



ASSOCIATION OF
METROPOLITAN WATER AGENCIES



Revisiting the Growing Green Bond Market: AMWA Member Perspectives

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1. Introduction

While firmly established as an investment category since 2007, green bonds set a record with \$269.5 billion in bonds issued worldwide in 2020. This figure, calculated by the Climate Bonds Initiative, an organization that advocates for the adoption of green bonds, eclipsed the previous 2019 record of \$266.5 billion by \$3 billion despite the economic challenges that accompanied the COVID-19 pandemic.¹ The 2021 green bond figures will continue the trend. The Climate Bonds Initiative ascertains that the bonds remain a growing market, with an average increase of 60 percent annually since 2015 and currently representing \$1 trillion in capital.² In 2020, the United States led the world by issuing \$51.1 billion in climate bonds.³ Investments in water infrastructure worldwide attributed to \$17.5 billion or seven percent of all green bonds globally in 2020.⁴ In the capital markets, U.S. Environmental, Social and Governance (ESG) index funds are outperforming traditional index funds during the pandemic for a variety of reasons, including reduced investment in energy and fossil fuels.⁵

This document speaks specifically to green bonds, a part of the ESG bond market. In general, green bonds focus on the “E” in ESG because companies use them to fund projects with environmental and/or climate benefits. This white paper explores how utilities have chosen to employ green bonds and examines how these financial instruments can support future utility funding. In 2016 AMWA developed its first paper, [The Green Bond Market](#), on this topic. AMWA released a revised paper in 2017. This standalone document, *Revisiting the Growing Green Bond Market: AMWA Member Perspectives*, intends to provide an update on current trends in the green bond market. It reiterates the fundamentals of green bonds while highlighting the success of AMWA member utilities that have been early adopters in this area. While recognizing the unique circumstances of utilities, the case studies also examine the utilities’ reasons for and benefits observed from issuing green bonds.

¹Record \$269.5bn green issuance for 2020: Late surge sees pandemic year pip 2019 total by \$3bn. Climate Bonds Initiative. 24 Jan 2021. [Web](#).

² Ibid.

³ Ibid.

⁴ Ibid.

⁵ Here is more evidence that ESG funds outperformed during the pandemic. 7 Apr. 2021 [Web](#).

2. Non-financial Benefits of Green Bonds

In consulting with its members, AMWA learned that for some utilities, the investment of resources to issue a green bond or develop a green bond program outweighs the financial benefits provided, in part because of increased disclosure requirements. However, other AMWA members have chosen to add green bonds to their funding portfolios because of the advantages outside of a pure pricing benefit on a bond-to-bond comparison. Some examples of these non-financial benefits⁶ include:

- For smaller debt issuers or those who issue debt infrequently, self-labeling and second-party verification may enhance the marketability of the bonds to investors who would otherwise pass on conducting an extensive review of the bonds.
- For those who issue bonds for more purposes than just water or wastewater projects, labeling green bonds may help distinguish the use of proceeds for those bonds compared to bonds issued to fund non-green projects.
- For many issuers, green bonds provide a measure of accountability and demonstration of responsible use of debt financing to ratepayers.

Other utilities have found:

- Public relations value from the recognition of their climate- and sustainability-focused efforts.
- Greater interest from non-traditional investors.

In recent years, demand for municipal bonds has routinely exceeded supply, pushing rates lower; if this trend weakens or changes on any given sale date, green bonds may yield a larger pricing benefit. Furthermore, continued issuance of green bonds grows the market for the bonds overall and increases awareness of them as an investment consideration.

Standard & Poor's Global (S&P) notes, "corporate debt issuers in North America are increasingly willing to consider sustainable financing as part of their capital funding" plan despite the limited overall adoption of green bonds.⁷ It also observes that "one reason why issuance has not been significant in the U.S. is because approximately 95 percent of green issuers are investment-grade companies where spreads between rating categories are typically narrower, especially in a low-interest rate environment," and anticipates investor interest will increase as a broader range of entities issue green bonds.

⁶ Email communication, EBMUD, 12 May 2021

⁷ The State of Green Business 2021 Positive Impact. S&P Global. 03 Mar 2021. [Web](#).

