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INVESTMENT RISKS FOR WATER PROJECTS

By *Sharlene Leurig*[†]

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I. INTRODUCTION

Unlike most of the developed world, where investor-owned water systems serve the majority of the population, the United States relies mostly on water provided by public systems. To a great extent, these systems were financed through the taxation authority of the federal government—the iconic Hoover Dam only one of the many hundreds of pipelines and reservoirs built by agencies such as the Bureau of Reclamation and Army Corps of Engineers for the benefit of local economic development. Similarly, many of the drinking and wastewater treatment facilities in operation today were built to help communities comply with the federal Safe Drinking Water Act and Clean Water Act and financed in large part by federal dollars distributed through the Environmental Protection Agency, sometimes leveraged by state revolving loan funds. What of our public water systems has not been paid for by federal or state tax dollars has been debt-financed through the tax-exempt municipal bond market. Of the \$3.7 trillion municipal bond market,¹ roughly 10% is debt issued by water and wastewater systems to build, repair and expand water infrastructure.²

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1. William Selway, *U.S. Municipal Bond Market Shrinks as States, Cities Cut Debt*, BLOOMBERG (June 7, 2012, 11:04 AM), available at <http://www.bloomberg.com/news/2012-06-07/u-s-municipal-bond-market-shrinks-as-states-cities-cut-debt.html>.

2. See generally MUNICIPAL SEC. RULEMAKING BD., 2011 FACT BOOK, <http://www.msrb.org/msrb1/pdfs/MSRB2011FactBook.pdf>.

Water use has remained static over the last three decades,³ attributable to passive savings as our household, agricultural and industrial technologies became more water efficient, and in some places by behavior changes such as movements away from lush lawns and toward xeriscaping in desert communities. Yet population movements, infrastructure decay, over-allocated water resources and climate variability and change are necessitating a new round of investments in capital assets for water treatment, storage and delivery.

In the absence of significant federal subsidies, states and local governments will have to make room on their balance sheets to finance the \$300 billion⁴ to \$1 trillion⁵ in projected capital needs over the next thirty years, or incent private capital to participate in water projects. Much of this projected need is simply to replace existing assets; cost of securing new water supplies could easily double this need—the state of Texas alone projects \$53 billion in capital expenditures for new supplies by 2060.⁶ How local governments will pay for this investment in critical infrastructure, and whether these capital expenditures will be sufficient to secure reliable water supplies, is as important to water-intensive industrial and commercial entities as to households, as public water systems count industrial and commercial water users among their customers.

To a great extent, corporations' access to reliable and cost-effective water supplies is in the hands of local entities. Yet as market awareness of water risks in corporate performance has risen, leading to a proliferation of investor risk assessment tools including Ceres' Aqua Gauge, World Resources Institute's Aqueduct and others, few equities investors or corporate risk managers have developed analytical tools to assess risk down the supply chain. Fewer still have cultivated engagement pathways beyond the corporation to manage risk in the watersheds or aquifers feeding their operations or supply chain. Water is a shared resource, one that cannot be adequately managed without long-term planning, cooperation between providers and their customers and even between users competing for the same resource.

At present, our tools for assessing water providers' risks and the reliability of their resources are inadequate to determine risk and re-

3. J.F. Kenny et al., *USGS Circular 1344: Estimated use of water in the United States in 2005*, U.S. Geological Survey 2009, 43, <http://pubs.usgs.gov/circ/1344/pdf/c1344.pdf>.

4. 2007 DRINKING WATER INFRASTRUCTURE NEEDS SURVEY AND ASSESSMENT, FOURTH REPORT TO CONG. OF THE U.S. ENVTL. PROT. AGENCY, EPA 816-R-09-001 (Mar. 2009), available at <http://water.epa.gov/infrastructure/drinkingwater/dwns/index.cfm>.

5. See *Buried No Longer: Confronting America's Water Infrastructure Challenge*, AM. WATER WORKS ASS'N 10 (Feb. 27, 2012), <http://www.awwa.org/publications/breakingnewsdetail.cfm?itemnumber=58522> (stating "AWWA Report finds infrastructure bill to top \$1 trillion.").

