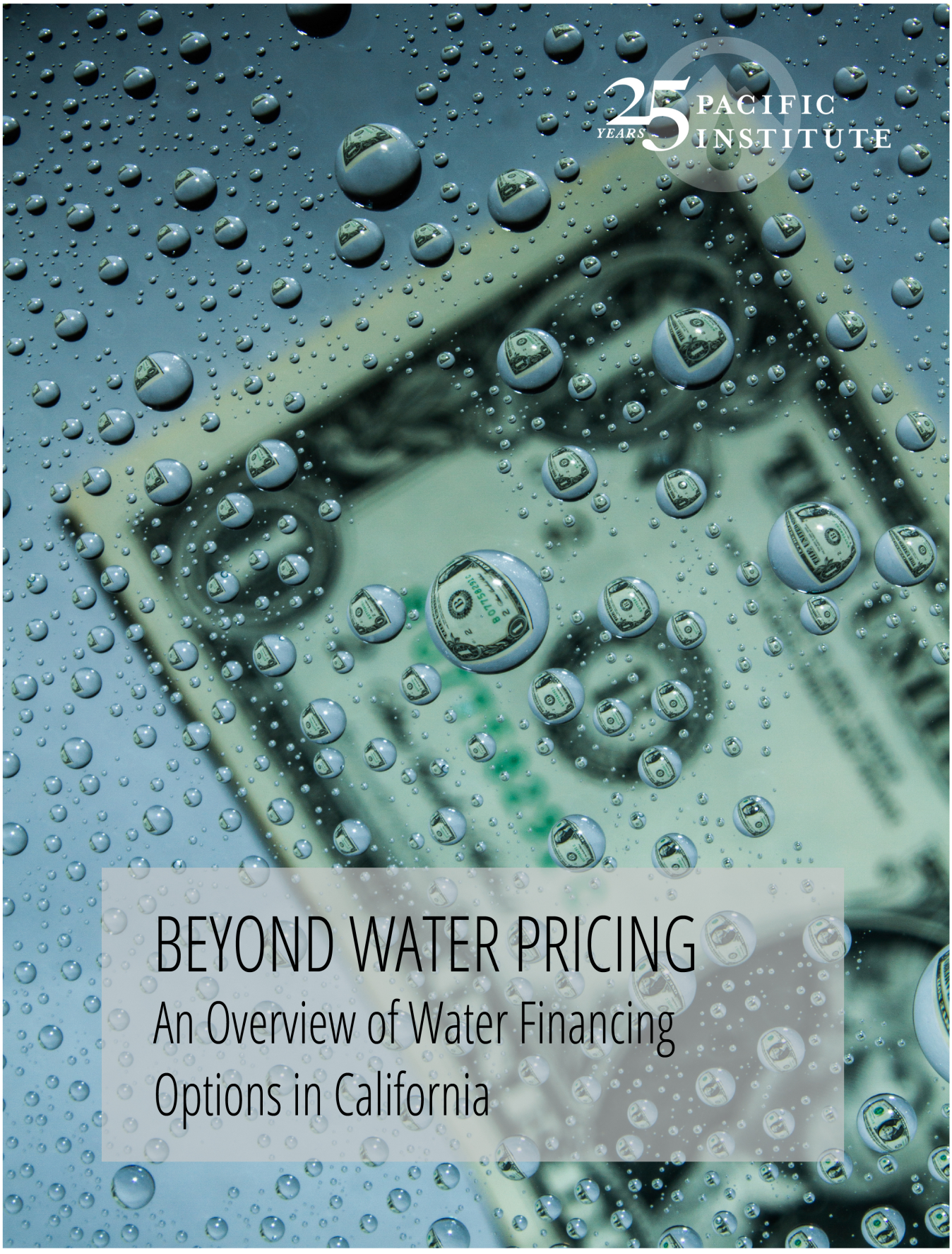

BEYOND WATER PRICING

An Overview of Water Financing Options in California

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November 2013

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Table of **Contents**

1 Introduction

California's social and economic wellbeing is directly tied to water availability, reliability, and strategies for sustainable use. Water has the unique ability to connect upstream and downstream interests, and water policies are often a combination of local, regional, state, and federal approaches that encompass technological, economic, and regulatory tools. Exploring stable and sustainable sources of funding for water projects at various scales is a key component to long-term solutions.

Various financing options have been used throughout the state to invest in the existing water systems and services, develop new ones, and in some cases, mitigate environmental impacts, but there are serious unresolved economic and financial challenges facing water systems (Figure 1). In many areas, for example, water prices fail to cover all of the expenses associated with constructing, operating, and maintaining a system that delivers water to meet state and federal drinking water standards, leading to a gap between revenue collected from customers and total system costs (Black & Veatch 2012).[1] Water utilities make only limited investments in conservation and efficiency, which is typically the least expensive source of new water. Finally, water prices rarely reflect the full costs related to the water itself, such as the ecosystem impacts related to extracting water.

As various communities deal with the direct and indirect impacts of climate change and extreme weather patterns, decaying water and wastewater systems, ecosystem challenges, emerging contaminants and stricter water quality requirements, and population and economic growth, there is a growing urgency to reinvest in water and wastewater management systems in order to continue to provide high-quality and reliable water services. This white paper, the last in a series of four covering different aspects of water pricing in California, from water affordability (Christian-Smith et al., 2013) to lessons from the electricity sector (Donnelly et al. 2013), reviews some of the local, regional, and statewide water financing options in California, including:

- Municipal bonds
- State revolving funds
- Public-Private Partnerships (PPP)
- Tax initiatives
- Public benefit funds

[1] Also see "An Overview of the "New Normal" and Water Rate Basics" - http://www.pacinst.org/publication/water-rates-series/

We briefly discuss each of these financing options, in turn, and explore how they have been employed in California and what lessons we can learned about their use. The objective of this paper is to provide a short overview of these financing mechanisms and highlight the political, economic, and social challenges they entail. For California to solve existing and future water challenges, it has to consider a broader range of funding options and select the ones with the least long-term social and economic impacts.