3. Green Bond Principles and Criteria

Utilities that pursue issuing green bonds have at least three options for verification: self-certification options, external reviews, and second-party opinion services. The International Capital Market Association released the latest version of [Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds](#) in June 2021.⁸ The document, a voluntary framework, outlines four key tenets for the certification of green bonds:

1. Use of Proceeds.
2. Process for Project Evaluation and Selection.
3. Management of Proceeds.
4. Reporting.

The Climate Bond Initiative finalized the latest version of its Climate Bond Standard, a third-party verification framework, in December 2019.⁹ The framework includes supplementary standards specific to the water sector, referred to as [Water Infrastructure](#), with the most recent iteration released in February 2021¹⁰. While this document helps verify projects that span the spectrum of drinking water, wastewater, and stormwater services, the “key elements” of these criteria mandate that a project facilitate and promote “increased climate resilience in the systems in which they are located” and “greenhouse gas mitigation through reduced emissions or increased carbon sequestration.”¹¹

4. Example Certification Options

Utilities entering the market have a variety of options available as they develop their green bonds. Depending on the certification approach chosen, the utility can perform the bond evaluation internally or use an external organization. In addition, all of the bond rating agencies, Fitch, S&P, and Moody’s, have acquired or developed ESG assessment capabilities, which allows them to issue holistic ESG profiles and credit impact scores for utilities. However, the ways these assessments may affect pricing and financial benefit for utility issuers remains unclear. ESG-focused funds also often conduct evaluations of green bond-issuers, particularly for those not evaluated by an outside certifier. Table 1 provides an overview of green bond certification options.

⁸ Green Bond Principles. International Capital Market Association. [Web](#).

⁹ Climate Bonds Standard V3.0. Climate Bond Initiative. [Web](#).

¹⁰ Water Infrastructure. Climate Bond Initiative. [Web](#).

¹¹ Water Infrastructure Criteria under the Climate Bonds Standard. Climate Bond Initiative. [Web](#).

Table 1: Overview of Guidance on Green Bonds for Water Utilities

	Green Bond Principles (GBP)	Climate Bonds Standard and Water Infrastructure Criteria	Vigeo-Eiris Second-Party Opinion Service (one example, many firms provide this service)	S&P Sustainable Finance External Reviews and Opinions (one example, many rating agencies provide this service)
Link to product(s)	Principles	Standard and Water Infrastructure Criteria	Product home page	Product home page
Developer	International Capital Market Association (a group of financial institutions)	Climate Bonds Initiative	Vigeo-Eiris, now V.E. (subsidiary of Moody's)	Standard and Poor's
Description	Principles that identify the types of projects that can be considered green, and then best practices for issuing a green bond. A good starting place for understanding how to issue a green bond.	A water infrastructure-specific standard against which issuers can be certified for projects that aim to address climate adaptation or mitigation. Part of CBI's Climate Bonds Standard.	Replaced Moody's green bond verification system in 2020 (V.E. is a subsidiary of Moody's). ¹² It examines the best practices followed in issuing the bond, the issuer's alignment with ESG goals, and discrepancies between the practice of the issuer and the goals of the bond.	A second party opinion "to help companies provide investors and regulators with greater insight into how their investments will impact and align with global climate and sustainability goals." Framework Alignment Opinion: "a point in time Second Party Opinion on the alignment of an issuer's green/social/sustainability framework with the Green Bond/Loan Principles, Social Bond/Loan Principles or Sustainability Bond Guidelines." Green Transaction Evaluation: "A point in time quantitative opinion on the net environmental benefit generated by the activities/projects financed by the transaction." It can also include an [optional] Framework Alignment Opinion.
Third party verification required?	No, but recommended	Yes, by approved organizations under the Climate Bonds Standard verification scheme.	Yes, by second party opinion service hired.	Yes, by the assurance firm hired.

¹² Moody's Retires Green Bond Assessment Product in Light of Market-Leading Second-Party Opinion Service Available from its Affiliate Vigeo Eiris. Business Wire. 22 Oct 2020. [Web](#).

5. Case Studies

Green bonds are emerging as a financing instrument that specifically ties bond proceeds from the bond sales to environmentally sustainable, often climate-friendly projects. The marketplace currently permits diverse certifications and processes to define a green bond, although the industry widely accepts the Green Bond Principles as a starting place. As time goes on, the market may mandate standard practice and required certification processes.

Third-party certification or verification usually requires additional reporting burdens for the issuers, potentially adding risk to the bond issuer if the issuers do not deliver the reporting and disclosures promised in the bond covenants. Although most AMWA members featured in these case studies have not experienced an additional rate-of-return for green bonds, in some cases, issuing the green bond has grown the utility's investor base. The benefits that drew these AMWA members to issue green bonds have not been primarily financial but instead have offered other social and environmental paybacks, such as raising awareness of the utility's environmental stewardship in the community and touting ESG accomplishments.

This paper outlines brief case studies, in alphabetical order, of AMWA member utilities that have issued green bonds since 2016. These case studies revisit examples from AMWA's original paper, *The Green Bond Market*, and describe the utilities' subsequent efforts. In addition, the paper highlights new initiatives from Central Arkansas Water, not featured in the original work. This utility's issuance marked the world's first green bond issued to invest in forested land to protect source water quality.

