
INSURANCE, BOND RATINGS AND CLIMATE RISK

A Primer for Water Utilities

Realities and ramifications of climate change connections between the insurance industry, bond rating agencies and water utilities.



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METROPOLITAN
WATER AGENCIES**



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1. Introduction – Why and what water utilities should know about climate change, bond rating agencies, and insurance companies

The interest of insurance companies and bond rating agencies in climate change has been steadily growing for the past several years. The acknowledgement of climate change in ratings criteria and discussions of creditworthiness by bond rating agencies have increased steadily, particularly as green bonds, climate bonds, and resilience bonds have gained traction in the market.

Climate change connects insurance companies and water utilities in two ways. First, insurers issue utility policies that can address and/or be impacted by climate change. Secondly, insurance companies as a group purchase a large percentage of U.S. municipal bonds (upwards of \$500 billion in total) as capital for claim payouts. Many utilities, of course, issue municipal bonds to finance capital projects. Therefore, as the insurance industry's approach to climate change evolves, the water utility community should be prepared to adapt to these changes.

This paper is meant to be a brief overview of how changing perceptions of climate risk pertain to water utilities. It presents information on how thoughts about climate change are evolving for both the bond rating agencies and the insurance industry. It also poses questions utilities should think about as they consider how climate change impacts not only utility planning and operations but also creditworthiness, insurance coverage, and municipal bond buyers.

2. A changing perspective within the insurance industry

The insurance industry once viewed the effects of climate change and a warming planet as natural hazards. As such, its emphasis centered on measuring the *additional* dollar effect of climate change on property damage resulting from extreme weather events. The industry then shifted its thinking to include the indirect and adverse effects of gradual climate phenomena on the severity and frequency of natural hazards. In 2011, flooding in Thailand affected global commerce in ways not previously anticipated. Thailand was a critical supplier for the auto and electronics manufacturing industries so the floods severely impacted the global supply chain of these industries, causing a two and a half percent reduction in global industrial production (Polycarpou, L., 2014). As a result, tens of billions of dollars in business interruption claims were filed around the globe. The resulting damages resulted in \$5.3 billion dollars in non-life insurance claims in Japan alone. Insurance companies struggled to assess their losses due to the lag time of the claims that were made based on these disruptions in the global supply chain. These claims resulted not just from the event but also the worldwide ripple effect of lost production (Haguchi and Lall, 2015).

Based on these unexpected, diverse, and pervasive losses, the insurance industry had to quickly “advance from laggard to thought leader on climate change” (Fuller, 2019a). As a result, the insurance industry is actively researching the human, financial, and societal costs of climate change and examining its future impacts on an increasingly concentrated, aggregated, and interdependent society. According to Paul Fuller¹, CEO of Allied Public Risk, “Climate change, without equivocation, represents an existential risk to the insurance industry and, as such, it has brought forth proactive and immediate modifications to our underwriting and investment operations.”

Due to this material risk, the insurance industry has modified its approach to the pricing and underwriting of climate change in its policies. Consequently, with its collective portfolio in mind, the industry is assigning substantial weight to the effects of climate change within its enterprise risk management systems.

Regulators and ratings agencies for the insurance industry see climate change as an existential risk because it can directly and adversely impact underwriting and investment portfolios. The underwriting portfolio is of concern because pricing and reserving for climate risk is an inexact science, and the insurance industry has a poor track record of accurately anticipating and pricing for emerging and potentially catastrophic losses (Fuller, 2019a). Climate change is interconnected with several different lines of insurance. Examples include the connection between climate change and more pronounced wildfires in California, more extreme flooding in the South and Midwest, and more frequent named storms in the Gulf of Mexico and along the Atlantic coast. There are also examples comprising lines of insurance not normally associated with climate change. Such

¹ Paul Fuller in a discussion with AMWA’s Sustainability Committee, February 5, 2019, amwa.net/2019Feb5SC.

examples encompass lower crop yields from extreme heat and drought, higher healthcare claims from smog, and exacerbated economic disruption and mortality rates from rising sea levels.