Theme of Era				
Development and Growth	Federal Investment	Infrastructure Expansion	Water Resources Development / Protection	Current State Bond Funding
Significant Actions				
• Construction of dams, canals and levees for transportation, agriculture and water supply occurred throughout this period in the Central Valley, Bay Area and, most notably, in the Sac/S.J. Delta	• Central Valley Project • USACE and Bureau of Reclamation involvement in water conservation, water supply, flood management, and wildlife protection projects	• State water project constructed • National Flood Insurance Act of 1968 • Continued flood infrastructure development	• Water Resources Development Act passed (1974, 1976, 1986, 1988, 1990, 1992, 1996, 1999, 2000, 2007) • State and Federal environmental laws enacted (Clean Water Act, Endangered Species Act, California Endangered Species Act California Environmental Quality Act)	• State bond funded infrastructure improvements, planning and emergency management preparedness projects
Financing Mechanisms				
• Levee construction by land owners and reclamation districts • Federal funding of flood control projects (e.g. Los Angeles River and, Sacramento River Flood Control Project)	• Flood Control Act of 1928 – Authorized the USACE to construct projects on the Sacramento River for flood control • Flood Control Act of 1944 authorized the Lower San Joaquin River & Tributaries Project	• General obligation bonds for State Water Project • Utility rates, revenue bonds ,and fees fund local agency projects • 1973 statute required local and State cost sharing of projects (Senate Bill 399 Sec 12585.2 of the California Water Code, Amended in 1973 (Chapters 893))	• Clean Water Act funds variety of Federally authorized projects • 1973 Way Bill (California Water Code §12980-12991) set requirements for State funding of non-project levee maintenance and improvement costs	• Passage of several Propositions with IWM components •Prop 13 •Prop 12 •Prop 40 •Prop 50 •Prop 1E •Prop 84 •2014 Bond (potential)

Figure 1. History of Funding for Water Management in California
Note: USACE refers to the United States Army Corps of Engineers
Source: DWR 2013

2 Financing Mechanisms

Municipal Bonds

Major water infrastructure projects in the U.S. have often been financed using municipal bonds. A bond is a form of debt financing. A municipal bond is issued by a municipal government (state, city, or county) or its agency and purchased by individual and institutional investors. For investors, municipal bond income, i.e., the interest payments, is typically exempt from federal tax and may also be exempt from state and local taxes. As a result, the investor will often accept lower interest payments relative to other types of securities. The bond issuer then benefits from tax-exempt bonds by paying lower interest rates on its debt than would a comparable corporate issuer, reducing the financing costs.

The two broad categories of municipal bonds are revenue bonds and general obligation bonds. General obligation bonds are typically used to fund projects that will not provide direct sources of revenue. General obligation bonds are sold by government authorities and their repayment, with interest, is guaranteed by a government's general taxing powers. The bond-issuing government authority may raise income tax, sales taxes, or various fees (e.g., license fees) to pay off general obligation bonds. Revenue bonds, on the other hand, are used to fund projects that are designed to serve specific populations, and are repaid through user fees and local taxes by charging the people who benefit directly from the project. For instance, the California Department of Transportation (CalTrans) may build or repair a bridge by selling revenue bonds. This money will be repaid over time by the tolls paid by people who use the bridge.

General Obligation Bonds

Over the past several decades, California has relied heavily on general obligation (GO) bonds to fund and finance a variety of water-related projects, including safe drinking water, flood protection, restoration, and water reliability projects. State GO bonds require voter approval after they pass through both houses of the state Legislature and are signed by the Governor. When California voters pass a general obligation bond, they commit to paying back the amount of the bond, plus interest, out of the state's General Fund.

The General Fund is the pool of public money replenished mostly (about 90%) by revenues raised through personal income tax, sales tax, and corporate taxes. The state uses the General Fund to cover the majority of the services that the state provides, including public schools and universities, the state prison system, the MediCal health insurance program, unemployment benefits, state parks, and other health and social services. Each year, the state also uses part of the General Fund to pay "debt service," i.e., the annual interest and principal for GO bonds. This is

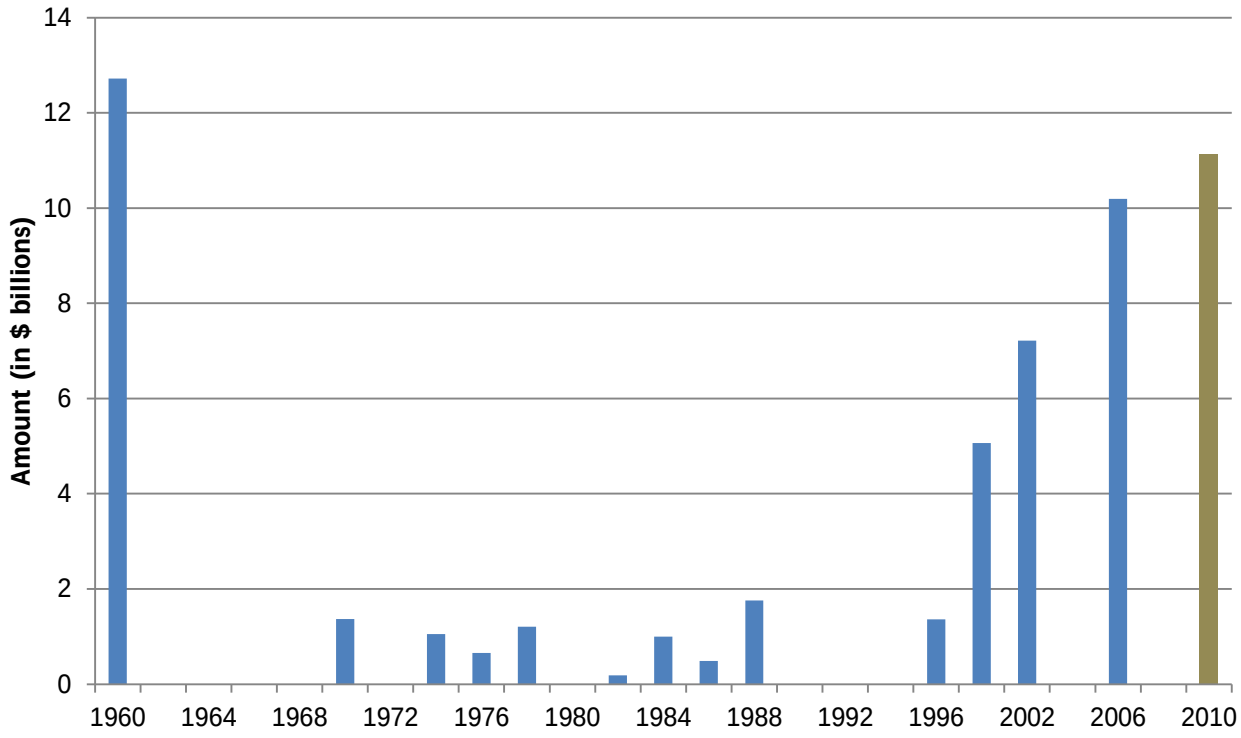

Figure 2. Water-related General Obligation Bonds, 1960-2010

Note: Inflation-adjusted amount (in 2010 dollars) of past water-related general obligation bonds (in blue) and the proposed 2010 water bond (green)

Source: Figure adapted from Christian-Smith et al. (2010)

similar to the way someone who has borrowed money to buy a car or house must make regular payments to repay the loan. Debt service payments from the General Fund reduce the amount of money to pay for essential state services.

