WATER AND ENERGY UTILITITES: IMPROVING COLLABORATION

Cindy Dyballa, independent consultant
Takoma Park MD
301-220-9041
c_dyballa@yahoo.com

ABSTRACT

Recent years have seen a burst of interest in the relationship of energy and water use and savings. This nexus has been defined and even quantified in many ways. The technical aspects of this nexus are becoming well understood, and technologies are emerging to address both energy savings in water systems and water savings in the energy sector. The number and success of programs that save both end-use water and energy is growing.

But the water and energy sectors operate in different worlds. It seems we don’t speak the same language, even when we are trying to. Without a way to find common economic and political ground and create opportunities to work together for mutual benefit, significant progress in water and energy savings will remain elusive.

This paper focuses on water and energy utility collaboration for end-user water and energy efficiencies. It, explores some of the key differences in the water and energy utility sectors, identifies barriers to collaborative program success, and suggests opportunities for greater collaboration. Besides differences in the dominant management systems (public or private), utilities differ in pricing and rate structures, utility size and numbers, and state regulatory structures, organizations and constraints. This affects utility objectives, finances, and how demand management and efficiency are treated within each sector.

Discussion is based on interviews with leading practitioners in the water and energy fields, institutional obstacles from program experience, and barriers and solutions identified by a workshop of water and energy conservation practitioners, as well as available literature summarizing each of the two sectors. The goal of this work is to articulate and understand these differences, in order to improve communication and contribute to more and better joint program efforts.

KEYWORDS

Water efficiency, water savings, partnerships, urban water use, energy efficiency, energy-water nexus, programs, energy savings

INTRODUCTION

One key aspect of the energy-water nexus--the role of water and energy efficiency in water and energy production, distribution, use and treatment--has received recent attention. Technologies are emerging to improve efficiencies. The impacts of greater efficiencies on water and energy providers, their customers and broader environmental goals are becoming clearer. Energy (electric and gas) and water (water and wastewater) utilities are exploring various methods to achieve both direct and embedded energy and water savings. Wastewater systems in particular are paying closer attention to improving operational energy efficiencies that reduce their energy costs.

Both water and energy utilities and their regulators have begun to estimate and target end-use, and in some cases embedded, water and energy savings in their programs. But despite recent program successes, few recent efforts have focused specifically on one specific approach that can contribute to water and energy efficiencies: collaborative end-user programs between water and energy utilities to achieve joint efficiencies.

Joint utility programs that reach end users have potential to create benefits for both parties and contribute to energy and water savings. But the water and energy sectors have historically not worked well or often together, and instead have generally created separate but somewhat parallel efficiency efforts (AWE and ACEEE, 2011). Industry differences between the water and energy utility sectors get in the way of finding common economic and political ground. Challenges have emerged during recent experience in joint efficiency programs.

Some have called for stronger collaboration on energy and water efficiency programs. A national workshop of water and energy experts, looking broadly at how to build joint water-energy efficiency efforts, called for several steps to strengthen cross-sector collaboration in their action "blueprint" (AWE and ACEEE, 2011). Analyses in several states, including Colorado, California and Texas, have urged states to address joint water and energy saving efforts. And a recent nationwide search for exemplary programs yielding energy and water savings highlighted several joint utility efforts (Young and Mackres, 2013).

A Colorado analysis of savings potential from water-energy efficiency programs urged state energy and water agencies to encourage joint efforts, noting residential and commercial program opportunities (Tellinghuisen, 2009). A Texas analysis concluded that implementing end-user efficiencies is one of the keys to sustainable use of both energy and water (Hardberger et al, 2009). Some California water and energy experts believe that despite extensive state experimentation with joint programs, the two sectors must still fully explore what's possible within and beyond existing institutional constraints (Parker, 2012). Another California paper urges further state support for energy-water partnerships of electric and water utilities, mechanisms to better estimate embedded efficiencies, and comprehensive guidelines for managing water and energy together (White, 2013). Broader calls for a greater focus on the water-energy nexus have also recognized the role of joint end-user programs, including the US Department of Energy (2006) and the US General Accounting Office (GAO) (2011).

This paper addresses the issues presented by utility collaboration, with a focus on end-user efficiencies, not energy and water savings in utility operations. The goal of this work is to articulate and understand these challenges and differences, along with possible solutions, in order to improve collaboration and contribute to more effective joint program efforts that save both water and energy.