Central Arkansas Water

Central Arkansas Water (CAW) is the largest drinking water utility in its state and is based in Little Rock, the capital city. CAW serves 18 communities and one in every seven Arkansans – about half a million consumers. In 2020, CAW issued its first [certified green bond under the Climate Bonds Initiative](#), raising \$31.8 million to fund a combination of green and gray capital projects.

Lake Maumelle in Central Arkansas is a blue gem surrounded by rich forests of oak, hickory, and short-leaf pine that supplies an abundance of the drinking water to the utility. However, much of the land around the lake is privately owned. As the city expands westward, the forests on this land are at risk of being cleared for development, threatening both the beautiful vista, and drinking water quality.

Recognizing this threat, CAW implemented a watershed protection fee in 2009 of \$0.90/month for residential-sized meters to raise funds to acquire and protect the forest land. But to acquire forests at a larger scale, CAW needed to raise more capital from the private market and decided to issue a bond.

“Our priority is providing high-quality water to our 500,000 recipients in an affordable and efficient manner, and green bonds are one more tool in our toolbox that we can use as we strive to deliver on that priority in a manner that also provides many co-benefits to our communities.”

CAW Chief Executive Officer Tad Bohannon

CAW’s green bond exemplifies a win-win-win situation for investors, local utilities, and residents. The dedicated watershed protection fee is the foundation for CAW’s recent success, allowing the utility to raise capital for a long-term investment in natural infrastructure and take advantage of the low interest rates on the bond market. The green bond platform helps investors find strong projects to allocate earmarked “green” capital, supporting a much-needed transition towards low-carbon investments. The residents of Little Rock and the surrounding area benefit from a protected watershed in the form of clean drinking water without paying additional fees. CAW paid \$500 for the application and will be able to comply with the annual reporting requirements internally via a report from its finance department, with no additional outside costs.

When CAW issued the bond in November 2020, the capital markets responded enthusiastically. After receiving bids from several banks, CAW sold the bond to Morgan Stanley.

Here are three lessons from the world's first green bond to invest in forests for water quality:

1. Municipalities and utilities like CAW increasingly see forests and other “natural infrastructure” as a key strategy to protect drinking water quality and increase water security.

Through this green bond, CAW will invest in traditional “gray” infrastructure, such as pipeline replacements, generators, and other improvements to the distribution system. However, 33 percent of the green bond proceeds are earmarked for green infrastructure to support land acquisitions, conservation easements, and other protection measures in the watershed. World Resources Institute (WRI) advised CAW on the mix of green and gray projects, provided due diligence in selecting third party verifiers, supported the preparation of the materials for scoring submittal, and provided marketing support. CAW's Finance department performs ongoing documentation for the green bond projects.

WRI research shows that a combined green-gray approach, which uses both human-made and natural infrastructure, is often an effective and low-cost way to protect water sources. Protecting forests can also yield important climate and human benefits, such as carbon sequestration, increased biodiversity, improved health, access to recreation, and job creation. The environmental and social benefits of the bond also attract investors interested in greening their portfolios and fulfilling sustainable finance commitments.

2. Response from capital markets indicates they increasingly see natural infrastructure and other climate-related investments as a smart bet.

Acquiring and protecting forestland requires a large up-front infusion of cash. It can take months, or even years, to unlock public and philanthropic funding in the amounts needed to acquire significant amounts of land. However, the capital markets can raise funds quickly and efficiently, but only with a trusted repayment mechanism to assure investors will recoup their costs.

CAW is relying on its current ratepayer structure and the dedicated watershed protection fee to repay the bond and the 2.136 percent true interest cost. CAW's investment in forests will yield future savings by avoiding water treatment costs and will potentially generate future revenue streams through voluntary carbon offsets, timber harvests, and non-timber forest products. Backers view this as a sound investment because utilities have predictable cash flows generated from providing an essential service - in this instance, supplying drinking water. This means the investors are likely to get their money back, while the “green” label ensures that their investment meets verified environmental criteria. This is increasingly important as institutional investors like pension funds look to increase their investments in green projects.

For certified green bonds, third-party verifiers assure investors that the proceeds of the bond will be invested in climate-related or green projects that meet the criteria. The Climate Bonds Initiative's water infrastructure criteria, developed by the Water Consortium, certified the bond and supports green-gray approaches that advance climate mitigation and resilience. The application fee was a fraction of a basis point on the value of the issued bonds (less than \$500.00).

3. Other cities and utilities across the country and the world can replicate CAW's approach.

Municipalities and utilities can follow CAW's lead by duplicating and innovating its model. Healthy watersheds protect drinking water quality and quantity. With low interest rates and access to cheap capital, it is a suitable time to raise funds for long-term planning projects, like green-gray infrastructure. CAW's green bond was the first to emphasize the value of cities' "nearby forests," not just urban green infrastructure such as street trees and green drainage systems.