6. TEXAS WATER DEVELOPMENT BOARD, WATER FOR TEX. 2012 STATE WATER PLAN 7 (2012).

silience, as they fail to recognize the interconnectedness of water resources, the impending exhaustion of groundwater resources that have served as insurance against drought, and the persistent deferment of basic maintenance and asset replacement, among other factors. Even worse, the market in its current state too often sends perverse signals to water managers who are balancing long-term resource resilience against short-term financial metrics. Credit ratings and cost of capital are among the most compelling benchmarks against which water managers adjust their performance. For this reason, it is imperative that the short-term outlook of markets and their focus on water systems' operational characteristics, rather than resource fundamentals, be adjusted if water providers are to develop more resilient water management practices. This is an imperative not only for the security and resilience of water resources, but also for sustainable returns for investors across a range of asset classes: those who lend to public water systems through the bond market, those with equity positions in water infrastructure projects, and even those with long positions in water technology companies and investor-owned utilities.

Better disclosure is fundamental to identifying and managing the shortcomings in our water management practices. Disclosure is necessary but insufficient—investors and financial intermediaries must adjust their own assessment methodologies to measure what matters, and price accordingly.

II. MARKET STRUCTURE

In the United States, public utilities owned by municipal governments or political subdivisions supply the lion's share of water to households, commercial and industrial enterprises alike. Unlike other developed countries, which tend to have a handful of large companies providing water services, the domestic water sector is a highly decentralized market with tens of thousands of providers (the Environmental Protection Agency ("EPA") estimates more than 53,000 state and municipal water utilities).⁷ These numbers are somewhat misleading: while 56% of the systems out there serve 500 people or less, nearly half of the U.S. population is served by 1% of public systems.⁸

The ability of water systems to raise financing for system replacement or expansion depends greatly on size. Though the majority of the population is serviced by systems that are large enough to go directly to the capital markets, most of the tens of thousands of water systems are too small to be creditworthy. As a result, they rely heavily on state revolving funds ("SRF") to finance upgrades. SRFs are a limited resource, perhaps unnecessarily so: they are seeded by Con-

7. See generally *2006 Community Water System Survey*, 1 EPA (2006), <http://water.epa.gov/infrastructure/drinkingwater/pws/upload/cwssreportvolumeI2006.pdf>.

8. *Id.* at 28.

gressional contributions to the EPA and matched with a required 20% minimum contribution from the states, which stretch this resource to varying degrees. Some states essentially grant the money in the form of forgivable principal, 0% interest loans, while others leverage the SRF funds by floating their own bonds to guaranty the debt of local borrowers. While some estimates suggest that the \$40 billion of net assets behind the Clean Water State Revolving Fund alone could be leveraged to fund \$3 trillion worth of infrastructure improvements⁹ (far outstripping even the most inflated estimate of water infrastructure need), in practice the use of SRF funding has barely scratched the surface of smaller systems' capital needs.

With too little money to go around (or in some states, too much money flowing in the form of subsidized loans to borrowers who could otherwise reach the bond market directly), the result is persistent underfunding of smaller systems, poor water quality in rural areas, and thousands of systems out of compliance with environmental regulations year after year. As regulatory non-compliance is often an indicator of system failure, we may expect a wave of forced capital expenditures in the coming decades as delivery, treatment, and storage assets reach their failure point. This wave of capital needs may in turn force consolidation in the sector, either through privatization by the few investor-owned utilities operating in the United States, or acquisition by large public regional providers. Texas is one state that has seen a recent spate of privatization of small systems by companies like Aqua America, Inc. and SouthWest Water Company.

One percent of the total number of water systems in the United States serve nearly half the population. These systems raise money for their capital improvement programs through the financial markets, predominantly through the sale of municipal bonds backed by revenue from water sales and sewage fees. The municipal market is highly effective at delivering long-term, affordable capital to public water systems—capital programs are often financed by bond series with principal repayments of up to thirty to forty year maturity, helping systems smooth the cost of large projects over several generations of ratepayers.

