

RISKS & RESILIENCE: Considering the Integration of Climate Readiness into Financial Analyses of Drinking Water & Wastewater Utilities

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Issue Overview

Climate change projections indicate a range of potential impacts that could affect drinking water and wastewater utilities (water sector) including rising temperatures, shifting precipitation patterns, rising sea level and more frequent extreme flood and drought events. As these trends play out on regional and local scales, they could exacerbate existing challenges the water sector faces such as accessing adequate and quality water supplies, maintaining infrastructure and managing water demand. Such challenges are reflective of the variety of climate risks that may affect water utility operations and financial health.

Drinking water and wastewater utilities currently manage a wide range of risks in operations management and long-term planning. The risk posed by potential climate change impacts is an emerging issue that some utilities are beginning to address. For utilities in parts of the country experiencing environmental changes, climate risk is becoming an increasingly prominent concern.¹ This growing concern is focusing attention on strategies for managing both direct and indirect (i.e., economic or demographic shifts that cause changes in revenue base) climate risks. Some utilities are already taking proactive steps to adapt their operations to account for climate change impacts while others are just beginning to view climate change as a noteworthy risk. Understanding the trade-offs involved with managing climate risk and adapting to climate change could help bolster utilities' pursuit of climate readiness and capacity for effective utility management.²

For investors who purchase utilities' debt obligations, evaluation of a utility's operational risks as they relate to the probability of defaulting on debt repayment, typically over a 5- to 30-year timespan, is critical to the credit assessment process and their ability to make financially sound investments. Currently, climate risk and readiness do not have their own metrics in credit rating methodologies (or other types of financial analysis), but are potentially assessed indirectly through other metrics. If market actors eventually determine that climate change impacts pose a threat to water utilities' financial standing or solvency, analyses of water and wastewater credit worthiness by the financial sector could be affected more directly.

¹ **Climate risk**, in the context of this dialogue process, was defined as the anticipated vulnerability of existing systems and services to climate impacts and consequences of these impacts to maintaining safe drinking water and clean water services. These risks include, but are not limited to public health, financial, regulatory, community, regional and other consequences related to operational challenges, natural disasters and hydrologic changes driven by changing climate conditions.

² The U.S. EPA's Climate Ready Water Utilities (CRWU) initiative defines **climate ready water utilities** as those drinking water, wastewater and stormwater utilities that are engaged in the process of: conducting activities to better understand their climate risks; planning to address climate impacts; and implementing adaptation measures to reduce the consequences of climate change. For more background on EPA's CRWU initiative, see: www.epa.gov/climate-ready/utilities. For more information about EPA's program on **effective utility management**, see: <http://water.epa.gov/infrastructure/sustain/watereum.cfm>.

Description of the Risks & Resilience Stakeholder Process

The U.S. Environmental Protection Agency (EPA), under its Climate Ready Water Utilities (CRWU) initiative³, invited representatives from water sector utilities, water associations and financial institutions to participate in a discussion about whether or how water sector utility climate readiness might be reflected in credit or bond ratings, and other financial analyses (see Attachment 1 for a list of participants' organizations). This was a strictly exploratory process intended to foster information sharing and learning between the two sectors. Although many key groups were represented, some important stakeholder groups not involved in the dialogue include small water and wastewater utilities (those typically not able to issue bonds), representatives from State Revolving Funds and bond counsel.

Discussions launched in September 2013 with an initial webinar to review the proposed process and identify priority discussion topics. The project planning team⁴ subsequently interviewed a selection of participants to identify key issues and questions, elicit topics of interest and gather input regarding useful outcomes. Those interviews informed the development of the agenda for a November 2013 in-person meeting in Denver, Colorado. Participants, including representatives from credit rating agencies, investment firms, water and wastewater utilities and water associations, shared views on perceptions and management of climate risk within the water and financial sectors. The group also discussed the appropriateness and feasibility of integrating information about climate readiness into credit assessment and other financial analyses of water and wastewater utilities through quantitative and qualitative means.