Figure 1: Lake Maumelle in Central Arkansas

DC Water

Recent Updates (August 2021)

Following its initial issuance in 2014, DC Water reissued Green Bonds in FY2017, FY2018, and FY2019; overall DC Water has issued over \$684 million in Green Bonds to support its Clean Rivers project that is reducing sewer overflows, improving water quality, and reducing flooding in Washington DC. The utility is also preparing for an issuance in January 2022 that will include green bonds. Moody's rated DC Water's Green Bonds in 2017 and 2018 and Vigeo provided the second party opinion in 2019. Moody's stopped rating green bonds and purchased Vigeo-Eiris (now V.E). All of DC Water's green bond issuances since 2017 have been utility revenue bonds.

Although DC Water has not received a pricing differential with its recent offerings, the agency is committed to green bonds.

"Green Bonds are a key part of the financing strategy for the Clean Rivers project and an opportunity to document our Environmental, Social and Governance accomplishments. We also believe that green bonds can bring new investors to the market and that there will be a pricing differential in the near future."

DC Water

Original offerings: Third-party certification approach

DC Water issued two green bond Public Utility Senior Lien Revenue Bonds, Series 2014A (\$350 million) and Series 2015A (\$100 million) bonds, to finance a portion of the DC Clean Rivers Project. These historic issuances marked the first certified green bonds in the United States to be supported by an independent sustainability opinion. DC Water retained Vigeo for the second party opinion of the Green Bond certification in accordance with ESG assessment methodology, which is based on criteria aligned with public international standards in compliance with the ISO 26000 guidelines. The green bond certification process included the establishment of certain ESG performance indicators and the commitment to undertake annual reporting on those indicators in a stand-alone report.

DC Water sees the top benefits for its issuance as responding to investor demand, portfolio diversification, and press coverage/increased brand value. The initial offering was expanded from \$300 million to \$350 million and was oversubscribed, resulting in DC Water's ability to lower the interest rate by 0.15 percent.

The Green Bond Report is intended to fulfill DC Water's commitment to its investors and other stakeholders to report on:

1. Use of proceeds of the green bond for the DC Clean Rivers Project.
2. Environmental and social outcomes achieved by the project for water quality, climate resilience, and quality of life.
3. Responsible management of the project regarding human rights, human resources, environment, business behavior, and community involvement.



Figure 2: Anacostia Water Pumping Station Bioretention

To ensure its commitment to DC Water's investors and stakeholders, DC Water engaged KPMG to perform an attestation on Series 2014A Green Bond for the 2015 fiscal year in accordance with the American Institute of Certified Public Accountants. Based on KPMG's review, DC Water followed the corresponding criteria set forth in Official Statement for Series 2014A. DC Water publishes its Green Bond report annually. For more information see <https://www.dewater.com/green-bonds>

The annual costs include the production and independent review of the Green Bond report and the rating, or second-party opinion associated with individual bond issuances.

Denver Water

Denver Water serves 1.5 million people living in Denver and its suburbs. The utility pursued green bonds to expand its investor base to allow ESG-focused investors to assess the potential environmental benefits of bond-supported projects. Denver has self-certified its bonds by giving investors focused on green bonds priority to purchase its bonds. Fifteen investors considered the bonds, and four placed orders for a combined 12 percent (\$18.03 million) of the total value.

Recent Updates (August 2021)

Denver Water has not pursued another green bond since 2017. Denver's approach to issuing its green bond in 2017 helped the utility demonstrate to the world its commitment to [sustainability and environmental stewardship](#).

Original offering: Self-certification approach

Denver Water issued its first green bonds, Series 2017A, in the amount of \$160 million on May 2017 to finance the redevelopment of its main operating and administrative complex, Operations Complex Redevelopment (OCR). Sustainability is a key factor in the design of the OCR Project. In 2015, Denver Water registered the OCR Project with the U.S. Green Building Council and will submit it for certification upon construction completion. The OCR Project provided a prime opportunity for green bond financing, because it offers environmentally beneficial features such as:

- LEED® certification at various level for all new buildings.
- Significant energy efficiency especially in the administration building through appropriate envelope design, high efficiency heating, ventilation, air conditioning, and lightening systems and controls.
- Central utility plant that utilizes an existing water pipeline on site for radiant heating and cooling in new facility floors.
- "One Water" reduction and use strategy.
- Recycling of construction/demolition debris and use of recycled materials where possible.

Denver Water adopted the Green Bond Principles in the issuance of Series 2017A Bonds and expects to provide information regarding progress toward allocation of 2017A proceeds to the OCR Project, any LEED® certification as it relates to the project, and reports on expected environmental sustainability objectives and progress toward such objectives. The utility will provide these reports to the investors at least annually on its website until all proceeds of the Series 2017A Green Bonds are spent. The entity decided to not pursue additional third-party verification other than the LEED® certification on the new buildings.