METHODOLOGY

This discussion is based on several sources, published and unpublished, from both the water (water and wastewater) and energy (electric and gas) fields. Available literature summarizing each of the two sectors was consulted for comparative industry profiles. Barriers to utility collaboration and possible solutions have been considered by experts in at least one forum (AWE and ACEEE, 2011). Programmatic challenges were extracted from documented program experience of exemplary water-energy efficiency programs (Young and Mackres, 2013), unpublished background material for that effort, relevant program efforts uncovered through an online Water-Energy Program Directory (ACEEE, 2013), California's PUC pilot programs (EcoNorthwest, 2011) and elsewhere.

Structured telephone interviews with water and energy efficiency experts and practitioners supplemented this information. The 17 interviewees were selected with attention to filling gaps, not presenting a comprehensive view of each sector. The nine program practitioners consulted have worked in several states in the eastern, western, northwestern and midwestern US. Nonprofit, research and government interviewees brought a state, regional or nationwide perspective and were familiar with the range of program experience in their field. Individual interviewees are not listed by name or quoted, giving them freedom to speak frankly about challenges.

In this paper, water refers to both water and wastewater; energy refers to electric and gas. The terms providers and utilities are used interchangeably. Efficiency here includes both efficiency (same service, reduced use) and conservation (reduced use and service) programs aimed at the end uses of water and energy.

RESULTS

This section summarizes challenges to implementing joint water-energy utility programs for combined water and energy end-use and embedded savings. These include differences in the water and energy industries, regulatory structures, economic factors, communications and information, and approaches to end use efficiency programs.

Challenges Identified by Others

Lack of existing cross-sector working relationships was high on the list of barriers to success for a collection of energy and water experts gathered by the Alliance for Water Efficiency (AWE) and American Council for an Energy Efficient Economy (ACEEE) to develop a joint water-energy action plan "blueprint". The group observed that the two sectors operate under different regulatory and business models and with structures that don't recognize efficiency benefits the same way. They put forward ways to improve collaboration on joint programs, research and policies and codes: "just add water" to integrate water and energy utilities' planning and implementing programs; learn from and replicate best practice programs; and pursue partnership in educational opportunities (AWE and ACEEE, 2011).

They also called for state and federal level policy support in the forms of: a platform to enable communication of energy and water regulators; increased federal and state coordination in grant funding, research, regulation, and technical assistance; regulatory structures and incentives that reward water and energy efficiency; specific energy-water elements added to existing federal legislation; state and federal tax incentives; and federal collection of water and energy end-use data across sectors (AWE and ACEEE, 2011). Participants in a 2010 western workshop, focused on increasing electric and water use efficiencies and on energy recovery from water operations, made similar suggestions for promoting end-use efficiencies, including a research collaborative and attention to ways to transfer the concept of decoupling, separating revenue from sales volume, from the electric to the water industry (Liner, 2012).

Perhaps the most robust discussion on end-user programs has taken place in California. A recent white paper on the water-energy nexus in California considers state level policy and programmatic issues that arise when contemplating programs (Parker, 2012). A paper prepared for the California PUC, in addressing the complexities and economic incentives of embedded energy and water, identifies the key issue as how to manage the water-energy portfolio together (White, 2013).

In considering federal approaches to reduce both energy use for water production and water use for energy development, GAO (2012) concluded that regulatory systems and economic feasibility inhibit widespread adoption of useful technologies and approaches. GAO (2011) noted water industry barriers to achieving end-user water efficiencies that reduce water-related energy uses, among them: water pricing that doesn't reflect all costs; how water utilities operate; competing operational priorities; and lack of public awareness about the energy demands of urban water.

Water and energy industry differences

Number, size and ownership in the water and energy industries differ substantially, despite a wealth of individual variation. Water and wastewater providers are likely to be smaller, more disparate, and publicly managed. These three structural factors have implications for the success of any efficiency program. While consistent precise numbers are difficult to obtain, approximate comparisons are still useful.

Start with the sheer number of providers: some 52,000 separate community water systems for drinking water,[1] and over 15,000 wastewater treatment facilities (EPA, 2009 and 2008), compared with just over 3,200 electric providers. Several of those interviewed commented on this disparity, on fragmentation in the water sector generally, and on the ability of smaller utilities to cope.

The larger electric providers have huge geographic service territories of entire metropolitan areas and even regions, which dwarf the scale of all but the very few largest water wholesalers. And only 145 electric providers represent nearly ¾ of total US electric sales (Nadel, 2013). Some 400 very large drinking water systems (each serving over 100,000 population), representing the top 1%, provide water for nearly half the served US population, and about 4,000 water systems (each with over 10,000 population) together serve more than 245 million (EPA, 2010). A Colorado analysis of savings potential from water-energy efficiency programs flagged mismatched service territories as one hurdle (Tellinghuisen, 2009). One practitioner interviewed noted the difficulties in bridging the scale at which the typical energy and water utilities operate. This vastly different scale is reflected in sales and revenues. Electricity dwarfs the others, with some $368.2 billion in revenue (APPA, 2012). US water utilities collected $42.1 billion in revenue in 2010; wastewater treatment revenue in 2010 was $46.9 billion, mostly from municipal sewage or wastewater treatment (Statista, 2013).