The discussions in Denver made it clear that climate readiness is not currently a significant factor in the assessment of water sector utility credit worthiness by the financial sector. Based on that key outcome and feedback from participating stakeholders, the project team shifted focus to generating this document, which is intended to synthesize input and lessons learned from stakeholder discussions and summarize the current state of the issues. With the completion of this document, EPA will conclude its role as the convener of the Risks & Resilience stakeholder process. The balance of this document summarizes the following aspects of climate risk and financial analysis of water and wastewater utilities explored through the process:

- Water Sector Perception and Management of Climate Risk.
- Financial Sector Perception and Accounting of Climate Risk.
- Opportunities for Future Discussion.
- Path Forward: Potential Venues and Mechanisms for Further Discussion.

³ EPA's CRWU initiative's mission is to provide the water sector (drinking water, wastewater and stormwater utilities) with the practical tools, training, and technical assistance needed to adapt to climate change by promoting a clear understanding of climate science and adaptation options.

⁴ The project team included staff from EPA's Climate Ready Water Utilities program, Ceres, Computer Sciences Corporation (CSC), and Meridian Institute.

Summary of Findings from the Risks & Resilience Stakeholder Process

- Climate change has the potential to exacerbate risks water sector utilities traditionally manage and present long term planning challenges. Utility preparations for and adaptive responses to climate change will be reflected in planning efforts, level of service objectives, operating and capital improvement budgets and financial plans. Financial analyses of a utility's credit worthiness consider these factors, but are primarily focused on the probability of default on debt obligations.
- The development of commonly applicable quantitative metrics to measure climate readiness is premature at this time and may not be statistically possible because of the uncertainty of climate science and the place based differences of climate impacts.
- Markets and investor decision making are currently driven more by immediate economic and political circumstances than by longer term factors such as climate change. Credit rating agencies indicated that criteria such as global economic trends, community employment trends and local politics are more influential with regard to utility risk assessment for bond ratings.
- It is extremely difficult to definitively attribute observed local changes in weather and climate patterns to climate change. Utilities have to manage considerable uncertainty specific to their local or regional geographic context when making long term decisions to prepare for potential future climate change impacts.
- Water sector utilities plan, design and build facilities that generally have useful lives of 50 years or more, whereas credit rating agencies are concerned with evaluating a utility's relative risk of default on its outstanding debt, typically over a 5 year to 30 year period.
- Water sector and financial sector professional associations can work together to: a) advance discussion of these important issues; b) promote sharing of information and experience regarding how others are addressing these issues; and c) determine if, when, and in what form, qualitative or quantitative factors can be established to help both sectors achieve their objectives.
- Participants identified the following four opportunity areas for potential future cross sector discussion:
 - 1) **Explore Mechanisms to Share Qualitative Information:** Identify appropriate mechanisms for water utilities to transmit qualitative information about their application of climate science and associated adaptation measures to credit rating agencies and investors.
 - 2) **Clarify Existing Ratings Factors:** Identify existing factors used in credit ratings that may be affected by climate change impacts and how they could influence overall ratings.
 - 3) **Understand Time Horizons:** Share information and insights about the time horizons used by water utilities in capital planning, the horizons that influence financial analyses and the horizons used to study climate change.
 - 4) **Examine Decision Triggers:** Share additional information and insights about the factors and thresholds that trigger important decisions in both sectors.

Water Sector Perception and Management of Climate Risk

Adaptive management is central to utilities' risk management strategy, since the possibility of changing circumstances (including both a shifting climate and increased regulatory obligations) in the longer-term requires flexibility in near-term planning. Utility managers already integrate a wide range of uncertainties into long-term planning, including projected population changes, water supply and demand, infrastructure demands and rate adjustments to meet operational needs. Many of these risks may be exacerbated or otherwise influenced by regional or local climate change impacts. Direct and indirect impacts that could affect water and wastewater utilities include, but are not necessarily limited to:⁵

- Changes in service demand due to demographic shifts (migration away from coasts to inland locations, migration due to heat and supply shortages).
- Changes in water quantity (drought-induced water shortages, reduced groundwater recharge, influx from flooding, changes in runoff patterns, snowpack depletion).
- Changes in water quality (saltwater intrusion, flooding or increased turbidity resulting in potential regulatory and permitting compliance issues).
- Increasing damage to infrastructure from wildfire impacts and stronger, more frequent storm events, among others.