Denver Water also issued Series 2017B Water Revenue Bonds in the amount of \$45 million. The utility sold both series, totaling \$205 million, simultaneously via negotiated sale. Over 40

institutional investors and 22 retail investors placed orders totaling more than double the amount of the bonds. In general, all maturities of 2017A Green Bonds were oversubscribed, which provided an opportunity to adjust the price down across the yield curve, ranging anywhere from 1 to 9 basis points. Denver Water saw interest from more than a dozen green bond investors who had not traditionally invested in Denver Water bonds. At the conclusion of the sale, five new investors purchased a portion of Series A Green Bonds for a dedicated green portfolio.

Denver Water staff started educating the board and the executive members about green bonds in 2016 by providing briefing papers and presentations. They clearly made the objective of issuing green bonds to expand the investor base, which could potentially provide a pricing advantage in the future; however, they did not anticipate a pricing advantage on this issue. The overwhelming demand for green bonds may have provided an opportunity for lowering yields on these bonds during the final pricing that the traditional revenue bonds would not have provided.

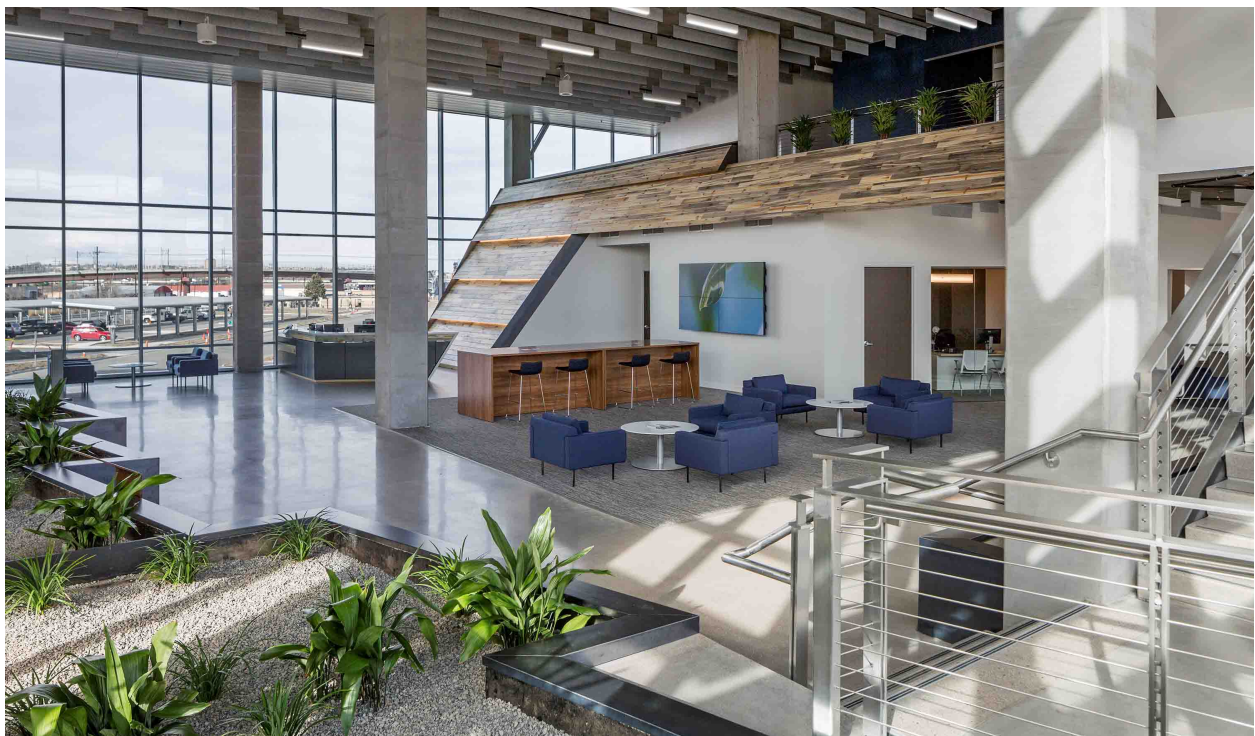


Figure 3: Denver Water Facilities

In addition, while the investors showed interest in designated green bonds, in Denver Water's experience, it is still predominantly driven by the yield because, 1) they cannot take advantage of the tax-exemption of muni green bonds, and/or 2) they prefer lower rated muni green bonds to AAA rated bonds as they offer higher absolute yields.

East Bay Municipal Utility District

East Bay Municipal Utility District (EBMUD) provides drinking water to 1.4 million Californians living in Alameda and Contra Costa Counties. It provides wastewater services to 740,000 people.