Ownership of the largest energy utilities is virtually all private, and of the larger water providers public. Nearly 7 in 10 of US electric customers (residential and commercial) are served by investor-owned utilities (IOUs), and over ¾ of these IOUs are large. The vast majority of larger gas utilities are also investor owned. Electric and gas IOUs dominate both energy sales and revenue (APPA, 2012). By contrast most Americans get their water and wastewater services from large, publicly managed utilities (EPA, 2008). Virtually all wastewater systems, regardless of size, are publicly managed. Only 7% of the US population with sewer service is provided by private entities (Pinsent

Masons, 2012). These ownership tendencies hold even though the total number of community water systems is evenly split public-private (EPA, 2011) and only a fraction of total electric utilities are investor-owned (APPA, 2012). This picture is complicated by the presence of public electric cooperatives, water wholesalers, federal water and power producers, and joint municipal utilities providing drinking water, wastewater and/or electricity services.

Regulatory Structure

These ownership tendencies affect regulatory structure. Public water providers and private energy IOUs dominate their respective sectors. These largely operate under different state regulatory schemes, managed by separate agencies, imposing different constraints. IOUs are regulated by state utility commissions, and water utilities are often governed by state agencies with other concerns. For public water and wastewater providers the overriding regulatory concern is health and water quality; public safety is a regulatory concern for energy, and more importantly costs and rates (shareholders) (also for water IOUs). Almost all those interviewed stressed the challenges this creates for joint programs. The regulatory scheme affects utility objectives, finances, focus on the customer or ratepayer, and most importantly how demand management and efficiency are treated.

Table 1.**Water and Energy Sectors Compared Nationwide (approximations)**

Characteristic	**Water**	**Wastewater***	**Electricity**	**Gas**
Number	52,000	15,000	Over 3,000	Nearly 2,000
Size and service	400 serve nearly half of customers	1770 produce 92% of volume	145 make ¾ of sales	140 make 90% of sales
Dominant ownership	Public (majority)	Public (over 90%)	Investor owned	Investor owned
State regulation	Drinking water quality	Water quality	Rates and profits (for IOUs)	Rates and profits (for IOUs)
Rate setting	Local or regional	Local or regional	State PUC approved	State PUC approved
Revenues	$42 billion	$47 billion	$368 billion	$115 billion
Approach to efficiency	Best management practices, conservation planning	Operational efficiencies	Energy efficiency Resource standards	Energy efficiency Resource standards

* Wastewater statistics are available in terms of facilities, not managing entities. Other numbers in this table refer to entities.

Economic Factors

Investor-owned energy utility rates are approved by state regulators; IOUs must justify rate increases to recover costs of operations and earn a fair rate of return on investments. For public water and wastewater providers, rate setting is primarily local and not reviewed by the state (Wisconsin is one exception). This can affect accounting for the costs, financing and benefits of efficiency programs, a major concern for most of those interviewed.

Most of those interviewed noted the ability of IOUs in nearly half the states to separate, or decouple, costs of efficiency programs from rate setting (ACEEE, 2012). Many raised the unclear authority of state-regulated energy utilities to invest in water efficiency programs that save energy in many states. One state expert interviewed urged a permissive, rather than legislative or rule making, state approach to this issue. Several noted that there's no other good way to economically estimate and apportion regional environmental and other benefits. Recognizing and allocating embedded savings should help efficiency programs to be cost-effective for individual utilities, but making such estimates is difficult and often requires incompatible or unavailable data (White, 2013).

Simple financial comparisons are difficult because public utilities and IOUs take different budgeting and rate-setting approaches. Most municipal utilities work on an annual basis, taking a cash-needs approach for each year. Energy IOUs, and many public energy utilities, employ a multiyear approach (Aldinger, 2010).

Recent declines in sales and revenue concern both industries. In water this is often attributed to reduced demand from successful efficiency programs. In reality, reduced demand for many reasons, combined with increasing operating costs, has led to increased water rate pressures, and a "new normal" for both the water and electricity industries (Beecher and Chesnutt, 2012; Faruqui, 2012). And while financial needs are an overarching concern of the water sector, sustainability challenges are intertwined; energy efficiency was identified as the most important sustainability issue facing the water sector by nearly half the respondents to a survey of water and wastewater managers (Black & Veatch, 2012).