Preparing for and responding to changing conditions influenced by climate may result in increased operating and capital costs, which will have implications for utilities' long-term financial planning and considerations of service affordability. Long-term planning is also complicated by the uncertainty about the magnitude of climate risks as well as the possible timing of impacts relative to the life of assets and the duration of loans. Utilities face an ongoing challenge in striking a balance between debt financing for near-term expenditures (e.g., regulatory compliance) and longer-term investments (e.g., upgrading facilities). As they move forward with adapting to climate change, utilities will also need to consider how future climate change impacts might affect vulnerable assets (e.g., coastal assets threatened by sea level rise or storm surge) and what technologies or adaptation strategies are available to protect them.

Financial Sector Perception and Accounting of Climate Risk

Critical drivers behind investor decision making include likelihood of repayment, pricing, and liquidity, in addition to the market environment on the day a bond is issued, the size of a bond, and the diversity and strength of the issuer's economy. Credit ratings are determined based on the extent to which a particular action or set of behaviors will increase or decrease the probability of default. At present, the immediate political and economic circumstances of a utility's community play a much more significant role in credit assessment and investor decisions than long-term, uncertain risks like climate change impacts. Credit rating agencies (CRAs) are only likely to integrate metrics that reflect climate risk into ratings if and when available data show that they have a material effect on utilities' probability of

⁵ U.S. Global Change Research Program. Global Change Impacts in the United States (Second National Climate Assessment). 2009. <http://www.globalchange.gov/what-we-do/assessment/previous-assessments/global-climate-change-impacts-in-the-us-2009> (accessed Aug 30, 2013)

default. In addition, since drawing causal links between climate change and specific weather events or natural disasters is extremely difficult, attempting to analyze climate readiness as a standalone credit assessment metric may be inappropriate.

The development of commonly applicable quantitative metrics to measure climate readiness is premature at this time and may not be statistically possible because of the uncertainty of climate science and the place-based differences of climate impacts. However, certain actors in the financial sector have interest in obtaining qualitative information about utilities' climate adaptation efforts. Each CRA considers qualitative data provided by water and wastewater utilities differently, but generally CRAs do incorporate it into their assessment of probability of default and the final ratings they issue. In addition, CRAs have the leeway to maintain ratings based on qualitative information about capital investment decisions. Thoughtful, well planned, investments in climate readiness could be viewed by CRAs as credit neutral or even credit positive. However, utilities need to be careful about expending their reserve funds in pursuit of climate readiness (or any other capital programs) if the long-term benefit does not clearly offset the potential for reductions in liquidity or higher debt levels.

Therefore, voluntarily sharing information about steps to proactively manage risks, climate or otherwise, can help a utility build shared understanding with a rating agency regarding the purpose of their capital expenditures. For example, providing a thorough explanation of the rationale for a large capital campaign to harden infrastructure against storm damage could alleviate concerns a CRA may have about the effect of the campaign on a utility's financial portfolio. There is also a small but growing segment of investors interested in supporting sustainable enterprises, who pay particular attention to environmental, social and corporate governance (ESG) variables. ESG investors represent another audience for proactive utilities to transmit qualitative information about their climate adaptation activities.

Opportunities for Future Discussion

The following section highlights four areas that came to the forefront during this process and represent opportunities for other parties to convene future discussions.

Opportunity 1) Explore Mechanisms to Share Qualitative Information: Identify appropriate mechanisms for water utilities to transmit qualitative information about their application of climate science and associated adaptation measures to credit rating agencies and investors.

Rating agencies, financial analysts and investors actively consider qualitative information regarding utilities' rationale for significant capital expenditures, including climate adaptation projects. Information about climate adaptation efforts may be of particular interest to ESG investors who want to gain a better understanding of how utilities are addressing climate risk in their capital planning and operations management. Utilities can describe risk management activities such as redundancy planning, hardening infrastructure and emergency preparedness in official disclosures, but are limited in drawing specific conclusions regarding what those actions might mean for their level of climate readiness. Utilities can and do currently use their websites to convey important information about their operations and long-term planning processes related to climate change. There may also be opportunities for utilities to convey qualitative information directly to investors in forums such as non-deal-related investor

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roadshows, or in fact sheets or other descriptive pieces that some investors use to assess bond issuers' ESG profiles. Collaborating with the financial sector to identify appropriate ways to communicate qualitative information now could benefit the water sector over the long-term, if and when climate risk becomes a significant concern in financial analysis.