Concern for the investment portfolio, which comprises the insurance industry's solvency bedrock, is equal to concern for the underwriting portfolio. Climate change can degrade the value, credit rating, and/or liquidity of investment portfolios. This is because the investment portfolio for insurance companies is the foundation of its policyholder compact and climate change can degrade the value, credit rating, and/or liquidity of investment portfolios. It is the reliability of this portfolio that guarantees that a remittance of a premium today will cover a payment of claims tomorrow.

In the eyes of insurance underwriters, climate change is an example of a gray rhino—an exposure that is highly likely to occur and clearly seen but is often overlooked and ignored. In other words, it is not a random surprise, but an effect that materializes after a series of warnings and visible evidence.

However, the anticipated litigation filed against public entities due to a failure of public entities to properly plan, prepare and invest to address effects of climate change could potentially dwarf the potential insurance payouts due to the more frequent and/or severe events that will occur because of climate change. Insurance companies are considering how such litigation scenarios could lead to the possibility of higher risks to municipal utilities' revenue bonds and the subsequent degrading of the value, liquidity and credit rating as result. These events would affect both the business side (underwriting) and solvency side (investment) of the insurance industry's financial foundation.

Such litigation could be packaged as breaches of duty, ordinary negligence, and inverse condemnation actions based on a public entity's failure to adequately plan, prepare, and invest for the inevitable effects of climate change. Any resulting unplanned expenditures due to climate change could potentially cause an inability of the municipality to honor their debt obligations.

Regulators and rating agencies apply a wide solvency lens to climate change with regard to insurance company solvency. Solvency stress tests now include specific climate change criteria that blend modeling, diversification, investments, and governance within enterprise risk management systems. These solvency measures are intended to ensure a competitive and sustainable insurance marketplace.

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To mitigate the potential risks of climate change, companies are taking steps toward diversification of their own portfolios. For example, Zurich Insurance Group recognizes that climate change will have effects on nearly every policyholder. As a result, Zurich's diversification – as it relates to the impact of climate change to the company – is both an asset and a liability. The company works to spread the risk of climate change throughout its holdings across the company and is no longer conducting business with companies deriving more than 50 percent of their profits from coal. According to Alyssa Sharr, a Zurich risk engineering consultant, the firm has invested substantially in intellectual capital by hiring climatologists, meteorologists, catastrophic modeling experts and public policy analysts to help assess and address the risk. It has also invested in infrastructure capital in the form of modelling software, artificial intelligence, and enterprise risk management systems.³

Zurich has been working to develop specific products in response to climate risk – many of these focus on sustainability, such as policies or building codes for building properties back to a better “green standard” after a loss (Sharr, 2019).

3. Climate risk and credit risk: perspectives from bond rating agencies

For the bond rating agencies – S&P Global Ratings (S&P), Moody's Investor Services (Moody's) and Fitch Ratings (Fitch) – climate change is an acknowledged risk for cities and municipalities. Climate risk is generally assessed as part of a review of the utility's operational risk management assessment and financial management assessment. Sometimes this risk is measured implicitly and other times explicitly.

For example, S&P's ratings criteria for U.S. municipal waterworks, sanitary and drainage utility systems (S&P Global Ratings, 2016) considers specific climate risk assessment strategies, such as supply planning and flood protection, in its assessment of asset adequacy and identification of operational risks assessment. It specifically calls out drought management plans in one of the subfactor assessment criteria for operational risks and identifies the incorporation of climate risk assessment into planning and operations as necessary for receiving a strong characterization⁴. S&P is also considering the impacts of climate change in its financial risk management assessment in its credit quality evaluations.

² The definition of a gray rhino is an obvious or highly likely but ignored threat. The term is often used in economic or business discussions and is attributed to Michele Wucker's 2016 book, [The Gray Rhino: How to Recognize and Act on the Obvious Dangers We Ignore](#).

³ Alyssa Sharr, Zurich, in a discussion with AMWA's Sustainability Committee, February 5, 2019, amwa.net/2019Feb5SC.

