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Regulatory and Legislative Mechanisms for Water Efficiency

Introduction

Although improving water efficiency,¹ energy efficiency and conservation are increasingly viewed as essential elements of public policy, under most current rate structures, water utilities are rewarded for selling more water – the antithesis of the efficiency and conservation ethic.

A water efficiency mechanism is a regulatory and legislative tool that has been adopted in many states for gas, electric and water utilities. Water efficiency mechanisms separate a water utility's cost recovery from the amount of water it sells.² Rather than implicitly encouraging water use and penalizing a water utility for encouraging conservation, a water efficiency mechanism adjusts rates periodically to ensure that a utility's revenue will be sufficient to cover its fixed costs regardless of sales volume, while providing an incentive for customers to use water more efficiently.

By allowing water and sewer utilities to collect the revenue authorized by regulators in a general rate case, a water efficiency mechanism removes a disincentive for utilities to promote end use efficiency and provides utilities with revenue stability for ongoing programs and investments to maintain and improve efficiency and service reliability. Removing barriers to improving efficiency and needed investment is in our customers' interests because, over time, it reduces the cost of providing water service to customers and promotes the sustainability of our natural resources. In addition to promoting the more efficient use of resources, a water efficiency mechanism provides customers with greater predictability of bills, incentive to use water wisely, and more gradual rate increases. Finally, a water efficiency mechanism effectively reduces the contentiousness of the ratemaking process used to determine the appropriate level of revenue upon which to set rates. The overall result is a better alignment of stakeholders' interests to provide for more economically and environmentally efficient resource decisions.

¹ Improving water efficiency means using improved practices and technologies to deliver water service more efficiently.

² A water efficiency mechanism sometimes is referred to as a revenue stabilization mechanism because it "stabilizes" a utility's revenue stream.

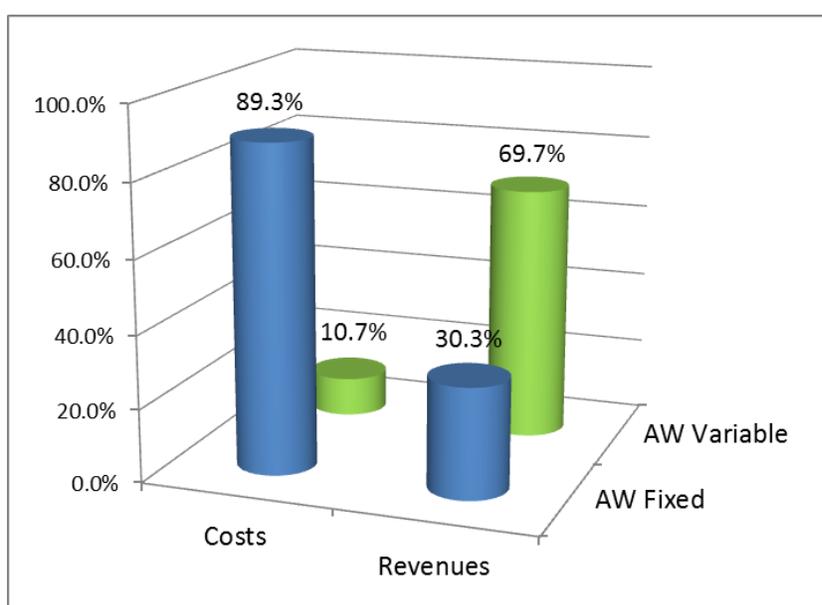
Challenges

Water Utilities Cost and Revenue Structure - The Throughput Incentive

A water utility's business consists predominantly of fixed costs that do not vary with usage. Water utilities operate their source of supply, treatment and transmission and distribution systems to provide water service to a customer's premises whether that customer uses a minimal amount of water or more per month. Water utilities must be ready to provide and deliver water to customers if and when called upon. In order to do so, water utilities maintain a significant infrastructure to provide and deliver water to customers, to provide customer service, to administer accounting and billing systems and to provide other critical internal and external services. Such fixed costs cannot be avoided in the water industry.