It issued its first green bond in 2015, and all its bonds have been self-certified. EBMUD's rationale for entering the market is to stimulate growth and foster development. EBMUD has not received any evidence to indicate green bonds have had a positive or negative impact on yielded cost or pricing benefits, although its leadership recognizes several other benefits other than pure pricing.

For future bond issuances, EBMUD plans to examine the best practices in the market at that time. Given recent market trends, EBMUD will examine the state of second-party verification or another form of additional verification, in addition to considering self-certification.

Recent Updates (August 2021)

Water System Revenue Bonds, Series 2019A (Green bonds, self-certified)

- Par: \$161.8 million
- Deposit to system fund: \$200 million
- Projects funded by the bonds fell into the following categories: clean water and drinking water; water supply and conservation; protection against flooding; renewable energy and energy efficiency; and sustainable land use and biodiversity conservation.
- Muni bond, negotiated sale

Water System Revenue Bonds, Series 2017A (Green bonds, self-certified)

- Par: \$185.4 million
- Deposit to the system fund: \$218 million
- Projects funded by the bonds fell into the following categories: clean water and drinking water; water supply and conservation; protection against flooding; renewable energy and energy efficiency; and sustainable land use and biodiversity conservation.
- Muni bond, negotiated sale

Initial Offerings: Self-certification approach

In April 2015, EBMUD presented to its Board of Directors an internally developed guidance to direct the District's entry into the Green Bond Market. EBMUD's rationale for entering the market was to stimulate its growth and foster its development. EBMUD's sustainability policy and Green Bond Guidance supports the goals of the Green Bond Principles. The guidance is used to point staff toward selecting projects to be funded by green bonds.

EBMUD issued \$74.3 million of tax-exempt green bonds in June 2015 for projects identified as meeting the criteria identified in the District's Green Bond Guidance. There are ten criteria, including maintaining water quality, improving biodiversity and ecosystem quality, protecting

against flooding, improving climate resilience, and reducing greenhouse gas emissions, among others.

EBMUD self-certified its green bond offering. The bonds reimbursed the District for prior project expenditures for projects that included, among others: distribution system renewals, reservoir rehabilitation and maintenance, recycled water programs, seismic upgrades to dams, pumping plant rehabilitation pressure zone improvements and wildlife projects to support compliance with the Endangered Species Act.

EBMUD is committed to identifying the projects funded by green bonds in its annual Sustainability Report to the utility's Board of Directors.

The continuing disclosure requirements are the same for EBMUD's non-green bonds, in part because the utility spent the proceeds on projects that were already performed and are typical to EBMUD, rather than for projects where the environmental benefit had not yet been realized. EBMUD has a history of providing more information than is typically required in its Continuing Disclosure Agreements, a positive factor for its investors.

The bonds were purchased by a bank, which was the underwriter that sold them to investors. EBMUD has no knowledge of who the investors were. EBMUD was advised that while some investors might prefer green bonds, they would not accept a lower interest rate in exchange for a green bond.

Massachusetts Water Resources Authority

Massachusetts Water Resources Authority (MWRA) is a public water authority, wholesale water supplier, and wastewater provider serving 3.1 million people in the Boston Metropolitan Area. Since 2016, MWRA has issued its refunding bonds as green, because the use of proceeds does not require new disclosure requirements. MWRA has issued refunding bonds as part of 2016 Series C and D, 2017 Series C, 2018 Series C and 2019 Series C, F, and G transactions. MWRA self-certified its green bonds and issued bonds not labeled as green at the same time.

MWRA continues to monitor changes in the ESG bond market. It continues to issue Green Bonds to increase awareness of the benefits of its environmental programs and to respond to market trends that might help provide a lower cost of capital in the future. MWRA collaborates closely with its financial advisor, bond and disclosure counsels, and market participants to ensure the market receives its bonds well and to provide the lowest cost of capital possible.

Recent Updates (August 2021)

The below table summarizes the nearly \$1.7 billion in green bonds issued by MWRA between 2016 and 2021.

Series	Par
2016C	\$ 681,615,000.00
2016D	\$ 104,260,000.00
2017C	\$ 254,745,000.00
2018C	\$ 21,900,000.00
2019C	\$ 19,190,000.00
2019F	\$ 547,750,000.00
2019G	\$ 22,825,000.00
Total	\$1,652,285,000.00

Table 2: MWRA 2016-2021 Bond Summary

MWRA self-certified all these issuances, which were sold in the public market. MWRA did not observe a pricing differential between the green and non-green bonds, which could be solely attributed to the green designation. With the growing number of ESG investment vehicles, MWRA and other market participants continue to expect increased demand for green bonds. MWRA continues to favor the self-certification approach, as recent estimates for a third party review cost for green bonds was \$45,000 to \$100,000 per issuance, depending on the complexity.

