

Financing Strategies and Guidelines for Funding Water Resource Projects

By David Kracman, The Flatwater Group

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As California considers implementing new water resource projects, one important part of the debate that has attracted a large amount of attention involves how to deal with the associated costs. Money and water are both finite resources, and even when everyone agrees that a project should move forward, planners and decision-makers are still faced with the problem of how to pay for it. Given the many challenges associated with finding sufficient, reliable sources for water resource financing in the future, it may be helpful to consider a few fundamental strategies and guidelines¹. Each project is unique, and there is no one-size-fits-all approach to financing that will work in every situation. Instead, the purpose of this discussion is to highlight a few activities that may be either effective or ineffective in helping to achieve sufficient project funding.

In the most basic terms, obtaining adequate funding for water resource projects involves answering two primary questions:

1. Who will pay?
2. How will payments be made?

Although seemingly simple, these two questions continue to frustrate efforts to fund critically important projects throughout California. The most clever analytical techniques and sophisticated economic models cannot change the hard fact that, for a proposed project to become a reality, someone must pay for it and determine how to make those payments over time.

Before addressing these questions, it's important to consider a few other issues in the funding process. To successfully finance a water resources project, decision-makers must know how much a project will cost in the first place – which can be particularly challenging for larger, multi-purpose projects. In turn, a good cost estimate requires a well defined project, while project features and descriptions can often still be in flux late into the planning stages. This is one of several “chicken and egg” problems inherent with project financing; while some believe an ideal funding process should occur linearly over time, in a step-by-step fashion, actual conditions often dictate an iterative approach instead. As projects become better defined, more informed cost estimates can be developed, and strategies for cost recovery can be tailored to meet those particular financial needs.

The development of cost estimates for water resources projects should, and often does, bring up another question among planners,

Cost-Benefit Analysis

Cost-benefit analysis (also called benefit-cost analysis) is a procedure used to assure that the value of the outputs exceeds the value of the inputs. Cost-benefit analysis is an evaluation technique used to aid decision makers in determining the economic worth of a project (U.S. Army Corps of Engineers, IWR Report 91-R-11).

¹ For a more comprehensive and technical discussion of many of these topics, see “DWR Economic Guidelines” (Draft), DWR Economics Analysis, December 2004.

legislators, and concerned members of the public: is the project **cost-effective**? In other words, do the results generated through project implementation justify spending the money to complete it? To answer this question, planners have traditionally turned to certain established economic procedures to compare the costs of a project with the resulting benefits. Known as **cost-benefit analysis**, this technique is used for a variety of efforts, including water resources projects, and can play a large role in the funding process. Before a decision is made to proceed with project implementation, planners may insist that the required investments will be justified by the resulting positive outcomes. Cost-benefit analysis can also be used to compare potential alternative projects and help choose the one that yields the biggest “bang for the buck”.

One of the most difficult parts of a cost-benefit analysis, and potentially with other financing steps, is the estimation of project **benefits**. Although describing the benefits of a project may appear to be simple, in practice the process can be nearly impossible. Part of the difficulty is associated with benefits that have a non-monetary component, such as habitat protection or aesthetic improvement. Although these features can be of considerable value to society, assigning dollar figures to them always involves a great deal of uncertainty, even with the use of the most advanced economic techniques.

Despite the challenges associated with determining benefits, there may be several advantages in describing benefits as thoroughly as possible. Understanding the benefits of a project is critical not just for purposes of cost-benefit analysis, but also for determining how to pay for project costs, and for accountability reasons. The projects coordinated under the CALFED Bay-Delta Program serve as a timely reminder of the importance of describing benefits. CALFED projects have recently come under increasing scrutiny for being unable to show meaningful benefits – whether in terms of money saved, fish survivability, or other metric – given the billions of dollars already spent under CALFED. Defenders of the CALFED Program argue that real, significant benefits have resulted from CALFED, and considerable efforts have been, and continue to be, made to inventory and track benefits associated with CALFED projects. Unfortunately, whether the benefits have not been effectively identified and conveyed to government officials and the general public, or because the benefits are in fact not commensurate with project costs, CALFED is under attack for not meeting expectations. Regardless of which argument is true, estimating benefits lies at the heart of CALFED’s accountability dispute.