Under the traditional ratemaking structure, a utility's revenues result from the combination of its customer accounts and its commission-approved rate schedules. Some of American Water's subsidiaries' schedule of water rates includes a customer charge that varies with meter size serving the customer's premises and usage charges based on the quantity of water purchased.

For example, the charts below show, rather starkly, that most of American Water utilities' costs to provide water service are fixed costs, while most of their revenues are variable. Approximately 89 percent of American Water regulated utility costs are fixed and only 11 percent of American Water's costs are variable. Approximately 30 percent of the revenues are fixed (including fire protection and miscellaneous revenues), while approximately 70 percent of the revenues are variable. Our water utilities, therefore, rely heavily on variable (or volumetric) revenues for collecting fixed costs.



American	Costs	Revenues	Variance
Fixed	89.3%	30.3%	-59.0%
Variable	10.7%	69.7%	+59.0%

Because water utilities are so dependent on volumetric sales for revenue, we are incented to sell more water and penalized if we promote the more efficient use of resources. Most of American Water's revenues come from volumetric sales -- more sales, more revenues; fewer sales, fewer revenues. This rate design creates a "throughput incentive": the more water customers use, the more revenue the American Water collects and, to the extent this revenue exceeds variable costs, the better its financial performance.

Weather Variability

The vagaries of weather are another good reason to consider a water efficiency mechanism. Actual weather can work either in favor of, or against a water utility from a financial standpoint. As a general rule, water use increases during hot, dry weather and decreases during cool, wet weather (primarily in the summer months) although the variation is regionally influenced, as well. A rate design that relies heavily on sales volumes means that revenues are driven by the randomness of weather, which is outside the utility's control.

The ratemaking process has historically tried to take the variability of weather into consideration by basing rates on "normal" weather conditions. In fact, "weather" is difficult to define in a statistical sense, and establishing "normal" weather is even more difficult. In the water industry, there has never been a consistent definition of "weather" that has been adopted for weather normalization purposes or a generally accepted weather normalization adjustment methodology. Weather has never been satisfactorily addressed through existing ratemaking models for water companies because, even if properly "normalized," actual weather is never "normal." The result is that water companies receive either too little or too much revenue due to the vagaries of weather. A mechanism that mitigates the adverse effect of weather variability on revenues recognizes that normal weather is a condition that will likely never be achieved and effectively reduces the adverse impacts of weather variability for both the water utility and its customers.

Declining Water Use Per Customer

In households across the U.S., water use is declining steadily, a trend expected to continue for the next 15 years or more. From 1978 to 2008, average household water use declined 13 percent. Increased use

of water-efficient appliances, a growing conservation ethic among consumers, and water efficiency programs implemented by utilities are some of the main factors that have led to this trend. At American Water, declining per customer consumption is observable in every regulated operating state, often in the 1-3 percent per year range. This trend has positive environmental and societal benefits; however, it directly and unfavorably impacts utility revenue stability.

Reduced water sales and the resulting reduction in revenues can have significant adverse financial impact on utilities. In the face of this persistent and significant declining customer use and falling revenue, some continue to insist the decline in sales is temporary, and the resultant revenue projections often continue to fail to adequately reflect the declining use. Despite overwhelming evidence that water sales per customer are steadily declining, some even argue sales will increase and that, as a result, the requested rate increase can be reduced or eliminated to the extent that new sales provide the additional revenue. This is extremely unlikely to happen in the face of increasingly efficient appliances, water-saving devices, and policy initiatives that encourage efficiency. Ultimately, these arguments are fueled by the existing ratemaking structure that fails to align the stakeholders' interests. If we proceed from the notion that a utility should be entitled to recover its prudently incurred fixed costs, then there are no serious arguments against a water efficiency mechanism that reconciles actual revenues to the level forecasted as necessary to recover those costs.