Specific questions that could inform future discussion regarding the communication of qualitative information about water sector climate adaptation efforts include:

- 1) Are there examples from other sectors regarding the sharing of qualitative information relevant to the management of operational and financial risk that could be instructive for drinking water and wastewater utilities? If so, what effect did sharing that information have on the credit assessment process for those entities?
- 2) Are there certain investors (e.g., ESG investors) looking for information beyond that which utilities already provide? If so, how and when can utilities communicate the desired information?
- 3) How are utilities currently reporting management activities they are undertaking to evaluate, assess and respond to known or potential but uncertain climate change impacts? Is there an opportunity to improve how that information is translated for the purpose of financial analysis?
- 4) How might the financial and water sectors collaborate in the future on the development of principles or assessment questions that could be used to account for climate readiness in financial analyses?

Opportunity 2) Clarify Existing Ratings Factors: Identify existing factors used in credit ratings that may be affected by climate change impacts and how they could influence overall ratings.

Several representatives from the water sector identified an interest in clarifying which of the criteria CRAs currently use may be affected by climate in some way (e.g., line breaks, spills, density of customer base, future demand forecasting, and affordability). One important question around which future discussion could be organized is whether climate change is already sufficiently reflected in rating agency criteria. Addressing this question in the near-term could help create a common understanding of how financial institutions may be indirectly factoring climate risk into their current analyses, which could potentially generate mutual benefits for the sectors over the long-term. The water sector could continue building their understanding of how financial institutions are considering climate risk and refine their reporting accordingly. Meanwhile, rating agencies could gain greater insight into the science, planning practices and adaptation measures water utilities are developing to cope with climate risk, which could help ensure that any updates in the rating process align with water sector practices. In particular, greater understanding between the two sectors could be valuable in the event the financial sector someday decides to consider new assessment factors related to climate readiness.

Opportunity 3) Understand Time Horizons: Share information and insights about the time horizons used by water utilities in capital planning, the horizons that influence financial analyses and the horizons used to study climate change.

Differing time horizons pose a challenge for aligning the financial and water sectors' consideration and treatment of climate change impacts and climate risk because water utilities focus on long-term planning while financial analysts often focus on shorter-term risks and returns. In addition, the uncertain and evolving nature of climate science requires utilities to decipher what constitutes actionable science as they develop capital improvement plans. For example, the decadal time horizon of climate change impacts may be an important consideration for future water supply planning because many infrastructure decisions are made based on expected infrastructure asset life cycles on a similar timeframe. The fact that the time frame typically used by the financial sector to evaluate investments tends to be shorter complicates the relationship between utility planning activities and financial institution decision-making. However, the water sector's adaptive management planning approach effectively moves their decadal planning horizons closer to the shorter-term horizons used by rating agencies and other financial analysts. The differences between the planning time horizons of the two sectors present an opportunity for additional discussion about the implications they may have for consideration of climate risk and readiness, and other uncertainties in the future.

Specific questions that could inform further discussion about planning time horizons include:

- 1) How might water utilities' adaptive management approach to planning align with or influence rating agencies' periodic re-evaluation of ratings?
- 2) What strategies can water sector utilities and financial institutions use to calibrate planning time horizons in mutually beneficial ways while accounting for the different interests they possess regarding long-range risks?

Opportunity 4) Examine Decision Triggers: Share additional information and insights about the factors and thresholds that trigger important decisions in both sectors.

There may also be an opportunity for the two sectors to explore and compare the variables and timing associated with key decision points (i.e., decision triggers) in their respective sectors. For example, it would be helpful for financial analysts to understand what factors inform a wastewater utility's decision to build a new treatment plant. On the other hand, it would be helpful for water sector managers to understand what statistical changes in ratings criteria prompt an agency to downgrade or upgrade a utility, or to change their assessment factors. Exploring these issues could help both sectors develop a better understanding of how their respective practices might influence one another and how climate risk and readiness might factor into decision-making.

Specific questions that could inform further discussion about decision triggers include:

- 1) What are the variables and thresholds in the water sector that trigger a utility to seek financing for capital improvements?
- 2) What are the variables and thresholds in the financial sector that trigger ratings upgrades or downgrades?
- 3) What magnitude or frequency of extreme weather events or natural disasters could potentially catalyze a shift in how the financial sector perceives the relative significance of climate risk?
- 4) How does the financial sector determine thresholds beyond which a risk is deemed sufficiently material to be included in the Official Statement or other forms of disclosure (e.g., if the time horizon of a debt's maturity overlaps with the time horizon of a risk to a physical asset, is it material enough to disclose)?

