. When these bonds were brought to market the term ‘green bond’ had not been used to describe municipal bond offerings, they were instead issued as ‘clean

¹ Project Midas | Larsen C Ice Shelf Poised to Calve (January 5, 2017)
<http://www.projectmidas.org/blog/larsen-c-ice-shelf-poised-to-calve/>

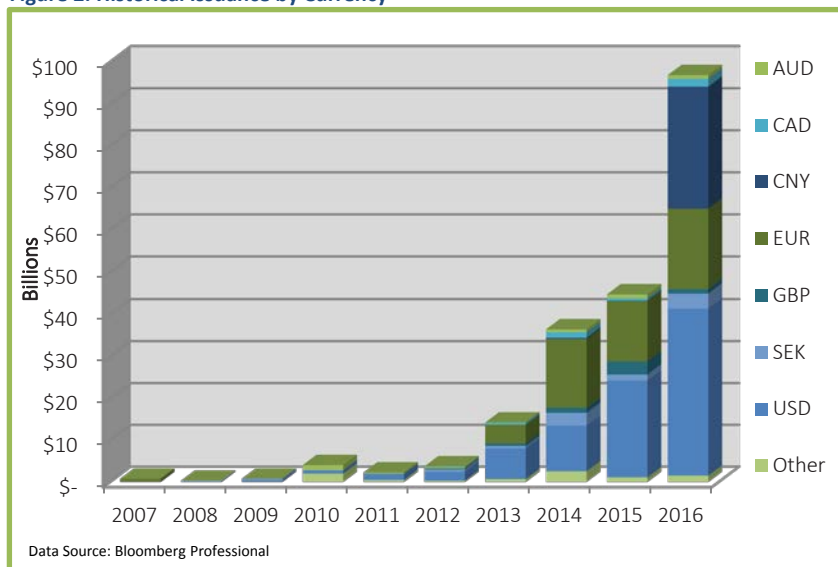
² Global Analysis – Annual 2016 | State of the Climate | National Centers for Environmental Information (NCEI)
<https://www.ncdc.noaa.gov/sotc/global/201613>

renewable energy bonds' (CREBs). CREBs were created through Division B of the Economic Stabilization Act, the Energy Improvement and Extension Act of 2008. Bondholders of CREBs benefit from owning these bonds by receiving a tax break in lieu of a portion of the traditional coupon payments, resulting in lower borrowing costs for qualified renewable energy projects. The green bond market also saw the entrance of its first sovereign government agency issuer in 2010 when Kommunalbanken, a Norwegian local government funding agency, issued five Uridashi³ green bonds totaling \$154 million in the Japanese market.

While 2011 and 2012 brought lower overall green bond issuance, Fannie Mae introduced green mortgage backed securities (MBS) to the market through four transactions totaling \$55.7 million during 2012. Green MBS bonds are securitized similarly to other Fannie Mae MBS bonds with the exception that green MBS bonds are comprised of a single underlying loan instead of hundreds or thousands of loans. The underlying loans are on multifamily housing units that possess at least a nationally recognized, current green building certification, or the property owners commit to make improvements to the property that increase energy efficiency and/or conserve water by 20% or more. Fannie Mae has continued to issue green MBS every year since.

Major developments within the green bond market occurred in 2013 and included an increase of issuance over 275%, the first green asset backed bonds, and the first green corporate bond. Credit Agricole became the first corporate issuer of green bonds, issuing the equivalent of \$220.7 million across seven Uridashi bond offerings. Credit Agricole has used the funds for sustainable energy projects, but also for socially sustainable efforts such as decreasing poverty through job creation in impoverished areas. Additionally Bank of America issued \$500 million of the first US dollar denominated corporate green bond; the proceeds

Figure 2: Historical Issuance by Currency



of which were used to fund loans for renewable energy projects. As shown in Figure 2 issuance of green bonds has taken off significantly following the introduction of corporate green bonds in 2013. SolarCity brought to market a \$54 million green asset backed security⁴ (ABS) deal which was comprised solely of loans for solar panels to the company's residential and commercial customers. Up until this point US dollar denominated green bond issuance had been predominantly comprised of project bond⁵ offerings, many of which are issued as private placements and may or may not be

rated by one of the major bond credit rating agencies. Over the last five years the green bond market has grown dramatically, driven mainly by leaps in issuance in corporate bonds, much of which was issued in US dollar denominated securities.