How Does a Water Efficiency Mechanism Work?

A water efficiency mechanism is a regulatory mechanism to ensure utilities have a reasonable opportunity to collect roughly the same revenues they would collect under conventional regulation, independent of changes in sales volume (for which the regulator wants them to be indifferent). This provides fairness to customers and utilities by providing cost recovery for the utility's true cost of service.

Water efficiency mechanisms will allow water and wastewater utilities to collect the revenue authorized by the regulators in a general rate case. Actual revenues are tracked against the commission authorized revenue requirement, and revenues are "trued-up" on a periodic basis,³ to the predetermined revenue requirement using an automatic rate adjustment.

A water efficiency mechanism that adjusts revenues between rate cases will merely deliver the same revenue requirement that has been found by the commission to be just and reasonable. Accordingly,

³ For example, through a monthly, quarterly, or annual surcharge or credit in the subsequent period for revenue requirement surplus or shortfall.

there is no change in the revenues the utility is permitted to collect and no change in the relationship in the underlying cost factors.

Reducing the Contentiousness, Complexity and Frequency of Rate Cases

Water efficiency mechanisms can improve the ratemaking process by reducing the contentiousness, complexity and frequency of rate cases. Once the utility's total revenue target is set, the sales volume debates become largely irrelevant because any sales volume errors are trued up. This benefits customers in a couple of ways. First, the savings from less-costly rate proceedings will be passed on to the customers. Second, it allows the parties involved in the case to focus upon the issues that are pertinent to providing quality service.

One of the more controversial aspects of many rate cases is the forecast level of utility sales during the year the new rates will be in effect. As a ratemaking tool, water efficiency mechanisms will effectively reduce or even eliminate the contentiousness related to the process of determining the water volumes used to set water rates. If the total revenue target is set directly, the sales volume debates become largely irrelevant because any errors are trued up. If, on the other hand, the allowed revenue level per customer approach is used, then the problem shifts from determining water sales to determining the number of customers and use per customer. The latter approach is likely to reduce but not eliminate the controversy.

A water efficiency mechanism that allows for periodic adjustments (credits and surcharges) in between rate cases should also reduce rate case frequency, resulting in increased rates for customers, when necessary, on a more gradual basis. Under current ratemaking, in an environment of falling sales, a company will suffer earnings erosion in between rate cases that will prompt the filing of more frequent rate cases. With the implementation of a water efficiency mechanism that allows for adjustments between rate cases, the company will not need to file to recover revenue shortfalls in an environment of falling sales. On the other hand, when the company does experience sales growth, it will credit the revenue in excess of the authorized amount. So customers should benefit from both a reduction in contentious issues in rate cases as well as a reduction in the frequency of rate cases.⁴

⁴ At its 2013 annual meeting, the National Association of Regulatory Utility Commissioners ("NARUC") adopted a resolution that supports consideration of alternative recovery mechanisms for water and wastewater utilities and identifies the following benefits: Alternative regulatory mechanisms can enhance the efficiency and effectiveness of water and wastewater utility regulation by reducing regulatory costs, increasing rates for customers, when necessary, on a more gradual basis; and providing the predictability and regulatory certainty that supports the attraction of debt and equity capital at reasonable costs and maintains that access at all times.

Resolution Endorsing Consideration of Alternative Regulation that Supports Capital Investment in the 21st Century for Water and Wastewater Utilities - Sponsored by the Committee on Water, Recommended by the NARUC Board of Directors November 19, 2013, Adopted by the NARUC Committee of the Whole November 20, 2013. (Attached as Petitioner's Exhibit AJD-3)

The Impact of Water Efficiency Mechanisms on Cost of Equity

The presence of alternative ratemaking approaches such as water efficiency mechanisms, raises the question as to whether such a mechanism reduces a utility company's financial or business risk, and to what extent a utility company's authorized return on equity (ROE) should be reduced, if at all. While adjustment clauses, riders, and cost tracking mechanisms may mitigate (on an absolute basis but not on a relative basis) a portion of the risk and uncertainty related to the day-to-day operations, there are other significant factors to consider that work in the reverse direction, for example the weakening of the economy, declining customer water usage, and the company's dependence on a significant capital spending program requiring external financing. In other words, alternative ratemaking approaches constitute responses to other risks that have heightened or appeared.