Between 1970 and 1999, water-related GO bonds were passed every few years, ranging from $188 million to $1.8 billion (in 2010 dollars), and totaling $9.1 billion over the 29-year time period(Figure 2). Since 2000, the frequency and size of water-related bonds have increased markedly. Between 2000 and 2006, six water-related general obligation bonds were passed, ranging from $2.5 billion to $5.8 billion, and totaling $22.5 billion (Christian-Smith et al. 2010). In 2009, the state legislature passed an additional $11.1 billion water bond to be put before voters in November 2010, but the vote has been delayed twice.

The growing reliance on GO bonds has important financial implications, as it has led to increasing state debt liability. GO bonds are repaid through the General Fund, which is sensitive to changes in the economy. For instance, General Fund revenue collections in 2008–09 were 12% lower than 2007-2008 due to job losses, declining consumption, and weakness in the housing market and overall economy (PPIC 2010). Debt repayment has a higher financial priority over other services and programs funded through the General Fund. When the state has a deficit, approving GO bonds forces the state to either raise tax/fee revenues or reduce spending on other General Fund programs and disrupt these services, such as education and healthcare. At a time when the

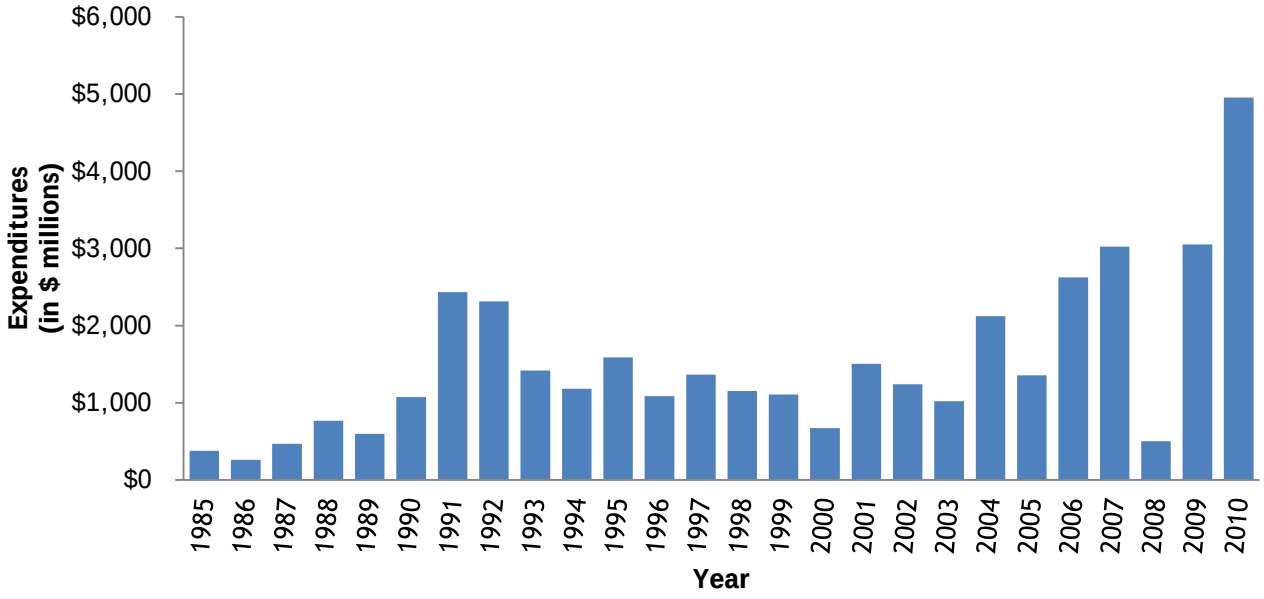

Figure 3. Statewide Local Issuance, Public Enterprise Revenue Bonds (in 2010 dollars) for Water/Wastewater Projects, 1985-2010
Source: Figure adapted from Edwards (2011)

state has budget surplus, paying debt service accelerates how quickly the surplus is depleted and reduces expenditures on other priorities sooner than would occur if fewer GO bonds were approved.

In addition, GO bond funding does not provide long-term, predictable revenue: "California does not have adequate funding mechanisms in place to ensure the needed investment in water management improvements over the long term. In recent years, local communities have relied primarily upon state bond funding to augment local investment in water management and efficiency improvements. Bond funds alone do not provide a steady, reliable source of funding and are subject to 'boom and bust' cycles that make it difficult to plan" (CA DWR et al. 2010).

Revenue Bonds

Revenue bonds are issued for a specific project and are repaid from a specific revenue source (often the project itself). In California, local agencies have relied on revenue bonds to raise capital and finance local infrastructure projects for many years. Water-related projects, such as treatment plant improvements/expansions, desalination, groundwater recovery, and water meter installations are among some the projects that have been financed using these bonds. Between 1985 and 2010, local governments in California issued $39 billion (in 2010 dollars) in revenue bonds for water and wastewater projects, which represents 37% of the total revenue bonds issued during that period (Edwards 2011).

Figure 3 shows the trend of revenue bond issuance in California from 1985-2010. The issuance of revenue bonds has grown significantly since 1985, ranging from $261 million in 1986 to about $5 billion in 2010. The dollar value of these bonds was steady between 1985-2006, on average about $880 million annually. In 2009, as part of the American Recovery and Investment Act

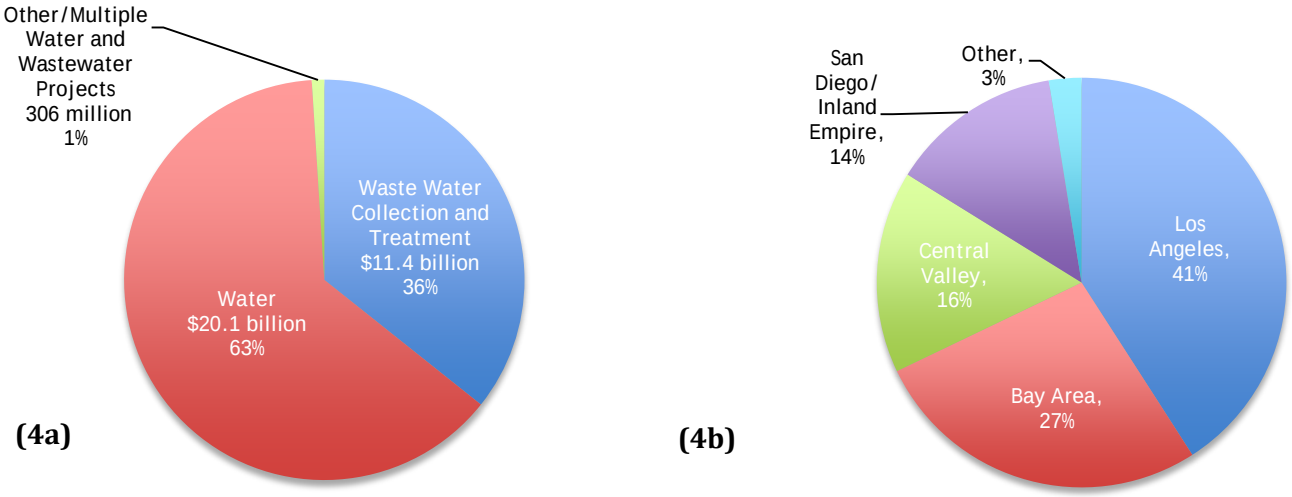

Figure 4. (a) Statewide Local Issuance Public Enterprise Revenue Bonds Water/Wastewater Projects, 1985-2010; (b) Regional Comparisons of Capital Improvements Projects Financed through revenue bonds, 1985-2010