Under the current fiscal environment, it is becoming more important to be able to show that benefits justify expenditures. As a result, there is greater incentive for project planners to invest the time and effort to adequately describe the benefits of program actions and estimate project costs. If project proponents wish to seek funding from federal or State sources, they may be more effective by presenting a defensible and comprehensive list of benefits that would result from those appropriations. Local sources also often demand to know where their taxes, fees, and other revenues are going, and what they are getting in return. In each case, using a transparent process of identifying and describing project benefits, and determining the relative balance of costs and benefits, can be beneficial in seeking adequate funding.

Who Will Pay?

Assuming that, through some form of cost-benefit analysis, it has been determined that implementing a certain water resource project is in the best interest of the State, the next step for

planners is to decide how to pay for the resulting costs. Economists have devised a technique for assigning cost responsibilities known as **cost allocation**, through which project costs are distributed across project **purposes**. The word “purpose” as used here has basically the same meaning as “benefit”, and may include categories such as recreation, flood control, and irrigation supply. Cost allocation is an incremental step in the funding process through which costs are assigned not to individuals or groups of individuals, but to the benefits of the project itself. Several methods exist for allocating costs, and special techniques are required for multipurpose projects for which certain costs are used to pay for multiple benefits, but the general goal is to divide costs equitably across project purposes (benefits).

While cost allocation moves the funding process one step closer to determining who should pay, it also can stir up a hornets nest concerning the issue of what to include in the list of benefits. For example, some may argue that certain project actions should be considered as new benefits, with repayment responsibilities falling on the parties receiving the benefits. For others, the same project actions might be considered mitigation for past harms created by another entity, and that entity should be responsible for project costs. Inherent in this disagreement is the idea of a **baseline** – another term whose definition may depend on the individual using it – used to establish a time or set of conditions from which to start counting contributions and project actions. This issue of mitigation versus enhancement has been an important part of funding discussions for fish screens, with environmental interests arguing that water users should pay for the screens as mitigation for past harms to the fish resulting from the diversions, and water users (often irrigation districts) arguing that others should pay for the improvements made to existing fish conditions. The core of the dispute, once again, concerns how to define benefits.

After cost allocation, the next step is the actual process of determining who will pay for the project costs through a technique called **cost apportionment**, also referred to as **cost-sharing**. Federal guidelines define this process as the division of costs between federal and non-federal entities. Water resources planners may need to further apportion costs between smaller groups of **beneficiaries**, depending on the type of project involved. Beneficiaries are the actual groups of people receiving benefits from the project. The general goal of cost apportionment is to connect the project benefits with the beneficiaries, and then equitably allocate the costs linked to the benefits accordingly across the beneficiaries. Beneficiaries receiving benefits from certain project components would, as a result, bear some responsibility for paying for the costs required to create those benefits. CALFED has established this concept as the “**beneficiary pays**” principle, and in its recent finance efforts developed a list of beneficiaries which include categories such as recreation users, and CVP and SWP water users².

Identifying the beneficiaries can be a difficult challenge in the water financing process, in part because of the iterative nature of the process itself, as mentioned earlier. Some projects evolve as the needs become more clear, resulting in different purposes and benefits, and correspondingly different beneficiaries. New storage reservoirs, for example, have been studied for several locations throughout the State under the Surface Storage Investigations Program, but since it is still unresolved exactly how the reservoirs would be operated and for what purposes, both benefits and beneficiaries are still unclear. In turn, potential beneficiaries have been reticent

² For more information, see “CALFED Bay-Delta Program Finance Plan”, California Bay-Delta Authority, January 2005.

to define the benefits they might receive since project operations have not been finalized. These potential beneficiaries have expressed a concern that they could be locked into repayment responsibilities, only to have project operations change in the future in a way that reduces or eliminates their anticipated benefits. Providing **assurances** to beneficiaries that projects will be operated as determined prior to implementation might help beneficiaries feel more comfortable in coming forward and helping to identify their likely benefits, but it could also reduce operational **flexibility** for projects to adapt to changing future conditions.