Original offerings: Self-certification approach

MWRA decided to issue all of the refunding bonds referenced above as green bonds because the projects funded through this transaction assisted MWRA with meeting the requirements of the Clean Water Act and the Safe Drinking Water Act. Proceeds of these transactions were utilized

to refund bonds, which had funded a variety of wastewater and drinking water projects. The wastewater projects, important components to clean up Boston Harbor, included construction of the Deer Island Wastewater Treatment Plant and combined sewerage overflow treatment facilities and storage tunnels. Drinking water projects included the construction of the John J. Carroll Water Treatment Plant, MetroWest Water Supply Tunnel, and coverage storage facilities to eliminate the use of open reservoirs.



Figure 4: John J. Carroll Water Treatment Plant

Between 2016 and 2021, MWRA issued \$1.7 billion in green bonds. MWRA has seen increased interest from ESG funds for its bonds identified as green. MWRA did not observe any difference in yields between the green and non-green bonds.

When developing its green bond program, MWRA was cautious not to create new continuing disclosure requirements. MWRA urges issuers to focus on their disclosure requirements when developing programs.

Mohawk Valley Water Authority

The Mohawk Valley Water Authority (MVWA), located in Utica, New York, is a state Public Authority created in 1996 to assume ownership and management of a regional drinking water supply system serving an average of 20 million gallons per day to a population of approximately 130,000 people through roughly 39,000 service connections.

MVWA issued its first green bond in 2016 and another in 2020. Its 2016 bond was the first Moody's Green Bond Assessment in the continental U.S. In 2020, MVWA self-certified since Moody's subsequently exited the green bond rating market. While the green bond designation did not result in a "major financial benefit," it attracted a new subset of investment groups compared to other MVWA bonds. For the 2020 issuances, MVWA's underwriter noted that "six or seven additional investment groups" not previously interested in MVWA projects were interested in this bond.¹³

The utility assesses "this trend will continue, and the opportunity to obtain more favorable borrowing terms will increase over time." Capturing these potential benefits is considered part of MVWA's efforts to be "responsible stewards of our natural and financial resources."

Recent Updates (August 2021)

- In summer 2020, MVWA offered a self-certified green bond. MVWA staff determined the projects funded under this bond met the same criteria that had been used in 2016 with respect to environmental benefits, resilience, and sustainability. The bond was sold on the municipal bond market.
- For the 2020 issuance, MVWA noted additional and varied investors coming to the table than in the 2016 issuance. "It seems clear that many investment groups are targeting their resources to support projects and organizations that are engaged in activities consistent with the goals and philosophies of such investors. Our view at the MVWA is that this trend will continue, and the opportunity to obtain more favorable borrowing terms will increase over time. In an effort to be responsible stewards of our natural and financial resources, we will continue to emphasize system resiliency in our long-range capital improvements program. Accordingly, we will continue efforts to attract the attention of investors who are inclined to support environmentally friendly projects."¹⁴

Initial Offerings: First Moody's Green Bond Assessment in the Continental U.S.

In 2016, the borrowing arm of the MVWA, the Upper Mohawk Valley Regional Water Finance Authority, closed on its 2016 Series Bonds to finance the first phase of a new raw water transmission line that will span three miles from the water source, Hinckley Reservoir, to the Authority's water treatment plant. Phase One of the project will cost approximately \$4.1 million

¹³ Email communication Pat Becher to Erica Brown, June 4, 2021

¹⁴ Ibid.

to construct a new pipe bridge that will carry a 48" diameter pipe across a gorge that runs alongside the treatment plant. The remainder of the project will consist of replacing a 24" diameter pipe that was constructed in 1905 with a new 54" diameter transmission line. The 2016 bonds will also be used to refinance \$4.125 million of earlier bond issues.

The MVWA typically seeks bond ratings from both Moody's Investors Service and S&P. Both agencies reaffirmed their credit ratings of A1 and A+ respectively. Prior to contacting Moody's regarding the financial rating, the MVWA learned through its financial advisor that Moody's was attempting to enter the domestic market for "green bond assessments." Moody's had previously issued three such assessments in Europe but none in the United States.

MVWA obtained the 2016 Green Bond Principles and determined internally that the Phase One pipeline project might qualify for a green bond designation. This determination was based on the vast improvement expected in water transmission reliability by replacing a 110-year-old undersized line with a new, larger pipe. In short, water system resiliency would be increased dramatically. In addition, the larger diameter pipe would decrease head loss, allowing the MVWA system to meet all its hydraulic needs during times when Hinckley Reservoir could become abnormally low in the event of a severe drought. Thus, the project would provide improved water source sustainability and drought resistance.