Path Forward: Potential Venues and Mechanisms for Further Discussion

The Risks and Resilience stakeholder process generated mutual benefits associated with opening lines of communication between the water and financial sectors. Representatives from both sectors expressed interest in learning more about one another's perceptions of and practices for managing climate risk, and indicated that mechanisms for ongoing communication and coordination could be helpful as climate science, utilities' practices and market priorities evolve. Sustaining lines of communication between the sectors regarding climate change issues will help foster ongoing mutual learning about new developments, emerging questions and prospective changes in practice.

Water sector and financial sector associations or other organizations interested in the intersection of climate change and water infrastructure financing could convene future discussions to continue exploring the issues captured in this document. Participants suggested the following water sector venues as potential mechanisms for future cross-sector interaction:

- The [American Water Works Association](#) (AWWA) Climate Change Committee could be one venue for initiating additional discussions, as well as AWWA's annual conference or one of its specialty conferences including the Sustainable Water Management Conference or Utility Management Conference.
- The [Association of Metropolitan Water Agencies](#) (AMWA) is another water sector association that regularly explores financial issues that affect its members and could serve as a potential convenor of formal or informal dialogue with financial sector representatives or associations.
- The [Water Environment Federation](#) (WEF) has a Utility Management Committee that may have interest in engaging with financial sector representatives, and the Water Environment Federation's Annual Technical Exhibition and Conference (WEFTEC) also offers a major event to explore issues of risk and implications for financial analysis of wastewater utilities.

Participants suggested the following financial sector venues as potential platforms to convene interested parties in the future:

- The [National Federation of Municipal Analysts](#) (NFMA), whose members focus on the creditworthiness of municipal bonds, is the most likely financial sector association to have interest in exploring issues related to climate change impacts and financial analysis of water and wastewater utilities.
- The [Bond Dealers of America](#), which represents securities dealers and banks predominantly focused on the U.S. fixed income markets, is another possible association to engage in cross-sector conversation.
- As ESG investment grows as a potential source of financing for water and wastewater utilities, events such as [The Forum for Sustainable and Responsible Investment](#) and the [SRI Conference on Sustainable, Responsible, Impact Investing](#) offer possible venues for water and wastewater utilities to showcase their climate adaptation and sustainability activities.

It is important to recognize credit assessment methods may evolve over time as new factors become relevant. While climate change impacts have not been a great enough concern to affect ratings to date, CRAs could eventually develop new factors if the market perceives a material risk associated with climate change impacts in the future. Because much of the evidence CRAs use to develop ratings is largely theoretical, the uncertainty inherent in climate change projections does not necessarily preclude the integration of exposure and vulnerability to climate change impacts into financial analyses.

In the short-term, discussions between the sectors may have a broader focus than climate risk and readiness, but ongoing communication between the sectors on topics of interest today could help lay groundwork for an efficient, transparent and collaborative approach to integrating climate risk and readiness if or when they become significant factors in financial analyses of drinking water and wastewater utilities.

ATTACHMENT A: LIST OF PARTICIPANT ORGANIZATIONS

Representatives from the following water sector and financial sector organizations participated in one or more meetings of the Risks & Resilience discussions or otherwise provided input during the process. The views expressed by participating individuals were their own personal perspectives on the issues discussed and did not represent the official positions of their respective organizations. Additional stakeholders in both sectors were kept apprised of the process via electronic communications.

Water Sector

- American Water
- American Water Works Association (AWWA)
- Association of Metropolitan Water Agencies (AMWA)
- Austin Water Utility
- DC Water
- Denver Water
- Hampton Roads Sanitation District
- Las Vegas Valley Water District/Southern Nevada Water Authority
- Miami-Dade Water and Sewer
- Orange Water and Sewer Authority
- Philadelphia Water Department
- San Francisco Public Utilities Commission
- Seattle Public Utilities Commission
- Sonoma County Water Agency
- Tampa Bay Water
- Water Environment Federation (WEF)

Financial Sector

- Bayern LB
- Breckinridge Capital Advisors
- Fitch Ratings
- Goldman Sachs
- Moody's Investors Services, Inc.
- Rural Community Assistance Corporation
- Piper Jaffray
- UNC Environmental Finance Center

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