Through the process of cost apportionment, some costs may be assigned to the public as a whole for repayment. Historically, the State of California has used public funds to pay for a large number of water resource projects, as has been the case through the first five years of the CALFED Bay-Delta Program. However, local agencies also have played an important role in financing water projects in addition to State and federal participation. As federal and State funds allocated to water related projects have become diminished, and as local groups continue to improve their capabilities and expertise in planning and financing, the share of local financing may well increase. There has also been a growing movement to ensure that public moneys are not used to create unfair advantages for private interests, especially when those advantages come at the expense of taxpayers.

Because of the public’s expectation that public funds will be used wisely, a benefits-based approach may be more effective by focusing public investments toward actions that lead to **public benefits**. Just as the characterization of project benefits is important for cost-benefit analysis and repayment options, carefully deciding what positive outcomes from a project should be classified as public benefits can also be a central part of the water resource financing process. Traditionally, public benefits have been associated with features such as ecosystem restoration and other benefits that accrue to a diffuse set of beneficiaries and cannot be attributed to a specific set of beneficiaries. There are other situations, however, that may justify the expenditure of public funds for water resource initiatives even if benefits accrue to a specific set of beneficiaries.

The California Bay-Delta Authority, in its finance planning efforts, developed criteria to help determine when public

Public Benefits

One way that benefits can be described is based on whether they are public or private in nature. Public benefits are generally associated with public goods, which economists have defined as items such as parks, certain types of roads, and national defense, which have two common characteristics:

- 1. It is difficult for one person to prevent another from using a public good by using it for their own benefit (i.e. visiting a park does not usually prevent other people from also visiting).**
- 2. It is difficult for the producer of the public good to prevent people who have not paid for it from using it (i.e. a bird watcher can benefit from protection of a bird species, even if they don’t help pay for the protection).**

Within the water resource context, public benefits are normally associated with project purposes such as ecosystem restoration, certain types of flood protection, and aesthetic improvements. These benefits can be enjoyed by a large number of people, usually without diminishing the benefit. Since it is difficult to keep individuals from receiving the benefits without paying for them, public goods and their benefits are often paid for using public funds, such as tax revenues.

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funds should be used to pay for projects under the CALFED Bay-Delta Program³. The list of conditions for spending public money included the following situations:

1. Program actions are expected to yield significant, but very diffuse, benefits that cannot be easily associated with specific user groups.
2. Program actions generate public goods such as environmental protection and enhancement, advancement of scientific understanding, and basic research.
3. Program actions catalyze local investment in new water management approaches and technology.

These three criteria serve as useful guidelines for identifying additional conditions when it may be appropriate to include the public as a beneficiary. As mentioned earlier, under a benefits-based approach it is difficult to assign costs for project features that result in benefits that are not easily linked to particular groups. For those types of projects, the general public has been a key contributor. Environmental, scientific, and research-oriented projects provide a variety of benefits, and all people within the State can potentially gain from those actions. In addition, innovative projects used to develop new technologies and improved methods have also received public funds in the past. There may be other scenarios outside of the three listed above that justify public expenditures for benefits not enjoyed by the larger public, as will be discussed later, but in general, using public funds primarily for water resources projects that benefit the overall public may serve as a useful guideline.

Another factor in determining who should pay for water project costs concerns the economic resources of the beneficiaries. There may be situations where a beneficiary's ability to pay becomes a factor in water financing decisions, and certain groups with particular financial needs may require assistance. The term **equity** is often used in economics to describe the level of fairness in which taxes impact people with similar ability to pay (horizontal equity) and different ability to pay (vertical equity) capabilities. With respect to water resource financing, equity can be described as the condition where beneficiaries with a greater ability to pay may be required to make a larger contribution to cost repayment than beneficiaries with a smaller ability to pay, given a certain increment of benefit. Under an **equitable** arrangement, a financially healthy city might be expected to pay for the full cost of a 1 million gallon per day (MGD) water treatment plant, while a disadvantaged community might be assigned a fraction of full cost for an identical 1 MGD plant. It may be necessary to turn to the general public to pay for the cost increment above the beneficiary's ability-to-pay, if it is determined that the need is great enough to justify doing so.