Municipal bonds are often tax-exempt, making them appealing to individual investors—often through mutual funds—and banks and insurance companies seeking tax-exempt yield at reasonably low risk. Since 2003, water and wastewater systems have floated nearly \$350 billion in bonds.¹⁰ Bond issuances by water and wastewater enterprises peaked in 2010, surfing on a wave of the federal stimulus program's Build America Bonds, which infused nearly \$45 billion in

9. Michael Curley, *The Gold Mine*, 29 ENVTL. F. 24 (2012).

10. Greg Swartz, Senior Vice President, & Piper Jaffray, Ariz. Pub. Fin. Office, Panel Presentation at W. Governors' Ass'n/ W. States Water Council: Drinking Water & Wastewater Infrastructure Fin. (Nov. 15, 2012).

bonds for water and wastewater systems. That investment dropped precipitously in 2011 to \$30 billion, and even further to \$25 billion in 2012, well below the ten-year average for debt issuance.¹¹

There are several reasons for the decline in bond-financed capital improvement programs even in this environment of interest rates at all-time lows and growing need for water infrastructure improvement and development. One reason is that water systems are delaying infrastructure expenditures in the hopes of another flush of federal spending through ARRA-like programs or the much-anticipated National Infrastructure Bank, which could be structured to leverage public funds to attract private capital. And for many systems, the economic environment that has produced low borrowing rates is also responsible for stagnant economic development, a constraint to the upward rate adjustments that would be necessitated by increased debt.

Alongside these reasons is a trend that has escaped recognition by many water commentators and policy advocates: in recent years, per capita demand for water has declined at unprecedented rates, slowing demand even against the longer-term decadal trend of declining per capita water use across the United States.¹² This unexpected downturn in demand raises profound challenges for water providers, who are simultaneously confronting supply-side pressures and a financial model that streamlines supply projects but constrains demand management. Because the predominant business model in the drinking water sector is one of volume-based sales, it is also a source of considerable risk for water systems and the investors who finance their infrastructure. And at the heart of water systems' limits to financing is the willingness and ability of their customers to pay for their services, a problem that certainly extends to industrial and commercial customers but which rests, for the most part, on discovering sustainable revenue models for residential customers, which constitute the majority of water systems' revenues regardless of system size.¹³

There are no magical financing schemes waiting in the wings for water systems, despite the wishes of policymakers and the boosterism of some private market commentators. In recent years as the scale of need for capital improvements has outpaced revenue gains in the water sector, many have asked whether alternative financing models like public-private partnerships ("PPP"), private equity or infrastructure funds could play more of a role in financing water infrastructure, as such funding schemes do for transportation, airports, and other sorts of critical infrastructure. There is no doubt that far more opportunity exists to leverage public funding to attract private capital for

11. *Id.*

12. See generally Thomas D. Rockaway et al., *Residential Water Use Trends in North America*, 103:2 J. AWAA 76 (2011).

13. See 2006 *Community Water System Survey*, *supra* note 7.

water, but the repayment of such schemes will almost always be borne by ratepayers and taxpayers, just as they would be through public financing. A recent large scale water supply project in Southern California demonstrates this point: the Carlsbad Seawater Desalination Plant is a joint venture of the San Diego County Water Authority (“SDCWA”) and Poseidon Resources, a private entity which secured equity from a third-party investor. The financing terms for this project, whose total price tag approaches one billion dollars, were secured by a thirty-year water purchase agreement with SDCWA for 56,000 acre-feet a year at around \$2,000 an acre-foot, a model not dramatically different from those that finance electric power generation facilities.¹⁴ The majority of the project was financed through tax-exempt bonds issued by the California Pollution Control Financing Authority on behalf of both SDCWA and Poseidon. Ultimately, while private investors bear some degree of construction and contract risks, the project will be repaid by ratepayers of the San Diego County Water Authority and its contractor agencies.

In addition, the political hurdles to increasing private capital’s participation in water projects may be more obstinate in the United States than in any other developed country, as Americans hold peculiarly strong views of the sanctity of not only water but also the conveyance, storage, and treatment systems through which it passes as a kind of public good. In part this American ideology may reflect distrust in the ability of government to properly regulate private entities, with water representing the most precious and fundamental of all physical needs. Whatever the explanation for this cultural attitude toward private involvement in water infrastructure, the result is that the PPP market in the United States remains a tiny fraction of total water infrastructure spending—the average annual bond issuance by water and wastewater systems over the last decade was more than \$30 billion, while the total PPP market was around \$2 billion.¹⁵

But whatever the financing structure for water projects, fundamental risks are affecting the sector in ways that should be considered by water system managers, policymakers, and investors.