³ Uridashi bonds are bonds issued in offshore markets and sold directly to individual investors in Japan as public deals by selling agents in Japan. Uridashi bonds are typically issued in high yielding currencies in order to give the investor a higher return.

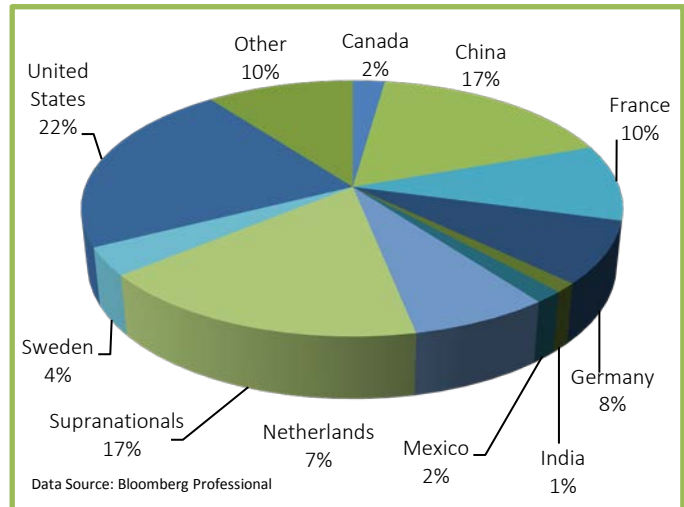
⁴ Asset Backed Securities (ABS) are fixed income securities whose value and cash flows are derived and collateralized by a pool of financial assets (leases, loans, receivables).

⁵ Project bonds are bonds used to fund infrastructure and construction projects. The repayment schedule of project bonds is based on the projected cash flows of the underlying project at the time of issuance.

Snapshot of the Current Global Green Bond Market

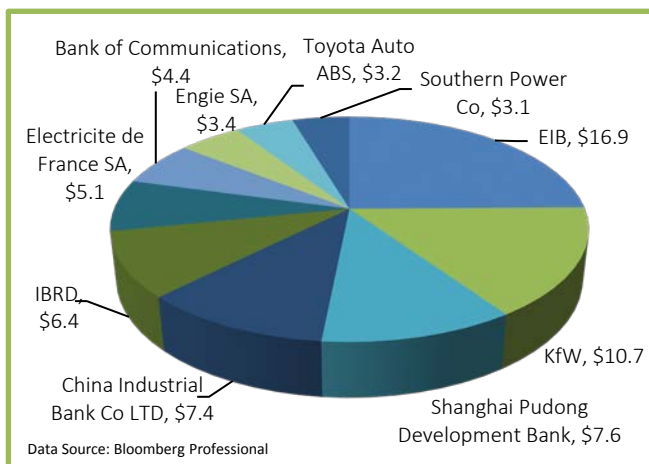
The green bond market flourished in 2016 and continued its evolution into a global market. Annual issuance over \$96 billion contributed to the over \$190 billion outstanding issued by entities domiciled in 32 countries. Figure 3 shows the distribution of green bonds outstanding at the end of 2016 across the top ten countries in which the issuing entity is domiciled. Within the 10% 'Other' category, South Korea, Latvia, Estonia, South Africa, Bermuda, and many other countries are using green bonds as a funding tool for projects ranging from water management to building renewable energy infrastructure. Most notable was the scale at which Chinese entities ramped up issuance in 2016.

Figure 3: Green Bond Market by Country of Domicile as of 12/31/2016



The first green bonds issued by a Chinese domiciled entity were introduced by the Agricultural Bank of China in late 2015 and totaled nearly \$1 billion US dollars. In comparison Chinese domiciled entities issued almost \$32 billion during 2016 and surpassed the combined issuance of supranational green bonds currently outstanding. This issuance should not come as a great surprise with the Chinese bond market one of the largest in the world paired with the fact that China is the largest emitter of greenhouse gases in the world⁶. While it is expected that Chinese entities will continue to increase their issuance of green bonds there are concerns regarding transparency and reporting. Instead of following the Green Bond Principles observed by most markets outside of China, Chinese entities have adopted a patchwork of domestic principles roughly resembling the Green Bond Principles. However some investors may not be comfortable with certain acceptable uses of proceeds such as 'clean coal'.