The effects on collaboration for efficiency programs can be powerful. One practitioner commented that area water utilities may want to participate, but can't, since they have no separate budget for efficiency programs and no way to recoup investment in the short run. On the other hand, another practitioner saw reducing their program costs as a motivation to attract partners. One expert interviewee noted that due to accounting differences, some energy utilities tend to assume that the bulk of savings will show up in the customer's bill. A state expert noted that while the benefits of embedded energy are widely accepted, the estimation of these is fraught with problems. Of note, few of those interviewed mentioned significantly expanding outside sources of funding as a way to address this.

Communications, Stove-piping, and Information Sharing

Perceived sector differences can influence communications and collaboration. Even the terms differ in each industry--water providers speak in terms of water deliveries and households; electric utilities measure sales; wastewater managers talk about facilities, not customers. Those interviewed pointed to weak understanding of how the other sector uses information, makes decisions, sets goals and formulates budgets. Several described the silos in which water, wastewater, electric and gas providers each tend to operate, even within one combined utility, industry norms of talking across these silos only when required, and a corresponding default attitude of mistrust. Several practitioners hit stumbling blocks during program design with time consumed by satisfying several internal bureaucracies, competing concerns over public credit, legal cautions, or the need to elevate to senior management just to get started. Mistrust takes many forms. One practitioner noted that some public water utilities don't want to widely share flaws in their operations (for example a high water loss percentage) as they are directly responsible to the public. Another offered that when the focus is on required program costs, not the customer, it's easy to assume the other utility would do the program without you.

The challenges inherent in data and information sharing for program design and evaluation were highlighted by several interviewees. Several practitioners noted that IOUs (primarily energy) have more restrictions on sharing customer information. This complicates both the delivery of customer program services and program evaluation. At least two successful programs found they needed extra time to spell out formal processes for multiple utility partners to work with customers, exchange and report program information, and get approvals.

Effective data collection is also a collaboration issue, and can require a formal agreement to spell out roles and resolve privacy issues. Collecting data from water and wastewater utilities to evaluate pilot programs was, in itself, a barrier to success in pilot joint programs requested by the California PUC (EoNorthwest, 2011). Consistent water and energy data reporting standards are being sought in California, to help identify gaps, establish best practices, and develop better programs (White, 2013). Texas researchers have made a similar call for better data to solidify estimates (Stillwell et al, 2011).

Approaches to End Use Efficiency Programs

Water and energy utilities take their approach to end use efficiency to some degree from their state regulators. And state policy approaches for water and energy efficiency tend to differ.

Many state water policy makers have focused on promoting or requiring water efficiency planning and/or best management practices (BMPs) for water efficiency. More than half of US states require some form of water efficiency planning, and 19 require some level of plan implementation. Most of the state planning frameworks stress measures or practices rather than percentage water use reduction goals. Conservation activities are required in 15 states as part of a water permitting or rights process[2] (AWE and ELI, 2012).

State energy regulators are moving toward adoption of statewide resource standards--energy savings performance targets that utilities must work towards. The 24 states with energy performance standards provide a strong impetus for local energy efficiency programs that go beyond the easy savings. Several of these states have legislated requirements for utilities to acquire “all cost-effective” energy efficiency resources; one state (California) requires electric utilities to look to energy efficiency as the first provider of new energy. Six more states use other policies to promote significant energy efficiency program savings, as reflected in reduced electricity sales of at least 0.5%/year (Foster et al, 2012). Some additional states (not mapped) include energy efficiency programs as part of an energy integrated resource planning process.

One result is seen in the scale of investment in end use efficiency and the ability to track results. Annual savings from energy efficiency programs increased significantly, topping 18 million mwh in 2010, roughly the amount of electricity used in Wyoming. Utility budgets, 85% for electric utility programs, rose to almost $7 billion in 2011 (Foster et al, 2012). No similar nationwide numbers are readily available for the water sector, although the California Urban Water Conservation Council estimates water savings from implementation of a few drinking water utility BMPs (CUWCC, 2013).

Both water and energy efficiency end-use efforts may get a boost from the emergence of local and state policies addressing other issues. Now 37 states have some form of planning for climate change, and 19 states have set greenhouse gas emissions targets (CCES, 2012). California is not unique in the convergence of several separate efforts to motivate water and energy utility collaboration to achieve greater efficiencies:

- A state assessment that water and wastewater production, distribution, use and treatment are a significant energy use statewide, leading to state policies emphasizing all sources of energy efficiency;
- Statewide water reduction goals of 20% by 2020 tied to urban water management plans that help meet water use reduction targets (AWE, 2012); and
- Climate change legislation (CA AB 32) mandating attention to actions that produce greenhouse gases.