The assessment process with Moody's took place in the form of a written application and five conference calls over a two-week period. Discussions included: the initial disclosure on the use of the bond proceeds, continuing disclosure regarding 'green' benefits from the project constructed, and the identification of key metrics that would be tracked and reported to measure improvements in green benefits. Under MVWA's Continuing Disclosure Agreement, the utility would report on the following four metrics on a continuing basis: hydraulic capacity improvements, total purified water conveyed annually, trihalomethane levels at peak season (improvements are expected from the implementation of carbon filtering medium paid for by the earlier bonds that were refinanced), and total kilowatt production from MVWA's inline power turbines, which should increase as pipe head loss decreases. As a result of these discussions, Moody's assigned its first green bond assessment in the U.S. by giving the MVWA its highest rating of Green Bond 1 (GB1).

The MVWA will report and update continuing disclosure annually in the MVWA's Comprehensive Annual Financial Report and on a dedicated section of its website.

The bond underwriter reported that the bond sale did, in fact, attract the attention of one green bond investment pool that purchased a portion of the bonds. However, it was not clear if the GB1 rating was their determining factor.

San Francisco Public Utilities Commission

The San Francisco Public Utilities Commission (SFPUC) provides drinking water and wastewater services to the City of San Francisco and is the wholesale water supplier for three Bay Area counties, serving a total population of over 2.7 million people. In addition, the SFPUC provides hydroelectric and solar power to San Francisco municipal departments.

The SFPUC issued its first green bond in 2015 for its Power Enterprise (self-certified) and since then the agency has issued more than \$2.5 billion in green bonds for its Water and Wastewater Enterprises. Green bonds align well with SFPUC's mission, including environmental stewardship, as well as the City of San Francisco's Climate Goals, which include greenhouse gas emissions reductions of 25 percent below 1990 levels by 2017 and 40 percent below 1990 levels by 2025.

Since 2016, third parties have verified all green bonds against the Climate Bonds Standard Water Infrastructure Criteria, published by the Climate Bonds Initiative (CBI). Starting with FY18-19, all green bond reports include:

- Project and SFPUC-wide climate and social impacts.*
- Details of how SFPUC investments meet state, city, and department environmental and social goals.*
- Descriptions of how impacts are aligned to the United Nations Sustainable Development Goals, which is included at the request of investors.*

Green Bond History

- In 2020, SFPUC conducted a \$492 million sale to support its Water System Improvement Program.
 - Tax-exempt offerings: First “greenium” or “green” premium for SFPUC tax-exempt bond issuance (one basis point) on \$25 million maturity.
 - Taxable offerings: Bond issuance saved two to seven basis points in a \$340 million series.
 - Two international investors participated.
 - This offering made SFPUC the first US municipality to list a green bond on London Stock Exchange.
 - Environmental Finance's Bond Awards 2021 recognized this offering as Bond of the Year.
- In 2019, SFPUC conducted a \$623 million water sale.
 - Eleven maturities oversubscribed with ESG orders.
 - Fifteen ESG investors accounted for 52 percent of the value.
 - High demand contributed to lower yields.
- In 2018, \$408 million wastewater sale yielded seven ESG orders (11 percent of the face value) and more demand for green bonds than non-green bonds.
- In 2017, \$506 million, a competitive water sale, received 11 orders from ESG-focused investors (37 percent of the face value).

- In May 2016, the SFPUC issued its second green bond with the \$241M 2016 Series A Wastewater bonds. The Commission relied on Sustainalytics for verification and issued the bonds as [certified under the CBI's Climate Bonds Standard](#). While it took time and internal coordination, the certification effort was straightforward and the capital program being financed, the Sewer System Improvement Program (SSIP), obtained programmatic certification. (Programmatic certification has enabled subsequent issuances for the same set of projects to be done at a lower cost and minimal review.) The 2016 Series A green bonds were sold together with the \$68M 2016 Series B Wastewater bonds, which did not include a green bonds designation. As an attempt to evaluate a green bond pricing benefit, both bond series were sold at the same time, on a tax-exempt basis and with overlapping maturities. One underwriter purchased both series at the same price. The SFPUC received the feedback that while investors like the green label, there is not yet a pricing advantage. Later that year, the SFPUC issued its first green bonds for the Water Enterprise to finance the Water System Improvement Program (WSIP) which also received programmatic certification.
- In May 2015, the SFPUC issued its first Power Enterprise revenue bonds, 2015 Series AB, with the \$32M Series A issued with the green bond designation. The Commission self-certified the bond, in consultation with the Climate Bonds Initiative, as the funded projects were limited to hydroelectric generation facilities. The bonds were sold tax-exempt and on a negotiated basis; the sale attracted new investors to the SFPUC.



Figure 5: Sunset Circle, Bioswale at Lake Merced.