⁴ S&P Water and Sewer Methodology (January 2016), p. 18

In 2017, S&P released an FAQ document about climate change risk and U.S. municipal ratings, noting the importance of considering the long-term credit implications for municipal debt issuers of the physical impacts of climate change. In 2018, Moody's report to subscribers, *Environmental risk: Evaluating the impact of climate change on U.S. state and local issuers*, states that its analysts weigh the impacts of climate risks against the mitigation, preparedness and planning of municipalities. Its report (for subscribers) lists the six indicators it uses to assess exposure and susceptibility to extreme weather events and longer-term effects of climactic shift (AMWA, 2018).

All three rating agencies have acknowledged that consideration of triple bottom line management principles, i.e., environmental, social, and governance (ESG) factors, have increased in prominence in discussions of global credit markets and individual credit ratings decisions. But many water utilities have long been considering these factors, because, as noted by S&P Global Ratings, ESG “balances the provision of essential services with environmental stewardship, affordability and maintaining financial integrity”

“If extreme weather events become more frequent and the potential effects of longer term climate change become prominent, the interaction between climate and finances will remain a rating consideration, whether it involves the short-term ability to absorb financial shocks during an acute event or the longer term finances of issuing debt to plan and protect against future ones.”

(S&P Global Ratings, December 2018). The nexus between environmental stewardship and preparing for climate change and extreme events, such as hurricanes and drought, is a natural connection. S&P also notes, “[i]f extreme weather events become more frequent and the potential effects of longer term climate change become prominent, the interaction

between climate and finances will remain a rating consideration, whether it involves the short-term ability to absorb financial shocks during an acute event or the longer term finances of issuing debt to plan and protect against future ones” (S&P Global Ratings, October 2018). ESG factors are part of the credit rating criteria for all three rating agencies and can affect credit quality (Moody's, 2019). In the case of Fitch⁵, ESG factors contribute to relevance scores which are quantitative measures that can impact a ratings decision. Rating agencies have also acknowledged the downgrading of a city's credit ratings following extreme events, which is why building resilience to climate risk is looked upon favorably by rating agencies (and insurers) (Office of Management and Budget, 2018).

Furthermore, rating agencies are looking to bolster their expertise in these arenas. Specifically, Moody's acquired a majority share of Four Twenty-Seven, a climate-focused

⁵ FitchRatings ESG Relevance Scores FAQ are at: <https://www.fitchratings.com/site/esg/fag>. A dashboard of Fitch relevance scores for US Public Finance are at: <https://www.fitchratings.com/site/re/10075341>.

business intelligence firm in 2019, and in 2018 it acquired a majority stake in Video Elris⁶, a global leader in ESG research and assessments.

Considering climate resilience and ESG factors through another lens, both S&P and Moody's have methodologies for assessing green bonds. Some utilities are using their sustainable practices and climate resilient practices as ways to market their bonds as green, either as self-verified or third party verified green bond offerings, such as via Moody's or the Climate Bonds Initiative standard (AMWA, 2017).

4. How shifting insurance markets will affect water utilities

There are three reasons water utilities should be aware of the changing perspectives of insurance carriers and underwriters regarding climate change. First, climate change will affect utility insurance premiums and the types of insurance available. As climate-related disasters increase, the insurance industry will be forced to better manage its exposure and consequently guard against the risk in the form of increased premiums.⁷ Eventually, there will likely be tighter property underwriting in coastal, convective storm, wildfire, and drought-prone regions due to these changes in the market.

Where insurance professionals see the potential for a more substantial change, however, is in the types of losses covered by liability insurance, including general liability (GL), errors and omissions (E&O) and directors and officers (D&O) policies. How underwriters are addressing climate change in these policies is still nascent.

As mentioned previously, utilities are expected to experience substantial exposure to litigation arising from the alleged failure of public entities to give climate change sufficient resources. Given the anticipated exposure and depending on the level of success of climate-related litigation and the damages involved, there could be total and absolute climate change exclusions attached to these liability policies in the next decade. As a result, policyholders may see riders specifically related to climate change or find that their policies no longer cover losses related to climate change.