A recent comprehensive study by the Brattle Group investigated the impact of water efficiency mechanisms on risk and the cost of capital and found that its effect on risk and cost of capital, if any, is undetectable statistically.⁵ A number of commissions addressing the ROE issue have noted the absence of empirical evidence regarding how, if at all, a water efficiency mechanism impacts a utility's business risk. This absence of evidence is not surprising since investors generally do not associate specific increments to their return requirements with specific rate structures. Rather, investors tend to look at the totality of regulatory and ratemaking approaches in place relative to those in place at comparable companies when assessing risk. In other words, the impact of ratemaking mechanisms such as a water efficiency mechanism is already reflected in the capital market data of the comparable companies.⁶

The risk impact of a water efficiency mechanism would be on a utility's risk from weather variability or failure to meet sales forecasts. In fact, an element of business risk addressed by this mechanism is the chance that cooler, wetter weather will result in a revenue level that is lower than the authorized level. However, the empirical evidence demonstrates that water efficiency mechanism adjustments are both surcharges for under-collections of revenues for fixed costs and credits of over-collections of revenues. In the credit situation, the utility has foregone the opportunity to collect more revenue than the amount authorized in its last general rate case. While opponents of water efficiency mechanisms tend to testify extensively about the risk reduction associated with the possibility of surcharges to adjust for under-collection of expenses, acknowledgements of lost opportunities associated with possible credits are far more infrequent. In essence, a company is surrendering some upside revenue potential associated with

⁵ Wharton, Vilbert, Goldberg & Brown, *The Impact of Decoupling on the Cost of Capital: An Empirical Investigation*, The Brattle Group, February 2011.

⁶ Direct Testimony of Roger A. Morin, PhD, on behalf of Missouri-American Water, Company Case No.: WR-2015-0301, SR-2015-0302 pp. 65-72 (July 31, 2015).

weather conditions that result in a higher-than-expected level of sales in exchange for some downside protection against the potential that weather conditions will cause lower-than-expected sales. As a general rule in ratemaking, a well-run utility should experience higher earnings than one that is more poorly operated. With weather, however, a water utility's earnings are affected by the mere caprice of the influence of weather on revenue. It seems counter-intuitive for a poorly run utility to experience higher earnings due to hot weather or an efficient utility to suffer an earnings shortfall from cool weather. A water efficiency mechanism eliminates that anomaly.

Another element of risk that a water efficiency mechanism could affect is the failure to meet sales forecasts. It is reasonable to assume that the revenue forecast upon which rates are based is the revenue forecast that the commission believes is most likely to represent the utility's actual revenue. If a utility is consistently failing to meet its revenue forecast – likely because the revenue forecast does not properly account for water efficiency gains and conservation – then that is a shortcoming of regulation that needs to be corrected and not an element of risk for which there needs to be a cost of equity adjustment.

Alternative ratemaking approaches such as a water efficiency mechanism do not necessarily reduce risk on a relative basis, as compared to other utilities. Alternative ratemaking approaches have become the norm for regulated utilities across the United States. The approval of adjustment clauses, riders, trackers, forward test years, and cost recovery mechanisms by regulatory commissions is widespread in the utility business and is already largely embedded in financial data, such as stock prices, bond rating and business risk scores.