Source: Adapted from Edwards (2011)

(ARRA),Build America Bond (BAB) program came into effect for two years (and expired in Dec ember 2010), offering special tax credits and federal subsidies in order to reduce the cost of borrowing for the states and local government issuers. The BAB significantly increased revenue bond expenditures in 2009 and 2010 (Figure 3).

Figure 4(a) depicts how these funds were distributed among various water-related projects. About 63% of the bonds have been used to finance water projects (Figure 4a). Figure 4(b) reveals the geographical distribution of revenue bonds. Los Angeles and the San Francisco Bay Area are two of the regions with the greatest number of projects funded through revenue bonds. The Metropolitan of Water District of Southern California is the largest issuer of revenue bonds for water statewide with about $4.9 billion in bonds issued between 1985 and 2010, followed by the Los Angeles Department of Water and Power, East Bay Municipal Utility District, and the San Francisco Public Utilities Commission, respectively.

Lessons Learned

Reliance on municipal bond financing has been on the rise since the 1980s. Both GO bonds and revenue bonds have been used heavily to finance water and wastewater projects (Figures 2 and 3). The shift to the greater use of bond funding can be linked to the decreased ability to raise government revenues through taxes and fees. In California, many of the revenue sources typically available to state and local governments are significantly constrained: in 1978, California voters passed Proposition 13, restricting property tax increases and requiring a two-thirds majority in both legislative houses for future increases in all state tax rates or revenue collected. In 1996, another ballot initiative, Proposition 218, further restricted the ability of the locally elected governing boards to raise revenue by changing local government finance rules and requiring approval in an election by either a majority of property owner or two-thirds of all voters to raise general taxes, assessments, and property-related fees (Sokolow 1997). While water and wastewater utilities were initially excluded from Proposition 218, California's Supreme Court, in 2006, ruled

that water rates also fall under Proposition 218. In particular, water suppliers must notify customers of any changes to water rates and allow customers an opportunity to protest such changes, further restricting water and wastewater utilities from raising rates and fees. Thus, while Proposition 13 limited taxes, Proposition 218 limited the other main source of government revenue: fees and assessments (Sokolow 1997).

State Revolving Funds

State Revolving Funds (SRFs) provide low-interest loans to develop or improve water and sanitation infrastructure in California. Infrastructure projects that are eligible for funding include: drinking water treatment upgrades, traditional municipal wastewater treatment improvements, and watershed protection projects that improve water quality (California Environmental Protection Agency n.d.). The monies for the SRFs come from federal grants and state contributions. The funds revolve based on the repayment of the capital and interest payments on outstanding loans. Currently, there are two active SRFs: the Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF).

Clean Water State Revolving Fund (CWSRF)

The CWSRF was created in 1987 as part of the Federal Water Pollution Control Act (Clean Water Act-CWA). This is a federal program that is administered by the State Water Resource Control Board. The program mainly funds projects that improve water quality, including all types of nonpoint source, watershed protection and restoration, and estuary management projects, as well as more traditional municipal wastewater systems. However, they also support water conservation, efficiency, and reuse projects as point source projects (EPA 1999).

Drinking Water State Revolving Fund (DWSRF)

The DWSRF was created in 1996 under the Safe Drinking Water Act. The purpose of this program is to provide financing mechanisms for the states to provide clean drinking water for the public. The funds are available for drinking water infrastructure improvements. The monies are distributed as low-interest loans that can be paid back in up to 20 years. The funds have been designed with emphasis on programs that work on pollution prevention as a tool and a special focus on small and disadvantage communities. The California Department of Public Health currently administers this fund.

Figure 5 depicts the total annual federal grant to California under both CWSRF and DWSRF. The big spike in 2009 is due to appropriation of monies as part of the American Recovery and Reinvestment Act (ARRA). The administrative agencies are encouraged to leverage these funds by securitizing the revenue streams and borrowing against that in order to expand the amount of funding available for borrowing for more projects (LAO 2012). The State matching fund has varied from year to year, ranging from 0-70% of the federal grants each year. Since the inception of the CWSRF, about 94% of funds have been invested in publicly-owned treatment projects, while the rest has gone toward estuary and nonpoint source projects. DWSRF funds have almost all (99%) gone to financing construction of new systems. Figure 6 shows the range of projects that have been financed through these funds in California and the percentage of monies invested in each category (EPA 2009, EPA 2010b).