III. SUPPLY RISKS

Supply risks imperil the ability of human users to exercise the use of water on which they depend for health or economic purposes. Supply risk takes myriad forms, both physical and legal. For water systems, these supply risks may translate into reduced revenue if water cannot be diverted for sale; increased capital expenditures to secure addi-

14. *Favorable Desalination Project Bond Sale Saves Ratepayers \$200 Million*, SAN DIEGO COUNTY WATER AUTH. (Dec. 14, 2012), <http://www.sdcwa.org/favorable-desalination-project-bond-sale-saves-ratepayers-200-million>.

15. Interview with Laurent Auguste, President and CEO, Veolia Water North America, at Ceres (Jan. 28, 2013).

tional supplies; or treatment facilities that lower debt ratios or higher operating costs that impair operating ratios.

It should be noted that corporate water users are also subject to these supply risks, whether they buy directly from a water system, hold water rights to surface resources, or manage their own supply infrastructure such as groundwater wells or storage reservoirs.

Physical risk may take the form of:

- *Over abstracted resources.* Groundwater accounts for 20% of water used in the U.S.¹⁶ and in areas of heavy usage and irregular precipitation is being rapidly depleted. Because groundwater is often the cheapest source of supply and its use is virtually unregulated, groundwater supplies can be both the lowest cost and the highest risk of supply options over the long-term. Because water users with groundwater resources often increase the exploitation of those resources during droughts or when surface supplies rise in cost, choices that seem financially prudent in the short-term may come at the expense of long-term supply security. The city of Lubbock is one example where emergency drought reinforcements came in the form of a well field drilled into the Ogallala Aquifer¹⁷—the Panhandle groundwater source on track to be depleted within a generation.¹⁸
- *Imperiled resources.* Groundwater supplies can also be imperiled from manmade pollutants or intrusion of natural contaminants that make water unfit for human consumption. Industrial waste injected into aquifers imperils the use of groundwater supplies in regions with unstable surface water supplies—in many cases, this pollution of aquifers is legally permitted by state and federal agencies, as in Texas, where more than fifty exemptions for disposal of industrial waste including uranium mining waste have been issued for aquifer injection, the most recent in September 2012.¹⁹

In low-lying coastal areas like Florida and Cape Cod, saline intrusion into aquifers is rapidly escalating costs of groundwater treatment. Sea level rise is also necessitating significant expenditures to replace

16. J.F. Kenny et al., *USGS Circular 1344: Estimated use of water in the United States in 2005*, U.S. GEOLOGICAL SURVEY 2009, 43 (2009), <http://pubs.usgs.gov/circ/1344/pdf/c1344.pdf>.

17. Adam D. Young, *Drought taxing area lakes*, *Water Advisory Commission to discuss strategic supply plan*, LUBBOCK AVALANCHE J. (Aug. 15, 2012), available at http://lubbockonline.com/local-news/2012-08-15/drought-taxing-area-lakes-water-advisory-commission-discussstrategic-supply#.UGzJk_k-uvU.

18. *Groundwater Depletion in Semiarid Regions of Texas and California Threatens U.S. Food Security*, U. OF TEX. AT AUSTIN, NEWSWISE (May 24, 2012, 12:45 PM), available at <http://www.newswise.com/articles/groundwater-depletion-in-semiarid-regions-of-texas-and-california-threatens-u-s-food-security>.

19. Abrahm Lustgarten, *Poisoning the Well: How the Feds Let Industry Pollute the Nation's Underground Water Supply*, PROPUBLICA (Dec. 11, 2012, 12:01 AM), <http://www.propublica.org/article/poisoning-the-well-how-the-feds-let-industry-pollute-the-nations-underground>.

stormwater and sewage systems overwhelmed by higher tides—in Miami Beach alone, the cost of improving stormwater infrastructure to handle higher sea level is roughly \$200 million.²⁰

Legal risks include:

- *Over-allocated resources.* The most notable example is the Colorado River, which supplies water to more than 35 million Americans. A 2012 study by the Bureau of Reclamation projects that over the next fifty years, future average flow of the river will be far below the total allocated rights.²¹ Climate change exacerbates this risk, as it is projected to significantly diminish snowpack and rainfall feeding river systems. In an over-allocated system, the standing of a water right is a vital metric of risk, as junior and senior rights holders will be disproportionately affected by physical water shortages.
- *Exposure to endangered species findings.* The Endangered Species Act can be used to limit water diversion in order to protect non-human species dependent on the same water resource. Protection of endangered species has resulted in significant reductions in permissible water withdrawals for major metropolitan areas, including Southern California, which has been denied delivery of as much as 800,000 acre-feet of water per year due to the endangered Delta smelt,²² and in San Antonio, where pumping from the Edwards Aquifer has been dramatically reduced since the 1990s due to impacts on endangered fish and salamander species.