Related to the idea of equity is the concept of **Environmental Justice**. The U.S. Environmental Protection Agency has defined Environmental Justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies". To fulfill the principles of Environmental Justice, projects need to be structured so that benefits are not distributed unfairly to one group over another. For instance, if a project generates flood control benefits for residential areas, lower-income families should be protected in the same way as higher-income families under these principles. Because of the tenets of

³ California Bay-Delta Authority, "Draft Finance Options Report", May 2004.

equity, this may require public funds, contributions from other project beneficiaries willing to pay more than their share of costs in order to enjoy the benefits of the project, or other sources in order to make up for any ability-to-pay deficiencies.

There are two particular groups in California for which equity and Environmental Justice principles may apply in making water resource financing decisions:

1. Disadvantaged communities
2. Tribal governments

For both disadvantaged communities and tribal governments, special considerations may be necessary in determining ways to fund water resource projects. For both groups, State funding may be needed in order to maintain equity in the development of water resources in California. While programs currently exist through which these groups can obtain public water project funds, such as DWR's Water Use Efficiency Program and the Drinking Water State Revolving Fund, greater effort may be required to ensure that all communities throughout the State are receiving safe and reliable water delivery, water quality, and other water-related services. New targeted programs that focus on these groups may allow for greater access to public funding.

Besides allowing for better access to State funds, these groups may require protection from the impacts of project implementation. Because disadvantaged communities are often located in close proximity to existing and proposed infrastructure projects, they have at times been forced to bear indirect costs of implementation. State and local agencies should work to ensure that these groups are not unfairly treated when decisions are made on project location and configuration. Considerable efforts should be made to minimize the physical, economic, and social disruptions that can result from new water resource projects. Just as many environmental benefits are difficult to quantify in economic terms, the costs associated with community impacts can also be difficult to measure, but that does not diminish the importance of preventing vulnerable groups from suffering unjustly for the benefit of others.

How Will Payments be Made?

Unfortunately for decision-makers, the financing process does not end after it is determined who will pay for the costs. A long list of mechanisms exists for cost recovery, each with its own set of advantages and disadvantages, with the effectiveness of each dependant on the type of water resources initiative involved. Instead of attempting to inventory as many of these techniques as possible, it may be useful to highlight a small number, while discussing a few general ideas related to the payment process. There are many references available which describe these and other methods in greater detail⁴.

Perhaps the most basic, and one of the most important, features of a funding mechanism concerns at what time payments will be made. Methods that require funding in the short term are known as **pay-as-you-go** options, while those that delay repayment in exchange for greater interest charges fall under the **debt financing** category. Using State appropriations, which are determined by the Legislature each year, is an example of pay-as-you-go financing, while the use

⁴ See in particular "Maintaining Momentum on California Water Issues: Business Leaders' Findings – Financing Options for Water-Related Infrastructure in California", California Business Roundtable, California Chamber of Commerce, California Farm Bureau Federation, California Manufacturers Association, May 1996.

of general obligation (GO) bonds, which are often paid off over several decades, is a form of debt financing. Pay-as-you-go financing is generally viewed as the more fiscally responsible alternative, as interest payments in the future are reduced or eliminated. Debt financing, however, can reduce the uncertainties associated with year-to-year funding sources, and can allow future beneficiaries the opportunity to share in the repayment instead of lumping all cost responsibilities on the present.