Figure 4: Top 10 Green Issuers by Market Share in Billions



The \$32 billion issued by Chinese corporations accounted for more than half of new green corporate issuance in 2016 and represented over a third of the green corporate bond market at the end of last year. Currently the largest issuer of corporate green bonds is the China Industrial Bank Co LTD, a Chinese bank that issued three large green bonds in 2016 totaling \$7.4 billion. The third largest corporate issuer of green bonds was another Chinese bank, the Bank of Communications, a new issuer in 2016 that quickly became one of the top corporate issuers in the market. The top ten overall green bond issuers are shown in Figure 4; note that three of the ten are Chinese entities that largely entered the market in 2016.

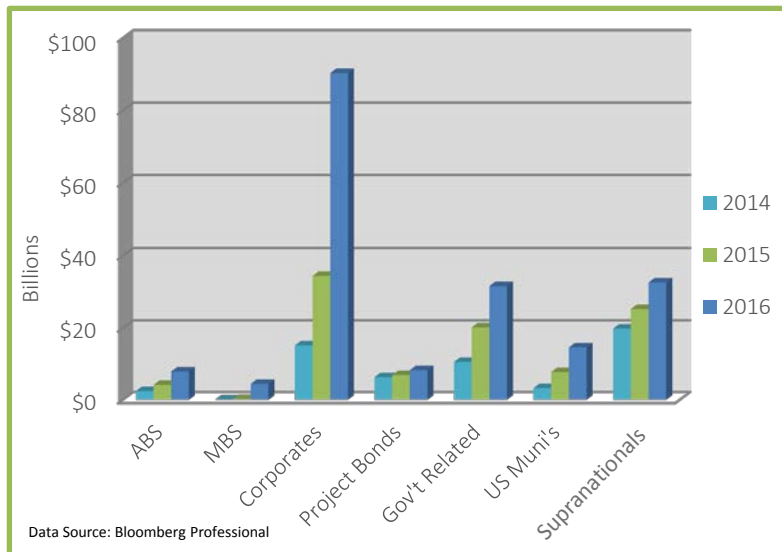
The EIB has continued to blaze the way within the supranational market accounting for more than 50% of supranational green bonds outstanding; additionally it is the largest green bond issuer, having issued over \$18.9 billion with \$16.9 billion currently outstanding. Over the past three years KfW Bankengruppe, a German government-owned development bank, has become the second largest green bond issuer with more than \$10 billion currently outstanding. 2017 may be the year the EIB is eclipsed as the largest green

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⁶ Global Greenhouse Gas Emissions Data | Greenhouse Gas Emissions | US EPA
<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data#Country>

bond issuer. The question is whether that is by Chinese corporations, another supranational, or a government agency. The market share comprised of governmental entities and government agencies has been growing at a faster pace than supranationals, due in part to KfW's \$3 billion 2016 issuance, as shown in Figure 5. The proceeds from KfW's bonds are predominantly used to fund renewable energy projects, and the total 2016 green bond issuance have contributed to the prevention of approximately 2.2 million tons of green house gas emissions⁷.

Figure 5: Green Bond Market Composition Three Year History



Beyond the significant new issuance within the green bond market, 2016 also brought the introduction of Moody's 'Green Bond Assessment' methodology. This rating tool is meant to evaluate the bond issuer's management, administration, allocation of proceeds to and reporting on environmental projects financed by the issuance of green bonds, it is not a measure of how 'green' or environmentally friendly the bonds are. The rating hierarchy can be found in Figure 6. Standard and Poor's Global Ratings announced in the fourth quarter of 2016 a plan to release a green bond evaluation tool in 2017.

Figure 6: Moody's Green Bond Assessment and Definitions

Grade	Detail	Definition
GB1	Excellent	Green bond issuer has adopted an excellent approach to manage, administer, allocate proceeds to and report on environmental projects financed with proceeds derived from green bond offerings. Prospects for achieving stated environmental objectives are excellent.
GB2	Very Good	Green bond issuer has adopted a very good approach to manage, administer, allocate proceeds to and report on environmental projects financed with proceeds derived from green bond offerings. Prospects for achieving stated environmental objectives are very good.
GB3	Good	Green bond issuer has adopted a good approach to manage, administer, allocate proceeds to and report on environmental projects financed with proceeds derived from green bond offerings. Prospects for achieving stated environmental objectives are good.
GB4	Fair	Green bond issuer has adopted a fair approach to manage, administer, allocate proceeds to and report on environmental projects financed with proceeds derived from green bond offerings. Prospects for achieving stated environmental objectives are fair.
GB5	Poor	Green bond issuer has adopted a poor approach to manage, administer, allocate proceeds to and report on environmental projects financed with proceeds derived from green bond offerings. Prospects of achieving stated environmental objectives are poor

Source: Moody's Investor Services – Green Bond Assessment Methodology

⁷ KfW Green-Bond-Reporting uber die Mittelverwendung fur das Jahr 2016 (January 2, 2017) https://www.kfw.de/KfW-Konzern/Newsroom/Aktuelles/News/News-Details_396928.html

The Domestic Green Bond Market

The US market has become the green bond issuer's market of favor for new issuance. Figure 7 and 8 illustrate the difference between the market denominated in US dollars and the US market share originating from issuers domiciled in the United States.