IV. DEMAND RISKS

Demand risk is the economic consequence of water demand failing to meet projected estimates. Demand may fall short of projections for any number of reasons including:

- Economic growth or population gains falling short of projections,
- Passive efficiencies, meaning a reduction in per capita usage due to uptake of high-efficiency appliances or behavior changes that were the result of forces exogenous to the water provider, or
- Active efficiencies, meaning a reduction in per capita usage due to uptake of high-efficiency appliances or reductions in outdoor water use that were influenced by the water provider through

20. Curtis Morgan, *Rising sea comes at a cost for South Florida cities*, THE MIAMI HERALD (Sept. 1, 2012), available at <http://www.miamiherald.com/2012/09/01/2980388/rising-sea-come-at-a-cost-for.html>.

21. SEC'Y SALAZAR RELEASES COLORADO RIVER BASIN STUDY PROJECTING MAJOR IMBALANCES IN WATER SUPPLY AND DEMAND, U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION (Dec. 12, 2012), available at <http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=41645>.

22. Paul C. Barton, *House Passes Bill Taking Aim at Tiny California Fish*, NEWS10.NET (Feb. 29, 2012, 4:16 PM), <http://origin.news10.net/news/article/181409/2/House-passes-bill-taking-aim-at-tiny-California-fish>.

appliance rebate programs, water pricing structures, or outdoor watering limits.

As appliance standards have increased consumer efficiency across the country over the past four decades, household water use has fallen everywhere, by tens of thousands of gallons per household annually in Louisville, Kentucky to nearly 100,000 gallons per Las Vegas household (this terrific reduction is the combined effect of passive efficiency gains and conservation programs by Southern Nevada Water Authority).²³ Despite this widespread demand decline, many systems continue to forecast future demand assuming that per capita use will remain fixed. In a sector whose revenue is largely driven by volumetric sales, the risk that demand may not meet future estimates is fundamentally revenue risk. Declining demand, without compensatory rate increases, reduces anticipated revenues while doing little to reduce fixed costs such as human labor, maintenance and debt service. Indeed, it is not atypical for a water system to have 80% of its costs fixed but 80% of its revenue variable and based on volumetric sales.²⁴

The relationship between water price and demand further complicates demand forecasts for water providers. Demand for water is price-dependent, although the sensitivity of customers to price depends on many factors, including customer class (i.e. industrial vs. residential) and income. For many years, water was considered to be a perfectly inelastic good, meaning that demand was independent of price. In part this theory was buoyed by observations of customer response to changes from extraordinarily low baseline prices (a few tenths of a cent per gallon), which with even a doubling in price could make the difference virtually imperceptible to a middle-class customer. Yet in recent years as water rates have risen, and as most water utilities have transitioned away from flat fees to metered pricing, there is evidence that water prices may be entering a range in which customers will be increasingly sensitive to price increases.²⁵ Yet few utilities factor demand response to pricing in their demand forecasts, and many systems do not estimate the sensitivity of customers to price when setting rates or estimating revenues.

23. See generally Rockaway, *supra* note 12.

24. See Jeff Hughes, *Pricing and Revenues: A Challenging Relationship*, U. OF N.C. ENVTL. FIN. (Aug. 23, 2012), available at <http://efc.web.unc.edu/2012/08/23/pricing-and-revenues-a-challenging-relationship/>.

25. Janice A. Beecher & Thomas W. Chesnutt, *Declining Water Sales and Utility Revenues: A Framework for Understanding and Adapting*, ALLIANCE FOR WATER EFFICIENCY 4 (Aug. 29–30, 2012), http://www.allianceforwaterefficiency.org/uploaded/Files/Resource_Center/Library/rates/Summit-Summary-and-Declining-Water-Sales-and-Utility-Revenues-2012-12-16.pdf.

V. GOVERNANCE

The governance of public water systems poses its own risks to timely cost recovery and long-term affordability of water services. Unlike electricity prices, which typically are set by state-level public utility commissions (“PUC”), most water systems depend on city councils or water boards whose membership is elected or appointed by elected officials to set prices. As a result, the process of water rate setting is highly politicized.