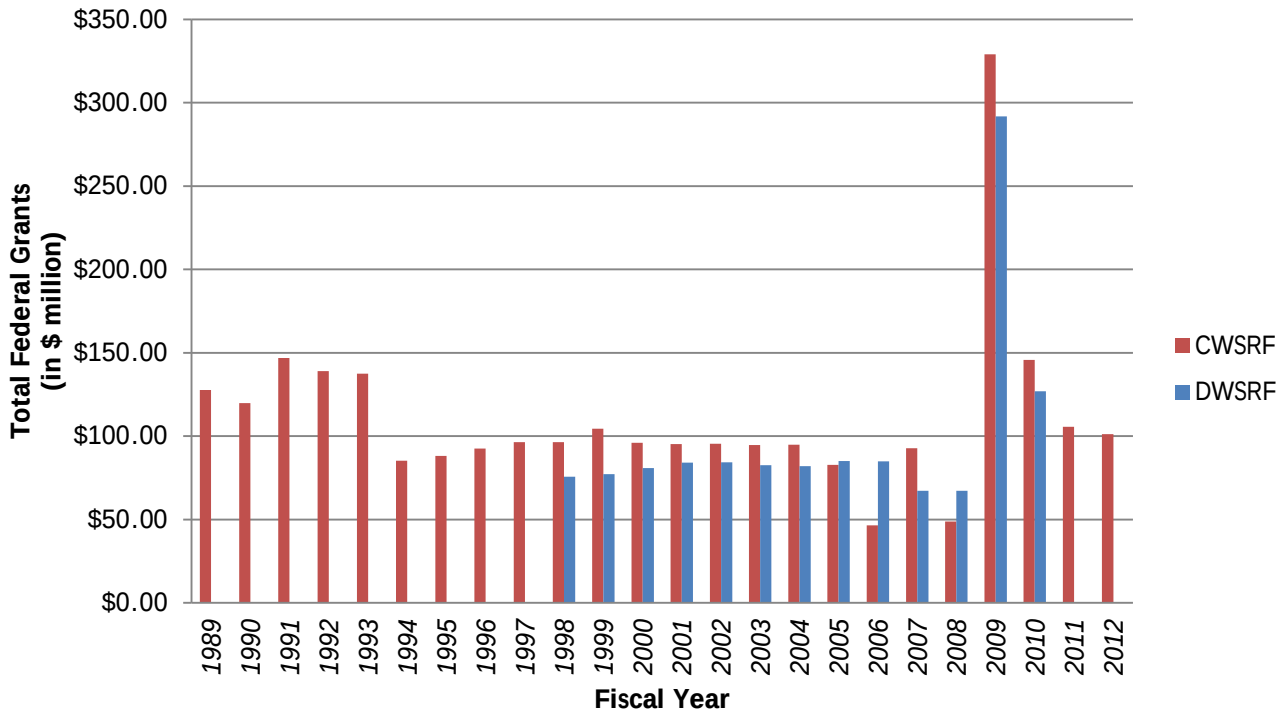

Figure 5. Total Federal Grants to California (in 2012 dollars) under both CWSRF and DWSRF.
Source: CWSRF data from (EPA 2012) and DWSRF data from (EPA 2010a).

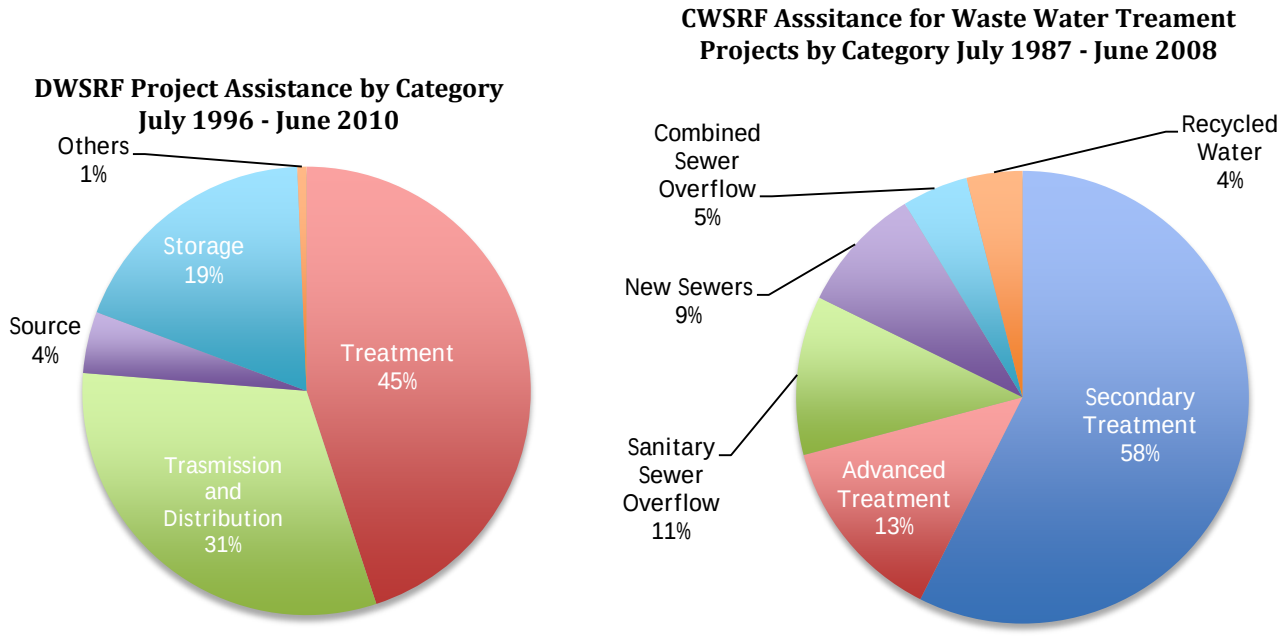

Figure 6. California's State Revolving Fund Expenditures, by Type
Source: EPA 2009, EPA 2010b