The Opportunity

Just as many in the U.S. are expressing increasing interest in energy and water efficiency and conservation as the least-cost investment, water utilities' current rate structure creates disincentives to promote end-use efficiency because revenues are directly tied to water throughput. To counter this "throughput incentive," a number of public utility regulatory commissions have adopted alternative ratemaking approaches intended to align their utilities' financial interests with efficiency, sustainability and conservation programs⁷. Water utility regulation may be significantly improved by the adoption of a water

⁷ The U.S. Department of Energy released an Accelerate Energy Productivity 2030 report in September of 2015. The report details a strategic roadmap for American energy innovation, economic growth and competitiveness, naming "Water Infrastructure" as one of the six "productivity wedges" or "scalable action that have the potential to reduce energy consumption and support economic growth." The report recommends a strategy for state regulators will be to "adopt rates and implement related policies affecting utility sector efficiency programs that more effectively align efficiency efforts with utility business models". The report also goes on to describe the problem that "concerns over cost recovery and losses of sales limit the financial viability of energy and water efficiency programs. The report suggest water utility rate reforms including decoupling, indicating that "decoupling, and other investment recovery reforms, is vital to ensuring that water and wastewater utilities have the

efficiency mechanism that has the potential to provide a Win/Win/Win for customers, environment, and society in general by:

- Aligning Stakeholders' Interests (States, Customers, Companies)
- Removing barriers to Capital Investment and Efforts to Improve Efficiency
- Supporting local economies through capital investment and job creation
- Environmental Benefits of Improving Water and Energy Efficiency

Aligning Stakeholders' Interests

Under current rate-setting practice, water efficiency investments by a utility cause a loss of profits. This is the case because current water utility rate setting is premised entirely upon the expectation that profits are earned through sales. The regulatory mechanics which give rise to this expectation are that a water utility's revenue requirement, as determined at the end of a rate case, is divided by its units of expected sales to set rates. It is through volumetric sales that most water utility revenues are collected: more sales, more revenues; fewer sales, fewer revenues. Conservationists, for their part, have decried the fact that the traditional profit incentive for utilities inherent in the coupling of earnings to water sales volumes hurts wider energy and water efficiency and conservation efforts.⁸ This throughput incentive also seems to run counter to regulatory policy that seeks to encourage efficiency and good environmental stewardship. There are a number of revenue stabilization measures used by regulatory commissions to counter this throughput incentive. Some of these measures provide nearly the same benefits to utility shareholders as a water efficiency mechanism. However, a water efficiency mechanism may provide more benefits, especially for customers and the environment.⁹

A water efficiency mechanism will make water companies indifferent to selling less water and will mitigate the adverse effect of declining consumption and weather variability on revenues. A water efficiency mechanism also will help ensure the company receives the authorized revenue, no more and no less,

incentives and the tools to reduce water and energy consumption. By separating volumes of water sold, from rates charged, decoupling enables water companies to help customers use less water and therefore save more energy.”

⁸ If efficiency and conservation are seen as good things, then removing the barrier to a utility's promotion of efficiency and conservation must also be a good thing.

⁹ For example: (1) ***Declining use adjustment*** - Why isn't a declining use adjustment enough? Even though the calculated revenue requirement may have taken planned efficiency or conservation activity into account at the time rates were set, it's one and done - it's only for the first year rates are in effect - there is no mechanism offsetting continuing revenue declines in between rate cases and once rates are set the fundamental sales-yields-revenues relationship (throughput incentive) continues to incentivize a utility to maximize sales in order to maximize revenue. (2) ***Straight Fixed/Variable rate design*** - where payment for utility service is not based primarily on volumetric sales shifts more of the cost of service to lower water use customers and to lower income customers (not the same) and doesn't provide an incentive to utility companies or customers to improve water efficiency. (3) ***Weather Normalization Clause*** - uses degree days to measure weather variability for the gas and electric industry is a weather-only adjustment that does not address lost sales due to either utility efficiency programs or consumer funded efficiency, and therefore does not eliminate a utility's throughput incentive. (4) ***Lost margin mechanism*** - provides recovery to the utility for distribution margin that is lost when customers participate in the utility-sponsored energy efficiency programs but does not eliminate the utility's throughput incentive.

and customers would pay the appropriate price for water service in their monthly/quarterly bills, whether collected through the fixed service charge or the volumetric charges.