Governance by individuals who are answerable to voters can lead to management myopically focused on minimizing water rate increases. As a result, too many water providers deliver services at rates below the actual cost of service, a math that works out through persistent deficit financing and under-budgeting for asset replacement. It is not at all uncommon for a water system to replace its buried assets (pipes) at such an incremental pace that complete replacement would only be achieved once every 300 years—Washington, DC is one city that struggled to revise rates to improve this absurdly protracted schedule.²⁶

Some states have sought to reduce the political nature of water utility rate setting—for example, Wisconsin is the only state that requires both investor-owned public water utilities to file rate adjustments with state public utility commissions, and Indiana permits public water systems to opt into state-level regulation at the PUC. Short of moving the forum for rate setting, the onus is on water managers to anticipate politics and articulate the imperative for investment in language responsive to the values and needs of political constituents.

On top of this political challenge is the fundamental problem of misaligned planning horizons endemic to the sector. Prices (rates) are reassessed in many places annually (if that frequently). Water managers may present boards or city councils with forecasts of five-year rate changes, but rarely do they look beyond that window. Capital decisions, including supply projects, are identified and prioritized based on planning horizons of up to fifty years, and debt financing over some thirty to forty years. Yet rarely do utility managers and finance directors looking over these multi-decade horizons communicate the rate effects of supply decisions over the long-term to city council members—and even if they did, city council members responsive to near-term election needs may be lacking motivation to take steps today that may increase near-term costs to their customers in favor of long-term affordability.

Water conservation falls subject to this near-term/long-term mismatch in incentives. On the one hand, conservation helps assure future supply and can defer or even obviate the need for new capital-

26. *DC Water Chief: Right Place, Right Time*, 1 WATER INTELLIGENCE 22 (Dec. 2010), http://www.dewater.com/news/pdfs/AWI_Hawkins.pdf.

intensive infrastructure—reservoirs, pipelines, and treatment plants—to bring new supplies to market. On the other hand, under a business model in which debt obligations are repaid with revenue highly dependent on volumetric sales, and in which most costs are fixed, the revenue forgone in reduced sales must be made up for through higher fixed charges, or higher unit costs, concepts that can inflame voters and create political risk for elected officials.

VI. ROLE OF MARKETS

Although these risks are already driving credit degradation across the sector, investors do not adequately assess the supply, demand and rate risk factors described above. The credit metrics and disclosure standards in the water sector are artifacts of the decades through which water systems maintained some of the lowest credit default rates of municipal issuers. Yet as the economic downturn has precipitated credit downgrades well in excess of sector averages,²⁷ it has also underscored the need for improved credit assessment even among essential services providers. In doing so, the markets can also play a more effective role in driving better governance and improved water management.

Institutional investors seek metrics that will allow them to readily compare systems against each other and against sector benchmarks. For this reason, they focus on characteristics that are easy to measure, and that are readily available for many systems. The metrics that water systems report are defined by credit rating agency methodologies and by the disclosure guidance of bond market professional associations, although institutional investors may seek out additional metrics for their own proprietary credit assessment approaches. Credit assessment metrics define how investors assess water systems, but they also determine the information that water systems give to the market. And because credit ratings and investor pricing decisions dictate the cost of capital paid by water systems when they go to market—a cost water systems seek to minimize—these metrics can also drive water management decisions.

The credit assessment process faces two problems: first, investors may not be measuring what matters, and second, the focus on short-term metrics may incentivize water managers to manage to short-term financial performance at the expense of long-term supply reliability and rate affordability.