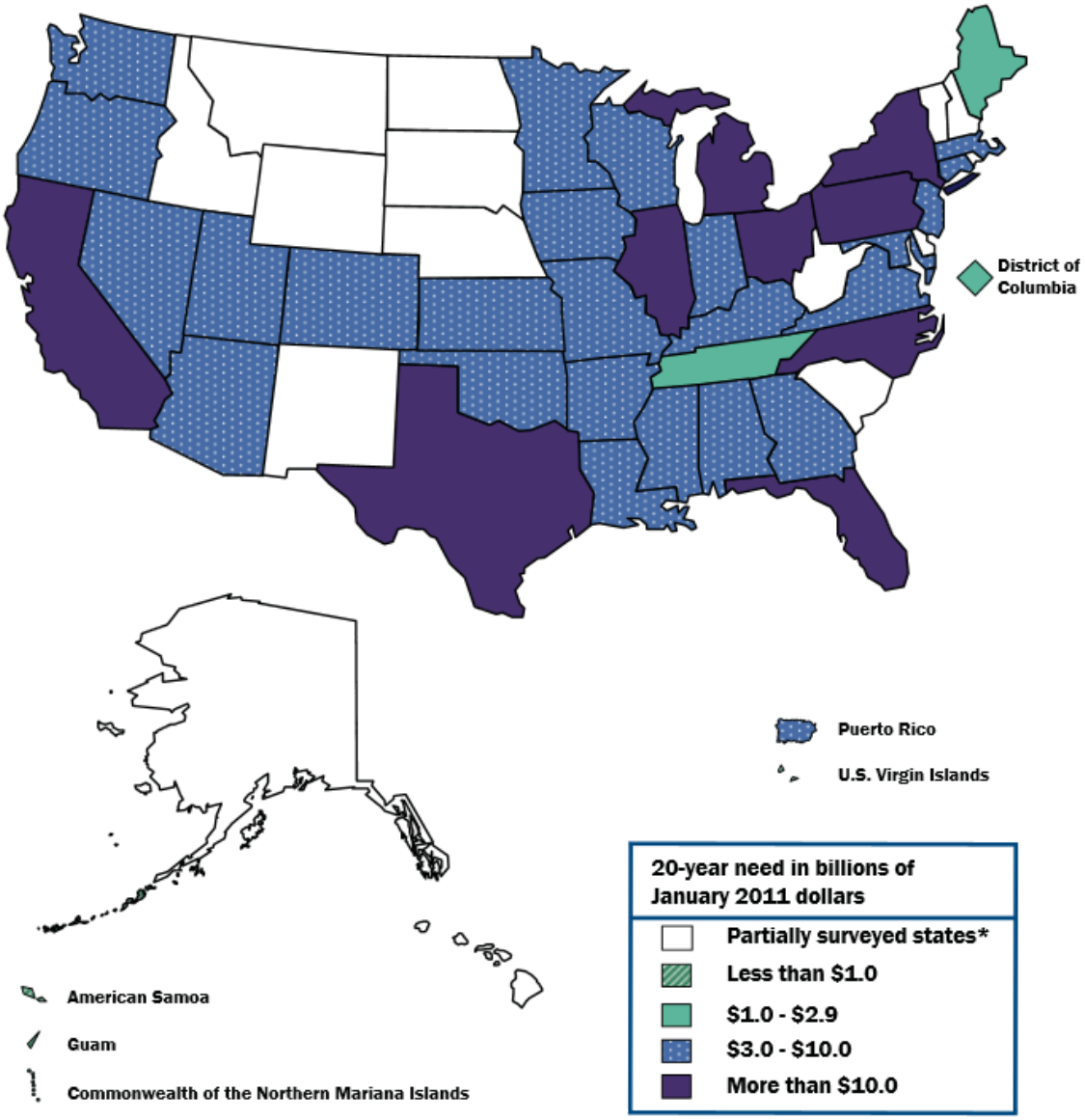

Figure 7. EPA's 2011 Drinking Water Infrastructure Needs Survey and Assessment
Source: EPA 2013

Lessons Learned

Nationally, the CWSRF program provides a strongly positive return on federal investment. Over the last 20 years, the program has financed $2.31 in projects for every dollar the federal government has invested (EPA 2008).[2] In California, the federal return on investment is $2.15 for every federal dollar invested (SWRCB 2012).

Unfortunately, the DWSRF has been mired in political problems in California. In 2013, the U.S. Environmental Protection Agency sent a notice of noncompliance to the California Department of Public Health for inadequately managing the DWSRF program, as California had spent a smaller portion of its federal money than any other state (Boxall 2013). For example, despite great need, $260 million of repaid loans had not been

[2] Return on investment (ROI) is a comparison between funds drawn from the federal treasury and total project disbursements.

earmarked for any project. Indeed, California requires $44.5 billion to fix aging water systems over the next two decades (Figure 7), according to a federal survey that placed the state at the top of a national list of water infrastructure needs (EPA 2013). Clearly, revolving fund programs can be successful, and have provided a high return on investment nationally, however, such programs must be managed well in order to make the most of federal investments.

Public-Private Partnerships

Public-private partnerships (PPPs) generally refer to the direct and formal relationship between a government entity and a private company to provide a public service. Within the PPP, the private partner may serve a range of possible roles, including designer, builder, operator, manager, and/or owner of the system. In some types of PPPs, the private partner provides a service, e.g., the operation of the system, and is paid for those services. In other cases, the private partner invests in the project in return for full or partial ownership of the system or the revenue stream generated by that system. In these cases, a PPP can allow for a mechanism to attract private investment and share some of the risks associated with a project. These private investments are generally made by a private equity firm, a venture capital firm, or an angel investor. There is also the possibility of using different types of bonds to back private financing. When a public agency or a local government is involved as a partner in a project (or possibly the final owner of the assets) and expected to purchase the water produced, an argument can be made supporting the use of public bonds with federal, state, or local tax exemptions or other subsidies to partially finance the project (NRC 2008).

Private equity investments in public infrastructure have grown considerably since the late 1990s, driven in part by shrinking public budgets, fast-track projects, and new technologies (Lokiec and Kronenberg 2001). While PPPs have been frequently used in the transportation sector, PPPs have not yet been a major source of funding for water projects. This may be changing. More recently, private equity is being considered as an option for financing nine seawater desalination projects in California (Cooley and Ajami 2012).

Lessons Learned

The challenge with PPPs is how utilities can leverage private capital to invest in projects such as efficiency and conservation projects, system operation and maintenance, systematic upgrades, and affordability. While these projects might not individually look attractive to private investors, they are essential for sustainable management of our finite resources and financial stability of the utilities. One way to address this challenge is project aggregation, in which projects are grouped together and evaluated as one single project. The collaboration between the Philadelphia Water Department (PWD) and the Natural Infrastructure Finance Laboratory (NatLab) consortium, including the Natural Resources Defense Council, The Nature Conservancy, and the investment firm EKO Asset Management Partners, to invest in green stormwater infrastructure in Philadelphia is a great demonstration of such innovative efforts. Philadelphia, along with about 800 communities nationwide, has taken steps to reduce their sewage runoff into municipal waterways under the Clean Water Act. PWD, with NatLab's help, has identified multiple ways they can leverage private investment to make implementation of green infrastructure financially viable for individual property owners. The projects considered by PWD and NatLab are mainly small scale and decentralized, which can pose a challenge for investors. To reduce upfront capital cost of these projects and attract private investment and partnership, project aggregation has been one of the innovative ideas Philadelphia

is piloting to finance their green city investments (Valderrama et al. 2013).

Public-private partnerships are evolving. In order for such partnership to be beneficial to the public, the terms and conditions, as well as risk allocation needs to be structured carefully (LAO 2012). If set up fairly and properly, private sector participation can expedite a development project, reduce costs, provide access to new source of funding, and create a risk-sharing opportunity (Hanak and Reed 2009, Valderrama et al. 2013). The success of such partnerships very much depends on how the partnership is structured and the risk is allocated. Project scale, scope, and the possible revenue streams can affect the way PPPs are structured. Designing a framework that would assist agencies and utilities of various scales, especially the smaller ones with limited capacity, on how to engage with and attract private investors and how to set up these partnerships to guarantee a desired outcome for both public and private partners, is an essential next step.

Tax Initiatives

While currently accounting for only a small proportion of water sector investments, tax initiatives can provide some revenue for water systems. As part of the Property Assessed Clean Energy (PACE) initiative, California Law (Civil Code §1102.6b and Streets and Highways Code §5898.12) authorizes local governments including cities, counties, water districts, and municipal utilities to provide upfront financing for installation of permanent water-efficiency improvements, such as recycled water connections, synthetic turf, cisterns for stormwater recovery, and permeable pavement, at residential, commercial, industrial, agricultural, or other real property. The loans are repaid over the predefined timeline (15 - 20 years) through annual property tax assessments, i.e., the property owner repays the loan through increased tax rates over the period of the loan.