Promoting water efficiency is the preferred way to meet the water and wastewater needs of residents and businesses at the least cost and with the greatest reliability, environmental and efficiency benefits. Improving water efficiency is a “win/win/win” providing a wide range of benefits—for consumers, utilities, businesses, and for communities as a whole. Approving a water efficiency mechanism opens the path to achieving that winning combination.

Removing Barriers to Capital Investment and Efforts to Improve Efficiency

Revenue, driven by declining use per customer is decreasing, while the nature of water utility investment has shifted largely from plant needed for serving new customers to non-revenue producing investments (e.g., water efficiency investments, aging infrastructure replacement and compliance with environmental regulations). The need to recover a rate of return on these significant investments, however, does not vary with usage. The current ratemaking structure is simply not well adapted to a no growth, high investment utility environment and is unlikely to encourage the necessary future investment to improve water efficiency. Utilities forego earnings when they invest in efficiency efforts, yet significant efficiency investments are likely to be a necessary component of a least-cost mix of resources.

A water efficiency mechanism supports more consistent planning and deployment of the most efficient resources. Just as prudent energy efficiency investments are the least-cost investments in energy resources, improving water efficiency reduces operating costs (e.g., energy, treatment and residuals handling/storage costs) and reduces the need to develop new supplies and expand our water infrastructure. The task of aligning investors' interest with least-cost planning is paramount. Ultimately, it is customers who will benefit from a water efficiency mechanism because it allows water utilities to anticipate a consistency of regulatory oversight necessary to attract capital, properly matches cost incurrence with cost recovery, and supports more consistent planning and deployment of the most efficient resources.

Supporting Local Economies through Capital Investment and Job Creation

The water utility industry is historically the most capital intensive of the utility industries, and it is expected to incur significant capital expenditure needs over the next 20 years.¹⁰ Those investments aren't for new

¹⁰ The U.S. Environmental Protection Agency's (EPA's) national assessment of public water system infrastructure needs shows a total twenty-year capital improvement need of \$375.3 billion. Additionally, the EPA's 2008 Clean Watershed Needs Survey tallied \$298.1 billion worth of investments needs in wastewater and stormwater infrastructure.

http://water.epa.gov/grants_funding/dwsrf/upload/epa816f13001.pdf
<http://water.epa.gov/scitech/datait/databases/cwns/2008reportdata.cfm>

growth from increasing consumption or a population boom on the horizon. The nature of water utility investment has shifted largely from plant needed for serving new customers to non-revenue producing programs and investments to maintain and improve service reliability – e.g., infrastructure replacement and repair and technology – which also supports job creation in local economies. Water and wastewater utilities are an integral part of our nation’s infrastructure investment solutions. Jobs in water utilities are accessible to workers with a range of educational and training backgrounds, and offer opportunities for workforce development and advancement. Every million dollars of investment in water utility infrastructure generates between 16¹¹ and 27 jobs.^{12,13} With over a third of the current workforce at water utilities eligible for retirement, there is an excellent opportunity to connect people to quality jobs.

Environmental Benefits of Improving Water and Energy Efficiency

Water and wastewater utilities are engaged in a broad array of efforts to become more efficient. Efforts to improve water and energy efficiency cover a wide range and include supply-side practices, such as improved pump efficiency, meter reading, leak detection, and infrastructure replacement and repair programs, as well as demand-side strategies, such as customer efficiency and public education programs and supportive rate designs that improve water and energy efficiency.

The U.S. has a unique opportunity to benefit from and to further the many efficiency gains that can be realized from the water-energy nexus.¹⁴ Working with stakeholders to realize these benefits would help achieve energy and water policy initiatives while equipping utilities with the means of providing customers with better, more reliable and more affordable services.