Alongside the near-term financial ratios used by investors to assess credit health, investors also evaluate operational characteristics to uncover any looming capital expenditures that may sizably increase debt load. These operational characteristics include the water systems'

27. REPUCCI & BARBERIO, *FITCH RATINGS, U.S. PUBLIC FIN. RATING ACTIONS* 2011 1 (2012).

treatment and storage capacity compared to daily maximum demand and failure to comply environmental regulations such as drinking water or surface water quality standards that may precipitate investment in treatment facilities. While growth needs and regulatory compliance certainly pose costs to water systems, supply and demand risks have equivalent potential to undermine systems' credit health; credit metrics barely touch on these factors. For example, bond buyers do not seek, nor do water systems provide, information on the seniority of water rights even in over-allocated water basins. Bond buyers do not seek out information on the storage capacity of groundwater supplies despite their precipitous decline in many regions. With respect to demand risk, bond buyers ask water systems to provide historical and future estimates of population and economic growth as a way of estimating future water demand, but not per capita demand trends or price sensitivity analysis.²⁸

How water systems behave during drought provides an instructive window into the perverse ways in which credit ratings can influence water management decisions. At the heart of the issue is the highly variable revenue water systems depend upon to meet largely fixed costs—revenue that primarily flows from the residential sector²⁹ and in the southeast and arid west 50-70% of which comes from outdoor watering.³⁰ Because water systems in the southeast and west are so dependent on outdoor watering for revenues, they may have little financial incentive to discourage usage during drought and often do so only when brought to the edge of supply failure. Midland, Texas offers a classic example: in 2012, once two of its three reservoirs had run completely dry and the third was severely compromised, the town finally took steps to reduce residential use. The drop in sales triggered a credit downgrade of the water system, and in January of 2013, Midland lifted the higher rates for high volume users it had imposed just months earlier to discourage excessive water use—the most likely reason for the about-face, restoration of the utility's credit ratios to enable further borrowing. With the Panhandle seeing little recovery from the drought of 2011, it remains to be seen whether Midland simply bought itself a short-term credit fix at the cost of irrevocably compromising its surface supplies.

In response to credit degradation spurred by the economic downturn and by growing awareness of water supply risks, institutional investors are beginning to develop tools to enable their own water risk assessment. Tools range from map-based risk models such as

28. See *National Federation of Municipal Analysts, Recommended Best Practices in Disclosure for Water and Sewer Transactions*, NAT'L FED'N OF MUN. ANALYSIS (Mar. 2006), http://www.nfma.org/assets/documents/DG.BP.rbp_water_sewer.doc.pdf.

29. See *2006 Community Water System Survey*, *supra* note 7, at 20.

30. Research Report on Turfgrass Allowance, EPA WATERSENSE at 2, EPA.GOV (Dec. 9, 2009), http://www.epa.gov/WaterSense/docs/home_turfgrass-report508.pdf.

Aqueduct, a project of World Resources Institute, to corporate risk assessment tools such as Aqua Gauge, a project of Ceres. The ability of investors to shape their own view of water risks is an important factor in a market that efficiently communicates risk through pricing. But for water systems seen as having outsized risk, the outcome can be sobering. Already, some investors predicate buy decisions on water availability, and in some cases simply do not buy in regions where the risk is viewed as being excessive or uncompensated. Recent regulatory filings by insurance companies—large investors in municipal bonds—describe such geographic screens.³¹

Theoretically, assessment by investors could provide an important feedback signal to water managers participating in the market, and financial incentive to attain a better level of practice. But it is also possible that pricing signals sent through the bond market could unintentionally drive unsustainable water management practices if those practices enhance short-term financial metrics, or could send inappropriate pricing signals to systems with strong management practices and comparatively low water risk if the mode of measurement is inappropriately designed. Geographic screens that do not consider place-based practice, such as long-range planning, demand management, and cost recovery could raise the cost of capital for entire states or regions and disadvantage well-managed systems that happen to be in that region.

In this environment, it is all the more important that risk assessments are designed to measure the metrics that matter, and reward sustainable water management no matter where the water is being used.

Disclosure is a tool that water systems can use to manage their own market risk—by providing superior information, systems can counteract investor bias and position themselves to perform well in investor-risk analysis. But developing and propagating disclosure expectations within the municipal bond market is challenging given the nature of securities regulation. Municipal entities are not regulated directly by the Securities and Exchange Commission (“SEC”), as the 1975 Tower Amendment to the Securities Exchange Act restricts the ability of the SEC and Municipal Securities Rulemaking Board (“MSRB”) to set disclosure expectations or filing requirements for municipal issuers.³² As a result, regulators’ disclosure guidance such as the SEC’s disclosure guidance for publicly-traded corporations clarifying expectations

31. See Nationwide Mutual Insurance Company, *Insurer Climate Risk Disclosure Survey Questions*, CAL. DEP’T OF INS., CLIMATE RISK SURVEY SEARCH DATABASE (2011); see also The Traveler’s Group, *2011 Insurer Climate Risk Disclosure Survey Questions*, CAL. DEP’T OF INS., CLIMATE RISK SURVEY SEARCH DATABASE (updated Feb. 2012).