California has implemented a number of PACE programs since the law went into effect. In July 2010, right after the financial meltdown in the U.S. and the housing crisis, Federal Housing Finance Agency (FHFA) ordered Fannie Mae and Freddie Mac not to underwrite mortgages for residential homes with PACE loans. This was partly motivated by the high rate of foreclosed homes nationwide and the fact that in most of the states that had an active PACE program, the PACE liens had priority over the bank that issued the mortgages and underwriters in case of a foreclosure (Speer 2010). Some local governments in California suspended their residential PACE financing programs due to the FHFA ruling. There are currently ten active and operational PACE programs across the state that provide financing options to both residential and commercial customers for energy efficiency, water conversation, and energy generation projects (PACENow 2012).

Lessons Learned

These programs are set at a local level and it is very hard to find a clear history of their success rate. Two of the largest PACE financing programs in the state include Sonoma County Energy Independence Program (SCEIP), which has been active since 2009, and the HERO Financing program, which is a public-private partnership between Renovate America and the Western Riverside Council of Governments, which has been active since 2011. Since its inception, the SCEIP program has funded 1,924 residential projects and 61 commercial projects totaling more than $64 million, of which only 2% addressed water conservation (SCEIP 2013a,b). The low investment in water conservation projects may be related to the fact that customer do not fully understand the nexus between water conservation and energy saving. According to the analysis done on Riverside County's HERO

program, it is expected that their $325 million investment in energy efficiency and generation projects will lead to 4,000 new jobs and a 15-million kilowatt-hour energy saving in the area (PR Newswire 2012).

Public Benefit Funds

California has explored other sustainable and stable sources of funding to finance water projects as well. In addition to projects that have been traditionally funded through bonds and SRFs, new investments are needed in projects such as water conservation and efficiency, nonpoint source pollution control, research and development, and monitoring and data management. In recent years, there have been several unsuccessful attempts to model a non-by-passable surcharge for water usage similar to energy to provide an additional revenue source for the water sector[3]. Here, we provide a short summary of two of the most recent of such efforts.

Senate Bill 34 (Simitian – 2011)

SB 34 – the California Water Resources Investment Act of 2011 – was introduced by Senator Joe Simitian. If passed, the bill would have created a statewide fund to finance public benefits of water-related programs and policies. Under the bill, every retail water supplier in the state would have been charged an annual fee based on (1) the volume of water it supplies to non-agricultural users and (2) the number of acres of land in its service area irrigated for agricultural purposes.[4] Fees collected from water suppliers would have pooled into the California Water Resources Investment Fund, which would have been established by the bill. Some of the proposed projects eligible for funding through the fund included:

- statewide water resources projects;
- operating expenses of the Delta Stewardship Council and the Delta Plan adopted by the Council;
- projects that reduce the impacts of mercury contamination in the Sacramento-San Joaquin Delta, and specified scientific studies and assessments; and
- debt service on general obligation bonds for projects and programs that provide statewide and interregional public benefits.

The bill proposed that monies from the California Water Resources Investment Fund be equally distributed (50/50) between statewide and regional water-related projects and programs. Allocation to regions was expected to be in proportion to the proceeds raised in each region.

SB 34 provided only the skeleton of a policy; the bill provided little-to-no information about how the fund would be administered, how "public benefits" would be determined, or how much water suppliers would be charged. According to the author (Senator Simitian), the bill was intended to be a "vehicle for discussion" (Senate Governance and Finance Committee 2011).

Senate Bill 571 (Wolk – 2011)

SB 571 – the Water Resources Investment Planning Act (introduced by Senator Lois Wolk) – would have reorganized governance and decision-making around water resources planning in the

[3] Nonbypassable means that such charges cannot be avoided by any customer or other person obligated to pay the charges.

[4] Fees for agricultural customers of California water agencies are calculated differently than fees for non-agricultural customers because a significant amount of agricultural water use is supplied by "off-the-grid" groundwater resources (i.e., not supplied by a water retailer) (LAO 2011). Not accounting for this off-the-grid water use would significantly reduce the amount of money collected by the fund. In order to account for this off-the-grid water use, the Legislative Analyst's Office (LAO) recommends that fees for agricultural water users be based not on the total volume of water that retailers supply these users, but on the total area of irrigated acreage agricultural customers of water retailers maintain.

state of California. Specifically, the bill would have: 1) established the California Water Commission as an independent government agency; 2) established regional water planning agencies; and 3) created provisions for the development and adoption of a California Water Investment Plan.

1) *Establish the California Water Commission as an independent agency*
   Under current law, the California Water Commission is managed within the Department of Water Resources. Its original purpose was to advise and make recommendations to the Director of the Department of Water Resources. SB 571 would have established the California Water Commission as an independent agency and would charge the agency with developing and implementing the California Water Investment Plan, establishing long-term funding priorities, and making decisions about allocations for water-related projects and programs.

2) *Establish regional water planning agencies*
   SB 571, if passed, would have established an unspecified number of regional water lannign agencies. The agencies were expected to be modeled after regional transportation planning agencies and would have been responsible for developing and implementing regional water investment plans.

3) *Create provisions for the development and adoption of a California Water Investment Plan*
   Under SB 571, the California Water Commission would have developed and adopted the California Water Investment Plan. The Plan would have included an estimate of available funds for water-related projects and programs, and would have established state priorities for the allocation of funding of these projects and programs. The plan was expected to be updated every five years.

Moreover, according to the author, this bill would have helped ensure sufficient funding for science, monitoring, and management needs associated with water management, which cannot be financed through state bonds. SB 571 did not include a source of revenue for state-funded water resources projects and programs. Analysis by the Senate Committee on Natural Resources and Water suggested the structure and source of funding could have been addressed by SB 34 (2011). In 2011, SB 571 was passed by the Senate Committee on Natural Resources and Water but later died in the Senate Appropriations Committee.

Lessons Learned

As discussed earlier, funding for water resources investments has traditionally stemmed from general obligation (GO) bonds and monies from the General Fund (LAO 2011); since 1996, voters have approved over $14 billion in GO bonds for water-related purposes (Senate Governance and Finance Committee 2011). But several groups, including the Legislative Analyst's Office (LAO) and the Public Policy Institute of California (PPIC) have noted the "unreliability and inappropriateness" of relying on GO bonds to fund public benefits of water-related projects and programs (Senate Governance and Finance Committee 2011.