Figure 8: US Green Bond Market by Country of Domicile as of 12/31/2016

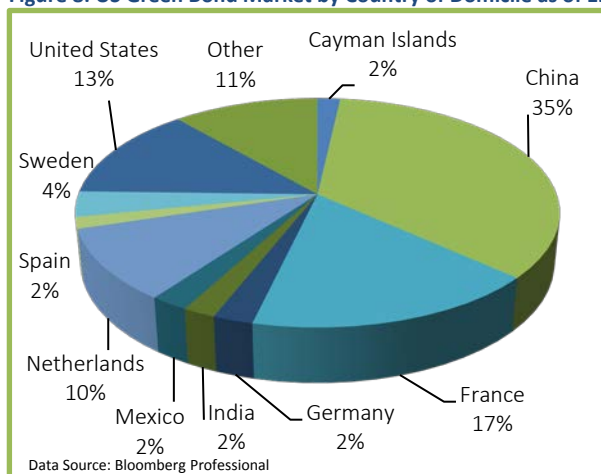
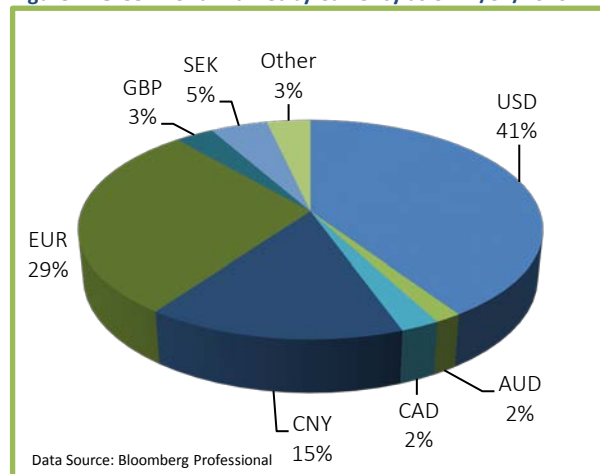


Figure 7: Green Bond Market by Currency as of 12/31/2016

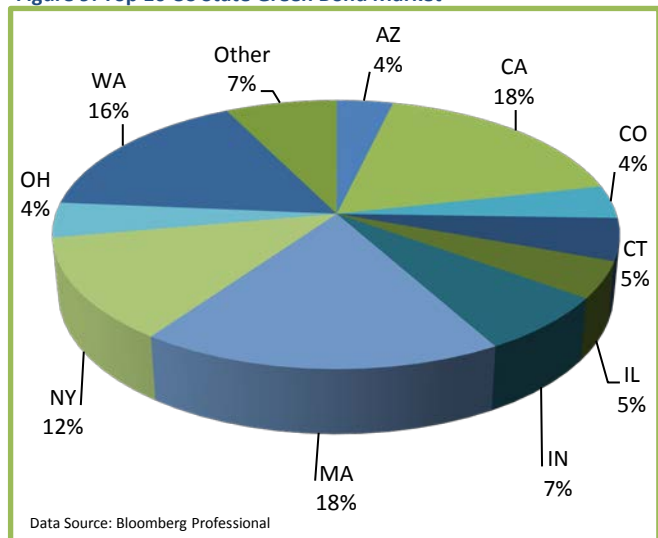


Of the over \$77 billion currently outstanding green bonds in the US market, corporate bonds are currently the largest segment accounting for 32.7%. The Bank of China through its London and Luxembourg branches issued \$2.75 billion in 2016 becoming the largest corporate green bond issuer within the US marketplace. The second largest issuer is the Mexico City Airport Trust, which issued \$2 billion in September 2016 to fund the development, construction, and operation of the new Mexico City International Airport.