In current and recent litigation related to losses that can be attributed to climate change, plaintiffs have not laid blame on defendants for extreme events themselves but assert that the events were made more damaging by climate change effects. Plaintiffs have alleged that defendants (utilities in some cases) are guilty of wrongful acts or negligence because the defendants gave climate change impacts insufficient consideration, planning, and investment. For example, this occurred in cases related to the 2018 California wildfires, where insurance companies, citing inverse condemnation, are looking to PG&E to pay for wildfire losses. This was also the rationale for a lawsuit that Farmers Insurance initiated in 2014 against the Metropolitan Water Reclamation District of Greater

⁶ Moody's Acquires Majority Stake in Vigeo Elris, a Global Leader in ESG assessments. April 15, 2019 press release: <https://bit.ly/2VOPjC7> (AMWA 2019b).

⁷ Assessing how much premiums are increasing is evolving and cannot be quantified yet.

Chicago, the City of Chicago, and its suburbs (AMWA, 2014). (The lawsuit was subsequently dropped.) Cases of inverse condemnation are constitutional issues, i.e., similar to eminent domain claims in that they are protected under the due process clauses of the U.S. Constitution.⁸

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Irrespective of their merit or success, these types of lawsuits will likely become more common and will be expensive to defend. As a result, many in the insurance industry feel that insurers will produce supplemental climate coverage offerings as a way to address these developments. The approach will be similar to the emergence of the cyber liability insurance marketplace, where

many insurers are offering cyber risk coverage to help address the costs that are incurred with recovery after a cybersecurity breach (Lindros and Tittel, 2016).

Second, as the insurance industry is one of the largest institutional buyers of U.S. municipal bonds, it is reevaluating conventional wisdom which says that municipal bonds are safe and reliable investments. Questions are being asked as to whether climate change will degrade the value or increase the default risk of certain bonds, as climate change can impact the rate of repair and rehabilitation of public infrastructure. Insurance companies are beginning to ask whether these investments are being adequately budgeted by municipal agencies, and they may soon seek more clarification directly from the agencies whose bonds they hold. Regulators and rating agencies for insurance carriers are asking similar questions (Fuller, 2019a).

Third, insurance companies are beginning to supplement traditional insurance by adding capacity in terms of insurance securities and insurance-linked financial instruments. Resilience bonds and catastrophe bonds are examples of insurance-based securities. Parametric insurance is an example of an insurance-linked financial instrument. It is a risk mitigation insurance product designed to complement traditional insurance products and not a stand-alone product. Parametric insurance is suited for low-frequency but high-intensity losses and is considered an “index-based solution” – that is, tied to a triggering event rather than the result of assessing the value of an actual insured loss (Martin, 2018).

⁸ This is a general statement meant to convey that sovereign immunity would not apply to cases of inverse condemnation as it does not to cases of eminent domain. This statement is not meant to address all the legal qualifiers related to this constitutional issue.

5. Considerations for water utilities

In addition to insurance companies and rating agencies, other buyers of municipal bonds will likely begin to ask similar questions about how municipalities and water utilities are considering climate and extreme event risks in their planning and operations. For example, in 2019, Blackrock Investments released an analysis to inform investors of how they should consider the impacts of climate-related risks on their portfolios (AMWA, 2019a).

As a result, water utilities may be required to provide more information to bond rating agencies and investors about how they are preparing for climate change and to disclose more information related to ESG considerations to provide more assurance of the reliability of the bonds they issue. In addition, utilities should not only understand how climate change and extreme events might impact their facilities and operations, but, as with the awakening of the insurance and bond rating agency industries, utilities should also understand other business risks, such as risks to their supply chain and ultimately their finances.