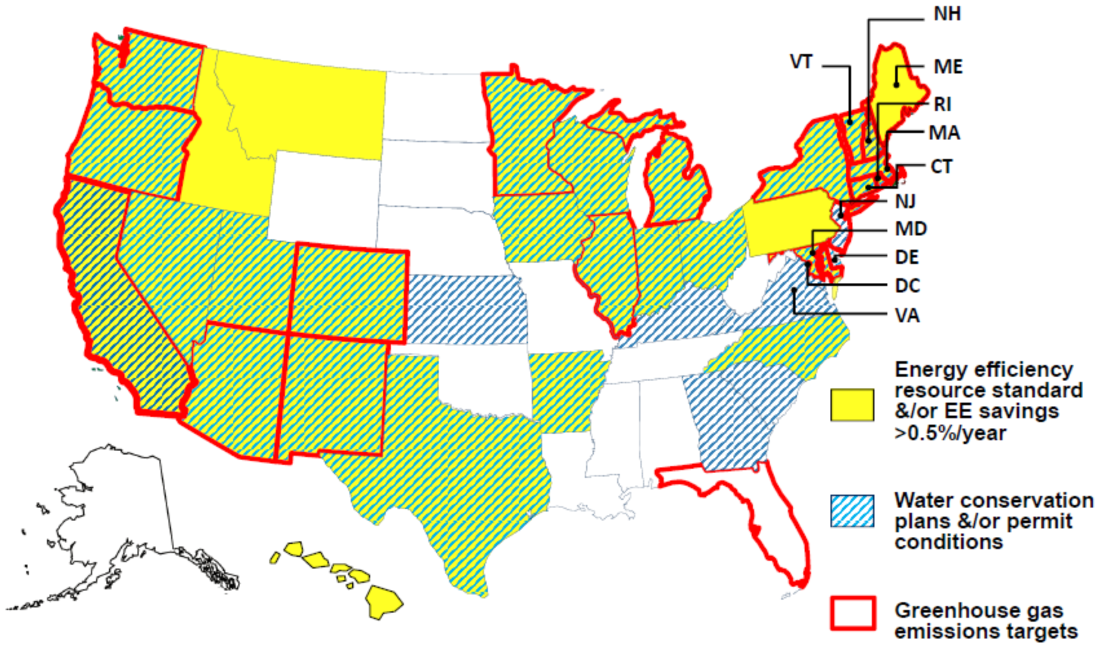

Figure 1. **Selected Water and Energy Efficiency and Climate Policies by State**

Taken together, the convergence of water conservation, energy efficiency and greenhouse gas targets in a state can both enable a regional perspective on benefits and encourage water and energy utilities to pursue joint efficiency programs. Consider a California proposal to link these systems, by meshing water efficiency best practices with energy efficiency program requirements, and designing a more comprehensive approach that builds on both water BMPs and energy resource standards to provide guidelines for managing the water-energy efficiency relationship as one integrated portfolio[3] (White, 2013).

Program Experience

Program experience across the US affirms both these challenges to joint programs and presents creative options to address them.

Evaluation results for several California PUC-requested joint utility water-energy saving pilot programs between three large energy IOUs and their water providers yielded significant energy savings. This was despite somewhat limited scope calculations of water and energy savings (individual utility, not regional perspective) and limited data availability, particularly for wastewater savings (EcoNorthwest, 2011). The PUC is moving ahead to integrate water into utilities' energy efficiency portfolios, and is considering changes to its cost-effectiveness procedures for energy-water efficiency measures to include energy embedded in water and wastewater. But they appear so far to be stopped short of a broader inclusion of energy embedded in all water and wastewater activities from source to use and treatment, regardless of service territory (Parker, 2012).

Several of the most successful energy-water savings programs selected by a group of water and energy experts resulted from joint utility collaboration. A closer look at these reveals both the challenges in joint programs and ways to overcome them. These programs went to great lengths to solidify joint utility commitment, ensure collaboration, and clarify benefits to partners up front. Several efforts started out narrowly before expanding to broader goals. Getting multiple organizations to understand their roles, trust each other, and communicate effectively was in itself a major accomplishment. Some programs had to establish structured decision making processes, rules of operation, or draft legal agreements. Once established, program partners found that collaboration helped mitigate issues of funding, staff time, and organizational commitments (Young and Mackres, 2013). The collaboration aspects of several of these are described below.