32. Andrew Ackerman, *SEC Looks to Target Tower Amendment*, THE BOND BUYER, BONDBUYER.COM (May 13, 2009), http://www.bondbuyer.com/issues/118_91/-303354-1.html.

for disclosure of material risks related to climate change, including water stress and scarcity,³³ has limited reach with respect to public water providers. However, municipal advisors, including bond underwriters, are regulated by the SEC, and may be subject to disclosure guidance.

Yet beyond the idiosyncrasies of regulatory oversight in the municipal market, the reality is that meaningful disclosure for water and sewer entities beyond basic financial statements is distinct from meaningful disclosure for other municipal issuers—the credit factors affecting water providers are materially different from public hospitals, school districts, and general obligations issuers. In this regard, the SEC’s recommendations for improving fairness and efficiency of the municipal market through development of best practices is realistically the most effective way of developing disclosure standards with the greatest relevance to the water sector:

Municipal market participants should follow and should encourage others to follow existing industry best practices and expand and develop additional best practices guidelines in a number of areas to enhance disclosures and disclosure practices in the municipal securities market.³⁴

To assist the water sector in perfecting disclosure practices, the Boston-based sustainability advocacy group, Ceres, working with some the nation’s largest water systems and members of its Investor Network on Climate Risk, a group of 100 investors with \$11 trillion under management, has developed a disclosure framework for water and sewer utilities that gets to the root of the changes affecting the water sector today. The framework, which was released in February 2013, has already been employed by Cascade Water Alliance, a regional wholesale water supplier near Seattle, in development of the Official Statement associated with its December 2012 bond issuance. The objective is for investors to use this disclosure framework as a best practice in disclosure, and incorporate the factors in the framework into credit assessment and dialogue with utility management and their financial representatives including underwriters. Uptake of this disclosure framework depends on cooperation from water systems along with their financial advisors and bond counsel, who may resist adoption on the pretext of increased compliance costs for continued disclosure in the secondary market (investor-to-investor transactions). Yet this resistance could be offset if issuers with superior disclosure practices are rewarded in the market by a lower cost of capital.

33. See COMMISSION GUIDANCE REGARDING DISCLOSURE RELATED TO CLIMATE CHANGE, 17 CFR PARTS 211, 231 & 241, RELEASE NO. 33-9106; 34-61469; FR-82, SEC. & EXCH. COMM’N (Feb. 8, 2010), <http://www.sec.gov/rules/interp/2010/33-9106.pdf>.

34. See REPORT ON MUNICIPAL SECURITIES MARKET, U.S. SEC. & EXCH. COMM’N (July 31, 2012), <http://www.sec.gov/news/studies/2012/munireport073112.pdf>.

For the market to truly reflect the business strength of a water enterprise, sellers will need to make available better information, and buyers will need to make use of this information. Good disclosure is not enough—the use of disclosure by investors is also necessary. Investment indices with selective eligibility criteria based upon management practice, and other investment products that better measure the resilience of water systems' business models and governance of these systems are much needed in the municipal market. Such products exist to some extent for corporate securities—one example is the ECPI Global Blue Gold Equity Index, which is limited to firms active in water-related businesses (e.g. water treatment, infrastructure, distribution) and further subject to a proprietary Environmental Social Governance (“ESG”) screen that selects companies based on their environmental score and endorsement of the CEO Water Mandate. Inclusion in such indices is often viewed as a boon to corporate management, as widely used indices create a readymade market for share trading which can result in higher share value.

Conceptually, there is no reason why an index for municipal water systems could not be structured to help investors identify systems with superior management practices. Hopefully, the turbulence created by credit degradation in the market will spur investors to develop such products, which can better aid investors in anticipating and pricing risk, and create a virtuous circle in the market by communicating beneficial price signals to systems that are operating as 21st century water enterprises.

VII. CONCLUSION

The operating environment for water utilities is changing in ways that can undermine the reliability and affordability of this essential service. For investors and water systems this changing reality requires new ways to evaluate risk. This also invites a new era of innovation for both the water utility business model and investment tools to finance water needs and evaluate water investments.