In addition to supply chain risks and risks to structural assets, climate change and extreme events may have a cascading effect on other utility business functions, including disruption to their cost and/or revenue streams. For example, an insurance company's reluctance to underwrite new commercial or residential development in a wildfire-prone area could affect the reliability of a utility's future demand forecast. Similarly, if property buyers or owners cannot procure insurance (whether required by lenders or generally for protection of their property) to purchase existing property, overall demand within a delivery area may shrink, adversely affecting utility revenue. Such developments could ultimately lead to the kinds of financial instability that are drawing greater scrutiny from credit rating agencies. Such scrutiny could potentially lead to higher borrowing costs in the future.

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Anticipating and managing future risks

As these business impacts may occur at frequencies and severity that are difficult to determine, utilities should have a good understanding of their risk tolerance and risk appetite. In other words, how much risk should utilities retain themselves and how much should be transferred via insurance or another form of financial instrument to a third party? For some utilities, financial instruments may have a larger role to play than in the past. For example, water utilities may need to acquire supplemental insurance or add-ons to

existing policies, because general liability coverage may no longer adequately cover low-frequency, high-consequence losses.

In the insurance and reinsurance market, despite increasing exposures for reinsurers covering recent catastrophes such as the California wildfires and Hurricane Michael in 2018, rates have not increased. However, as the increased severity and frequency of these events are linked to climate change, the pricing could indeed eventually shift upward, particularly since the insurance industry has not fully accounted in their pricing for the impacts of climate change on extreme events (Coleman, 2019).

Traditionally, water utility risk management with respect to natural disasters and extreme events has largely been managed via structural solutions. While structural solutions will always be part of a utility's strategy for managing such events, the water sector is recognizing that, in the face of future uncertainty, structural solutions are just one possible tool in the toolbox. Once built, these structures are inflexible and often cannot be readily adapted in the face of future uncertainty, making them, in some instances, less attractive than non-structural remedies that can be more easily adapted over time.

Therefore, utilities may consider insurance or other financial instruments as part of a risk management solution. Risk management will for many be a combination of structural, financial, and planning tools and strategies. Financial instruments can be easily modified to suit changing circumstances as these contracts are updated and renewed at much shorter intervals, compared with a built infrastructure solution. Financial instruments also allow the risk to be spread more broadly across more groups.

Legal considerations for utilities

Utility CEOs, directors, and board members may want to carefully research and identify potential liabilities for their water systems. Are there examples of liability exposure that may occur because a utility and its senior management failed to prepare? Are there add-on policies that might be prudent or that contain higher coverage levels that should be purchased? Given the anticipated increase in negligence allegations, it is best to consider these questions ahead of time and address any potential shortcomings.

Consideration of the potential for inverse condemnation lawsuits in the event of extreme events or climate-related incidents is also something that utilities should consider. Inverse condemnation is related to the U.S. Constitution's Fifth Amendment

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provision for eminent domain and refers to the taking or damaging of private property by a government entity without just compensation. An inverse condemnation action is a lawsuit by a property owner against a public entity for damages incurred by the property owner. For example, following the 2017 and 2018 California wildfires, several water

utilities that were debilitated as a result of the fire were then sued under inverse condemnation for failure to provide water to a fire suppression system. A \$69 million binding arbitration decision filed against a water utility in 2012 with similar fact patterns, however, applied the standard of strict liability.

In California, plaintiffs need only “demonstrate a causal relationship between the governmental activity and property loss complained of.” This is referred to as “proximate cause.” The public entity, therefore, may be held “strictly liable, irrespective of fault, where a public improvement constitutes a substantial cause of the plaintiff’s damages even if only one of several concurrent causes.” (*Marshall v. Dept. of Water and Power*, 219 Cal. App. 3d 1124, 1138.) This principle, referred to as the “substantial” cause-and-effect relationship, places strict liability on a public entity unless it is proven that other forces alone produced the injury. [*Belair v. Riverside County Flood Control Dist.*, 47 Cal. 3d 550, 567 (1988)]. The California just compensation formula is the same for inverse condemnation as eminent domain. And more recently in California, inverse condemnation has been claimed by plaintiffs following wildfires in cases where fire suppression systems were embedded within water delivery systems and therefore those fire suppression systems are considered public improvement (Fuller, 2019b).