One exemplary multifamily efficiency program, an effective three way collaboration of public and private water and energy utilities in Austin Texas, began with an interest in deeper building energy savings and a desire to reach a difficult customer segment with one-stop services. The utilities designed and integrated complementary programs and policies. One utility manages the program, others contribute to rebates; utilities staff are involved, but outsourcing the actual work can free up staff time and resources.

Some of the exemplary programs have similar outside partner involvement. The Denver area Watts to Water program delivers one stop services for hotels and large office buildings. Utility partners Denver Water (public) and Xcel (investor-owned) provide strong support and funds, with a collaborative marketing and outreach strategy, but this program is managed by a separate group with excellent contacts in the target customer group. Getting the many other partners all on board did take time upfront.

The successful Windsor Pays program, partnering the Town and two separate energy and water Sonoma county agencies agency to implement the program, brought a broader regional climate protection authority into the program's design. Similarly, a broader regional air quality management district helped with seed funding for the commercial ozone laundry program of a major electric IOU and the City of Santa Rosa Utilities Dept. (water and wastewater), was initiated as one of the PUC energy-water pilots. And for Living Wise programs that have signed on multiple sponsors, a turnkey contractor manages the program and seeks contributions (funds, staff time or other resources) from water and energy utilities beyond the initial utility sponsor. The Living Wise resource action program in southern California was highlighted as exemplary due to its commitment of both energy and water utilities (Young and Mackres, 2013).

Broader city climate change goals (beyond energy savings) allowed a bigger upfront investment for Boulder's public buildings program, designed as an energy performance contract. Since the City does not pay itself as supplier for water, water savings measures are bundled with other measures in packages that together show good payback. The Sonoma County Water Agency committed in 2011 to pursue a carbon free water supply; this provides another rationale for conservation programs to achieve long term water use reductions that also conserve power.

Joint end-user programs are not always appropriate or useful to an individual utility. MWRA, an award-winning program, has collaborated extensively with area energy utilities for many years, but does not currently pursue aggressive end user programs, with or without partners, at this time. Instead it takes advantage of state renewable energy standards and a regional greenhouse gas initiative to reduce its own energy use and produce power.

ACEEE has also recently posted an online water-energy program directory with summaries of over 450 energy saving programs nationwide that also produce water savings. Most do not involve collaboration between water and energy programs. Of those that do, several utilize a nonprofit group, existing or formed solely for program delivery, that is not restricted by state regulations for water or energy providers. These groups can deliver both water and energy savings and can pursue partnership commitments without actively involving all utilities in day to day decisions (ACEEE, 2013).

Outside this documented program experience are other working water and energy utility partnerships, some in place for years, among them San Antonio, Fort Collins, the San Francisco East Bay area (East Bay, 2013), and West Basin in suburban Los Angeles (West Basin, 2011). Interviews show that many of these partnerships were originally motivated by mutual concern for customer convenience and service, long before the current policy discussion about the energy-water nexus. In at least one case, the partners agreed they did not want to be embarrassed by customers asking why they could not coordinate similar programs and services.

For example, the Seattle area residential WashWise and other area utility end-user programs, targeting both water and energy, partnered water, wastewater, energy utilities and other groups in a long-standing set of programs. Begun as a pilot and focused on measures most cost effective for all, the program design directly addressed equity and collaboration among the partners and built in evaluation of savings and costs. Keys to partnership success were leveraging partner costs, identifying mutual benefits, using regional climate change and environmental goals as justification, and including private business and community group partners (Dietemann, 2008).

DISCUSSION AND CONCLUSIONS

What does all this suggest about ways to strengthen collaboration? Despite the many hurdles involved, water and energy utilities across the US, both public and private, have already joined together across their differences because they see benefits to customer service as well as immediate efficiencies for their system. All but one of those interviewed was very positive about the usefulness of and potential for collaborative end-user efficiency programs as one useful tool for reducing both water and energy use. There were several comments that this area needs more attention to fulfill its savings potential.

Key differences between the water and energy industries have significant implications for collaboration, and can inform what works and what doesn’t. The larger energy utilities tend to be investor-owned, the larger water utilities public. The water industry is more fragmented.

Regulatory structure and rate-setting influence how utilities account for efficiency activities. While potential savings are real, how they are accounted for and who gets to count them inhibit collaboration. Programs that clearly define this upfront and seek contributions proportionate to immediate benefits stand a better chance of success. In recognition of the difficulties in estimating and apportioning costs and benefits, especially embedded savings, some successful programs bring in an outside party for seed funding to get started and to acknowledge regional benefits.