Despite much agreement on the need for more stable funding sources for water improvements, there has been strong opposition to the idea of a state-run public benefit fund for water. Some of the opponents believe that such fees can be more effective if set up and managed locally by various water agencies or wholesalers. The "water stewardship rate" of Metropolitan Water District (MWD) of Southern California is a great demonstration of such local efforts. Since 2002 MWD has set up a fixed charge on the water rates, a "water stewardship rate," to fund their Conservation Credits Program (CCP). The CCP program started in 1988 and provides financial

support for conservation programs within MWD's member agencies (MWD 2001). Currently the program funds various rebate programs targeting directly and indirectly (through their member agencies) both residential and commercial consumers within their service area. They also support R&D and education and outreach efforts. More recently, efforts through the California Public Utilities Commission have focused on quantifying the energy savings associated with water conservation and efficiency efforts. If a clear framework can be adopted, some of the public benefit monies collected in the energy sector may be available to finance water efficiency efforts in the future.

2 Conclusions

Investment in sustainable water systems is vital to the livelihood and health of any region. Figure 8 shows California's per-capita expenditure (both capital and operational) for water and wastewater projects for 50 years (1957-2007) in 2008 dollars (de Alth and Rueben 2005, Hanak et al. 2011).[5] Per capita investment in water projects has been steadily increasing since the early 1980s, yet operating expenses have been rising even faster for water supply systems. Indeed, EPA's most recent survey of infrastructure needs ranks California at the top of the list in terms of the investments required to fix aging water systems over the next two decades (EPA 2013). This survey does not even account for the investments that will be needed

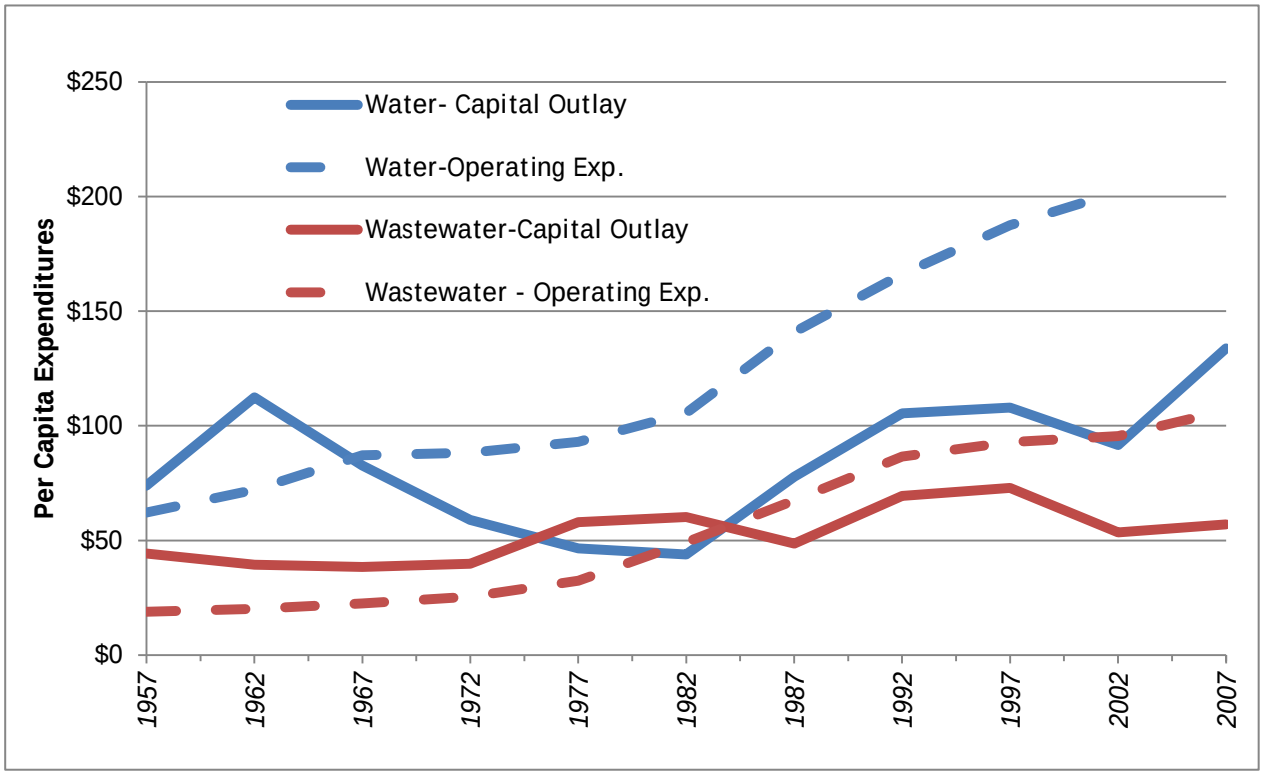

Figure 8. Per-capita Capital Investments Versus Operating Expenditures for Water and Wastewater

Source: Hanak et al. (2011)

Note: All expenditures converted to 2008 dollars.

[5] The data for this figure was provided by Ellen Hanak (Public Policy Institute of California).

to maintain and restore critical water-related environmental services.

At the same time, the state has restricted access to capital through voter-approved initiatives like Proposition 13 and 218. Meanwhile, many current water rates do not fully cover the cost of water services provided locally and statewide. Charging adequately for water services is politically difficult to implement as most water suppliers are governed by publicly elected boards who tend to resist water rate increases for fear of voter backlash (Donnelly and Christian-Smith 2013).

Consequently, in recent years California has relied heavily on bond financing which has shown to be unreliable and costly in the long run to both the state and taxpayers, as GO bonds are repaid with interest (California DWR 2013). Annual debt service for outstanding GO water bonds has increased three-fold since 2000, from about $20 annually per household to about $80 annually per household. This increase is due to a more dominant role of the GO water bonds in funding water throughout the state since 2000 (California DWR 2013).

New financing mechanisms and alternative revenue sources need to be explored for water conservation and efficiency, research and development, monitoring and data management, ongoing operation and maintenance, and upgrading failing water systems. The water sector needs a more comprehensive and stable financing portfolio. In the energy sector, conservation and efficiency programs have been funded through various energy pricing policies (e.g., decoupling mechanisms and Rate Stabilization Funds), as well as a number of larger-scale financing mechanisms, including bonds and a public goods charge (Donnelly et al. 2013). These financial mechanisms provide funding streams to support a long-term commitment to conservation and efficiency investments that does not compromise a utility's financial stability. The water sector can learn from some of these pricing policies and larger-scale financing mechanisms.

In addition, California needs to explore more innovative sources of funding to finance urgently needed water projects, such as revolving loan programs for water efficiency and conservation projects, on-bill financing, and PPPs. Innovative PPP approaches, such as aggregating multiple decentralized projects and consolidating systems and services to gain better economies of scale and scope, should be further explored. Finally, the concept of a public benefit fund for water investments would solve many of current challenges that water service providers face, as well as address some of the "externalized" costs of the current water system, including environmental degradation and pervasive nonpoint source pollution, which has become the nation's leading water quality threat. The details of such a fund would need to be clarified, and represents an area of future research.

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