Securitized green bonds have primarily been issued in the US market; in fact only two deals totaling \$756.7 million have been placed in markets outside the US. In contrast the capital markets have issued \$14.7 billion ABS and MBS deals in the US market. 2016 was a record issuance year across these asset classes and 2017 is shaping up to be another record breaking year. Fannie Mae increased the amount of green MBS deals it brought to market by more than 3,200%, with 2015 issuance at \$111 million while 2016 issuance was \$3.6 billion and on January 1st 2017 announced a \$1.5 billion dollar deal. Toyota remains the only automotive ABS issuer to sell green ABS and they have consistently issued more than a billion dollars each year since their inaugural offering in March 2014, making them the largest ABS issuer. Toyota's green ABS deals are not collateralized by 100% Hybrid vehicle loans and leases; rather the underlying collateral is diversified across all Toyota and Lexus models. The bonds are considered green because the proceeds from the sale of these bonds is used explicitly for new financing on gas-electric hybrid and alternative fuel Toyota and Lexus vehicles. Toyota has indicated these ABS deals are structured this way because market participants would view an ABS deal with concentrated model exposure (i.e. all hybrid vehicles) as riskier than a diversified pool and would therefore demand a higher interest rate on a deal composed of loans and leases on hybrid only vehicles. This makes it unattractive for Toyota to issue ABS deals comprised solely of loans and leases on hybrid vehicles. HERO Funding Trust, a special purpose entity created to securitize Property Assessed Clean Energy (PACE) loans, may surpass Toyota as the largest ABS issuer in 2017; in 2016 the company issued more than Toyota. These loans are made to individual, commercial, and industrial property owners that require funding to pursue qualified energy efficiency projects specified by their state's legislation. In states where PACE financing has been authorized property owners can obtain funding from their local governments, state governments, or other inter-jurisdictional authority for the up front cost of clean energy projects. The governmental bodies that make these loans can securitize them using entities such as HERO Trust Funding to remove the risk of non-payment as well as receive funds immediately, as opposed to waiting for the borrower to repay the loan. HERO Funding Trust more than doubled its issuance in 2016, bringing more than \$1.8 billion to market.

US municipal green bonds have become the second largest segment of the US green market at 19% and represent 7.7% of the global green bond market with \$14.6 billion outstanding. California State and its local municipalities currently have \$2.3 billion green bonds outstanding, the largest of the 39 states (including Washington DC) that have issued green bonds to fund local municipal projects. Municipalities are predominantly using green bonds as a funding tool for water infrastructure projects. Of current outstanding municipal bonds, water management projects account for approximately half, and of the \$7 billion of new issuance in 2016 49% will also be used for water management projects.⁸ In addition to being the largest segment of the US green bond market, there are significantly more individual green bonds than any other market segment. 185 municipal issuers have brought over 2,000 bonds to market. This means the bonds that are brought to market tend to be relatively small when compared to corporate issuers.

Figure 9: Top 10 US State Green Bond Market



Green Bonds and Your Portfolio

While the green bond market has grown dramatically in recent years it is important to recognize not all of the securities offered are appropriate for every investor. Within the \$77 billion US green bond market more than \$12 billion of that has been issued in private placements and cannot be purchased by anyone who is not a qualified institutional buyer (QIB) as defined by the SEC. Concerns surrounding the illiquidity of small bond offerings and creditworthiness of some issuers further restricts the US green bond universe we consider for our clients’ portfolios. Some have said the green bond market is illiquid, because the bonds trade less frequently than bonds issued by the same entity that are not green bonds. I disagree with this characterization. Typically when green bonds are brought to market in a new issuance the brokers who determine the allocation give preference to managers they know are allocating the bonds to socially responsible or environmentally focused portfolios. Because of this the majority of investors who buy the bonds are doing so because they see value in the green aspects of the bond and are therefore less likely to sell the bond, leading to less trading volume. The effect of people buying and holding to maturity more regularly than non-green bonds gives the illusion of illiquidity; green bonds can be very hard to purchase at reasonable prices in secondary markets, but if you need to sell for any reason you can usually do so. We will continue to monitor this growing market and consider green bonds for our clients’ portfolios as they become available.



Jacquelyn J. Weber is a Vice President at 1919 Investment Counsel. As the taxable credit analyst, she provides credit analysis of investment grade corporations for the institutional separate account portfolios. She also assists with the management of the corporate fixed income portfolios. Jacquelyn is a member of the Fixed Income Committee.

The views expressed are subject to change. Any data cited have been obtained from sources believed to be reliable. The accuracy and completeness of data cannot be guaranteed. **Past performance is no guarantee of future results.**

⁸ Paul Burton | Green Bonds Rise as a Funding Tool for Water Infrastructure, Resilience| The Bond Buyer | January 18, 2017