The regional economic and environmental benefits of joint programs can be significant, as water becomes more scarce more often in more places throughout the US, and as pressures of climate change force both energy and water utilities to adapt. The three trends prompting state attention in California—climate change, water and energy—are not unique, and can motivate action elsewhere.

Most practitioners described workarounds to address built-in hurdles of communications, differing perspectives, attributing costs and benefits, sharing customer information, and satisfying bureaucratic requirements. These methods can help obtain better results:

- Get the right folks talking at the start.
- Clarify common goals up front.
- Take the time to work through mechanics of collaboration.
- Start small, even with joint messaging and education or a pilot project.
- Pool resources proportionately.
- One utility can take the lead programmatically, and others contribute what they do best.
- Acknowledge difficulties in estimating costs and benefits and apportion contributions.
- Keep it simple for smaller scale utilities.
- Bring in another party (nonprofit) to provide the glue and attract outside funding.
- Agree that service and convenience to customers is an important mutual goal.
- It never hurts to ask (well, almost never).

Opportunities for utility collaboration on end-use efficiencies may be most immediate in situations with:

- Municipally owned joint utilities;
- Energy cooperatives with similar scale as mid-size municipal water providers;
- State energy efficiency resource standards and/or other policies to promote robust utility energy efficiency programs;
- Utilities in any sector that need to go beyond low hanging fruit;
- States and regions with persistent drought and water shortages; and
- Water and wastewater utilities facing significant energy costs or capital costs for expansion.

State policies can strongly support stronger program collaboration, although these policies are not easily adopted. Interviews and formal studies have suggested an array of potential methods to encourage partnership efforts:

- Individual agency actions that address cost-benefit issues;
- Regular communication among energy and water regulators;
- Water-saving targets for water utilities, just as many states have energy-saving targets;
- Integration of state goals for water and energy efficiency and climate change;
- In-state coordination of various agency mechanisms that support water or energy efficiency such as best management practices, planning, and energy efficiency resource standards;

- Water and energy end-use data collection efforts that cut across sectors;
- Use of existing funding mechanisms to jumpstart increased collaboration; and
- Formal mechanisms to recognize the broader benefits of programmatic water and energy savings.

Any and all of these actions can provide water and energy utilities with another avenue to increase efficiency of their service delivery, reduce their own costs, and achieve regional environmental benefits.

REFERENCES AND ENDNOTES

Aldinger, C, Oct. 2010. An Analysis of the Differences in Water Rates of Investor-Owned Water Utilities and Government-Owned Water Utilities. Peasley, Aldinger & O'Bymachow for California Water Association. At http://www.calwaterassn.com/wp-content/uploads/2010/11/CWA-Water-Rates-Differences-White-Paper.pdf.

Alliance for Water Efficiency (AWE) and American Council for an Energy Efficient Economy (ACEEE), May 2011. Addressing the Energy-Water Nexus: A Blueprint for Action and Policy Agenda. At http://www.allianceforwaterefficiency.org/blueprint.aspx.

Alliance for Water Efficiency (AWE) and Environmental Law Institute (ELI), Sept. 2012. The Water Efficiency and Conservation State Scorecard: An Assessment of Laws and Policies. At http://www.allianceforwaterefficiency.org/final-scorecard.aspx

American Council for an Energy Efficient Economy (ACEEE), 2013. Water-Energy Program Directory. At http://www.aceee.org/w-e-programs, accessed February 2013.

American Public Power Association (APPA), 2012. 2012-2013 Annual Directory & Statistical Report. At 111.publicpower.org.

Beecher, J and T Chesnutt, Dec. 2012. Declining Water Sales and Utility Revenues: A Framework for Understanding and Adapting. For Alliance for Water Efficiency and Johnson Foundation.

Black & Veatch, 2012. Strategic Directions in the US Water Utility Industry. At http://brstage.bv.com/docs/management-consulting-brochures/2012-water-utility-report.pdf.

California Energy Commission, Sept. 2009. 2009 Integrated Energy Policy Report-Draft Committee Report. CEC-100-2009-003-CTD.

California Urban Water Conservation Council (CUWCC) 2013. Urban water supplier best management practices are listed online at http://www.cuwcc.org/bmps.aspx?ekmensel=b86195de_24_0_7794_2.

Chesnutt, T, et al, March 2012. A Balanced Approach to Water Conservation in Utility Planning. For Water Research Foundation.

Center for Climate and Energy Solutions (CCES), 2012. Climate Action by State. Online at http://www.c2es.org/us-states-regions.

Department of Energy, US, 2006. Energy Demands on Water Resources: Report to Congress on the Interdependence of Energy and Water.