The recent and unprecedented wildfire activity in California resulted in the September 2019 passage into law of SB 901, which requires a standard of reasonableness, similar to the one applied in negligence cases, to apply in such situations. This action will provide the California State Supreme Court, which is the final arbiter on state constitutional issues, interpretative guidance from the state’s two elected branches of government. The only safeguards for water utilities as it relates to inverse condemnation is the lowering of the legal standard from strict liability to reasonableness.

6. Moving forward on this issue – suggested next steps for utilities

Utility resilience is critical in preparing for climate change and extreme events. Resilience reflects the ability to maintain a successful operation in the short run by making preparations to respond to unexpected or extreme events, and, over a longer time horizon, by adapting to change. Utilities can do many things now to prepare themselves:

- Water utilities can perform an enterprise risk management (ERM) survey. ERM is an approach designed specifically for the senior management and boards of organizations to provide a top-down strategic look at risks to an organization. North Carolina State University, for example, has many ERM resources [online](#)⁹.
- Utilities should develop a risk assessment that includes consideration of financial impacts to understand their risk tolerance and risk appetite. In the

⁹ NC State’s Risk Management Initiative is a program within the university’s college of management and includes an [online](#) library, which is cited in the reference section.

conversation to develop the risk assessment, utility managers can include not only their own risk management staff, but also financial staff, planning staff and climate resilience staff. In addition, many insurance companies have risk engineers who can analyze clients' exposures and advise steps that might be taken to increase resilience.

- The risks that would be most impactful to each organization are unique, but in

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considering climate-related risks, utilities should consider not only impacts to infrastructure and finances but also to personnel, such as outdoor workers. Using a risk identification and risk assessment process, utilities can assess

how those risks should be managed to help the organization meet its core objectives.

- If a utility is impacted by its city's financial management and climate risk management approach, the utility may want to talk with other city departments to ascertain the role of insurance or other financial risk management strategies in light of climate and extreme event risk for the city.
- Diversification of risk, such as looking for opportunities for operational flexibility, including redundancy in structural assets or increasing the number of vendors to mitigate potential supply chain disruptions, is always advisable. Utilities may be able to mitigate damages following a climate-driven event in a myriad of ways, including risk diversification. For example, leveraging regional partnerships could be a way to diversify risk: if one utility has an abundance of storage and another has an abundance of conveyance, the two utilities could look for ways to work together to meet their climate resilience needs, rather than each building what they need individually to adapt to a changing climate.
- Utilities may find opportunities to use what they already have in different ways, thereby saving money that could be put to use on climate change initiatives. For example, some AMWA members have found that pressure management can increase the life of distribution pipe by a few years to a decade. This could reduce distribution system expenditures, buy time for utilities to study distribution system impacts from climate change, and make funding available for priorities that may arise due to climate impacts.
- Like the insurance industry, utilities can learn lessons from how the 2011 Thailand floods impacted global supply chains. Utilities should consider avoiding sole source procurement and contemplate vetting their vendors' supply chains. A potential risk to a vendor might require a utility to find a new vendor or obtain insurance to protect against supply chain disruptions.

- Water utilities can provide information in their bond statements to rating agencies about how they are showing due diligence in preparing for climate change.
- As new budgets are developed, utilities should account for both long-term climate risks and potential short-term shocks, such as from extreme events. When possible, agencies should discuss with their insurance carriers and/or brokers about these risks to understand whether price increases may occur as a result during the coming budget cycle.

There are many resources available for agencies to understand ERM processes. For example, NC State University's Enterprise Risk Management Initiative provides hundreds of free resources on ERM basics, such as the business case for ERM, tools and techniques, and best practices. Also, Denver Water and Southern Nevada Water Authority collaborated with insurance and climate change experts in 2018 to develop a three-part climate risk learning module¹⁰.

¹⁰ The climate risk learning module is available at: <http://aawdm.org/videos/climate-change/>; NC State's ERM materials are at: <http://bit.ly/ncsuERM>.

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