Improving water and energy efficiency provides a wide range of benefits—for consumers, businesses, utilities, and for communities as a whole. Just as prudent energy efficiency investments are the least-cost investments in energy resources, improving water efficiency reduces the need to develop new supplies

¹¹ Alexander Quinn, et al., *National Economic & Labor Impacts of the Water Utility Sector: Executive Report*, Water Research Foundation and Water Environment Research Foundation, 2014

¹² Clean Water Council, *Sudden Impact: An Assessment of Short-Term Economic Impacts of Water and Wastewater Construction Projects in the United States*, 2009.

¹³ The United States Conference of Mayors estimates that a \$1 billion investment in water infrastructure creates over 26,000 jobs nationwide. http://www.usmayors.org/resolutions/82nd_Conference/env09.asp.

¹⁴ The amount of electricity used by water utilities to collect, treat, and move water is considerable, accounting for about four percent of the electricity consumed in the U.S. Additionally, a great deal of energy is used in the U.S. to heat, cool, move, and pressurize that water in homes, industries, and businesses. In 2010, 12.3 quads of energy (or 12.6% of national primary energy consumptions) were used for water related purposes. This is roughly the amount of energy used by 40 million Americans that year. (Kelly T. Sanders and Michael E. Webber, *Evaluating the energy consumed for water use in the United States*, 2012.) On the other side of the nexus, energy companies are large consumers of water. As observed in a recent report, “In 2005, the nation’s thermoelectric power plants—which boil water to create steam, which in turn drives turbines to produce electricity—withdrawed as much water as farms did, and more than four times as much as all U.S. residences.” In addition, increased use of natural gas as a fuel replacement for coal in power plants across the country implicates even more water use as, overall, hydraulic fracturing “water requirement[s] may range from 70 to 140 billion gallons. This is equivalent to the total amount of water used each year in roughly 40 to 80 cities with a population of 50,000 or about 1 to 2 cities of 2.5 million people.” <http://www.ucsusa.org/sites/default/files/attach/2014/08/ew3-freshwater-use-by-us-power-plants-exec-sum.pdf>

and expand water infrastructure and reduces operating costs (e.g., energy, treatment and residuals handling and storage costs). It also reduces withdrawals from limited freshwater supplies, leaving more water for future use and improving the ambient water quality and aquatic habitat.

Conclusion

Under current ratemaking structures, variability in weather and customer usage patterns can have a substantial effect on the water utilities' actual revenues. Changes in customer usage patterns can reflect seasonal variation in usage (e.g., from winter to summer) as well as long term water use trends (e.g., from sustained water efficiency and conservation efforts). These rate structures, which worked reasonably well in the 20th Century for water and wastewater utilities, no longer adequately address the challenges of today and tomorrow. Current rate structures are not well adapted to a no growth, high investment utility environment and are unlikely to encourage the necessary future investment in infrastructure replacement and efficiency.

The water efficiency mechanism is a ratemaking mechanism to address current realities. If the water utilities project too great a decline and sales volumes remain higher than forecasted, they will credit the over-collection of the revenues; conversely, if an adjustment to recognize declining usage is not adopted and revenues decline, then water utilities would recover the shortfall through the water efficiency mechanism.

A water efficiency mechanism makes water companies indifferent to selling less water, mitigates the adverse effect of weather variability on revenues, recognizes that normal weather is a condition that will likely never be achieved, and effectively reduces the adverse impacts of weather variability for both the utility and its customers. The result is a better alignment of stakeholders' interests to provide for more economically and environmentally efficient resource decisions. Implementation of this alternative regulatory mechanism will remove a disincentive to promote water efficiency and will support revenues for continued water efficiency investments. It provides the appropriate framework to work collaboratively toward promoting water and energy efficiency and conservation.

Removing barriers to improving efficiency and needed investment is in our customers' interests because, over time, it reduces the cost of providing water service to customers and promotes the sustainability of our natural resources.

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