Dietemann, A, March 2008. Water and Energy Efficiency Partnerships. Seattle Public Utilities unpublished presentation to EPA Water and Energy Meeting.

East Bay Municipal Utility District, 2013. High-Efficiency Residential Clothes Washer Rebates. Online at http://www.ebmud.com/water-and-wastewater/water-conservation/high-efficiency-residential-clothes-washer-rebates, accessed Feb. 2013.

ECONorthwest March 2011. Embedded Energy in Water Pilot Programs Impact Evaluation. Prepared for California Public Utilities Commission Energy Division.

Environmental Business International at Statista 2013. Revenue of the U.S. water utility industry between 2000 and 2010. Online at http://www.statista.com/statistics/192890/revenue-of-us-water-utilities-since-2000/.

Environmental Business International at Statista 2013. Revenue from U.S. Wastewater Treatment-since Since 2000. Online at http://www.statista.com/statistics/192838/revenue-from-us-wastewater-treatment-since-2000/.

Environmental Protection Agency, US, 2006. Community Water Systems Survey.

Environmental Protection Agency, US, 2008. Clean Watersheds Needs Survey 2008.

Environmental Protection Agency, US, 2009. FACTOIDS: Drinking Water and Ground Water Statistics for 2009. Office of Water. EPA 816-K-09-004.

Environmental Protection Agency, US, June 2011 (updated February 2012). Fiscal Year 2010 Drinking Water and Ground Water Statistics. EPA 817K11001.

Faruqui, A and E Shultz, December 2012. "Demand Growth and the New Normal." Public Utilities Fortnightly. At www.fortnightly.com.

Foster, B et al 2012. The 2012 Energy Efficiency State Scorecard. ACEEE Report number E12C. At http://aceee.org/research-report/e12c.

General Accounting Office, US, March 2011. Energy-Water Nexus: Amount of Energy Needed to Supply, Use, and Treat Water Is Location-Specific and Can Be Reduced by Certain Technologies and Approaches. GAO-11-225.

General Accounting Office, US, September 2012. Energy Water Nexus: Coordinated Federal Approach Needed to better Manage Energy and Water Tradeoffs. GAO- 12-880.

Hardberger, A and A Stillwell et al, April 2009. Energy-Water Nexus in Texas. University of Texas at Austin and Environmental Defense Fund. At http://ssrn.com/abstract=1873566.

ICF, 2008. Water and Energy: Leveraging Voluntary Programs to Save Both Water and Energy. For EPA Office of Water.

Klein, G, 2005. California's Water-Energy Relationship. California Energy Commission CEC-700-2005-011-SF. At http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF.

Liner, B et al, Nov. 2012. "Appendix C, Western Electric Power Sector/Water Sector Collaboration Workshop (2010)" in: Water Energy Future Workshop, Nov. 27 2012. Water Environment Federation, Danfloss and Alliance to Save Energy.

Nadel, S, February 2013. Unpublished ACEEE analyses of data from US Energy Information Agency 2004 Natural Gas Annual and 2013 Annual Energy Outlook.

Park, L, September 2012. California's Water-Energy Nexus: Pathways to Implementation. GEI Consultants.

Pinsent Masons, 2012. Pinsent Masons Water Yearbook 2012-2013 (14th edition). Pinsent Masons LLP, London.

Stillwell, A et al 2011. "The Energy-Water Nexus in Texas." Ecology and Society, *16*(1), 2. At http://www.ecologyandsociety.org/vol16/iss1/art2/.

Tellinghuisen, S June 2009. Water Conservation = Energy Conservation, A Report for the Colorado Water Conservation Board. Western Resource Advocates.

West Basin Municipal Water District, 2011. Water Efficiency Master Plan Highlights 2011-2015. At http://www.westbasin.org/files/water-efficiency-master-plan/we-masterplanhighlights-final.pdf.

White, R and M Zafar, Jan. 2013. Rethinking the Water Energy Nexus: Moving toward Portfolio Management of the Nexus Policy and Planning Division. CA Public Utilities Commission.

Young, R and E Mackres, January 2013. Tackling the Nexus: Exemplary Programs That Save Both Energy and Water. ACEEE & AWE. ACEEE Report number E131. At http://www.aceee.org/research-report/e131.

---

[1] EPA defines a community water system as one that provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections, or regularly serves at least 25 people year-round.

[2] In Great Lakes Basin states, an interstate compact with water conservation requirements covers parts, not all, of these states (AWE and ELI, 2012).

[3] White (2013) concludes that in some cases, balancing the water-energy portfolio together for greater water and energy efficiencies may lead to more water or energy use in a particular situation.