Whether repayment occurs through pay-as-you-go or debt financing methods, and despite the many uncertainties associated with water project financing, one thing is certain in California – there is a strong need today for reliable, long-term funding sources. Although public funding from the State has paid for a large amount of project costs in the past, the current scarcity and variability of public funds indicate the need for alternative sources. General obligation bonds can serve as useful tools for funding projects with widespread, public benefits, but over-reliance on GO Bonds can lead to degradation of the State’s credit rating, unfair subsidization of private groups, and higher repayment costs for taxpayers in the future. State appropriations also have a role in financing water resource projects that benefit the general public, but authorization requirements and the large degree of variability and uncertainty in year-to-year funding also suggest that alternative sources should be considered.

Identifying new funding sources may require looking more closely at financing tools such as revenue bonds, which link repayment with future project revenues and have provided a source of funding for the State Water Project for over four decades. This type of financing method also adheres to a benefits-based approach, since the project beneficiaries contribute to project funding using the direct revenues obtained from the operation of the project itself. User fees of some form may also be a potential alternative, assessing charges based on the quantity of water diverted, the magnitude of retail water sales, using a fixed monthly fee, or by other methods. The CALFED Bay-Delta Program has been evaluating various forms of user fees since it was directed to do so by the 2000 CALFED Record of Decision (ROD), and work continues under the oversight of the new California Bay-Delta Authority. Some legislators have expressed a concern that these fees might be crafted more as a tax than a targeted fee, and any proposed user fee would have to be carefully designed to conform to the beneficiary-pays principle. Local agencies could also continue to see increasing financial responsibilities as decision makers attempt to limit public fund expenditures.

A long-term funding source could also be used to help local agencies pay for the costs associated with developing Integrated Resource Plans. The State of Texas provides state funding for 100 percent of direct planning costs for its Regional Water Plans through a special grant program administered by the Texas Water Development Board. About \$20 million was awarded to the local agencies in state appropriations through this grant program to fund the first round of planning, which was completed in January of 2002. In turn, the participating agencies pay for all of the administrative costs associated with the plans. California could establish a similar program, funded through state appropriations or other sources, to help provide consistent state financial assistance for IRP development.

Beyond traditional funding sources and mechanisms, more unconventional strategies could also be used to harness the advantages created through certain forms of water resource partnerships⁵. A few examples of partnering arrangements include the following:

- Infrastructure-for-Water Transfers
- JPA Bond Pool Arrangements
- Public/Private Partnerships

An **infrastructure-for-water transfer** is a type of financing partnership where one agency transfers a portion of its water supply for new infrastructure improvements that are paid for by another organization. One prominent example of infrastructure-for-water transfers in California took place between Metropolitan Water District of Southern California (MWD) and the Imperial Irrigation District (IID), resulting in canal lining, on-farm management improvements, and other conservation measures in exchange for 106,000 acre-feet of annual supplies for MWD. These improvements often result in increased water efficiency for the group transferring its water, reducing or eliminating the need to seek replacement supplies. The increased efficiency can also limit damaging third-party impacts that can occur when water transfers reduce economic activity in the area of origin. The net result is new water supplies for the group funding the infrastructure work, and improved facilities and higher efficiencies for the agency transferring its water – all potentially without the need for public funds. Infrastructure-for-water transfers can be difficult to arrange because of the institutional and legal requirements that must be followed, but the dividends of completing a transfer can potentially justify the effort.

Joint Powers Authorities are arrangements where two or more agencies come together to share common responsibilities and utilize the coordination and management advantages inherent in JPAs. One particular advantage of a JPA is its ability to pool a number of separate smaller-scale bond offerings into a single financial instrument, resulting in smaller debt issuance costs and greater credit standing in the municipal bond market. **JPA bond pool arrangements** enable smaller agencies to gain access to debt financing that may otherwise be too costly or unavailable for smaller capital projects. One example of a JPA bond pool arrangement is the Financing Authority for Resource Efficiency of California (FARECal), which has helped finance water and electricity projects for cities, water districts, irrigation districts, and municipal utility districts throughout California. The benefits of bond pooling through JPAs must be weighed against the loss in local financing control and flexibility that is necessary to form a pool and the potential for credit erosion if too many high-risk participants join the JPA bond pool. In addition, a 1998 interpretation of State law⁶ by the California Attorney General set limits on how JPA bond pools could be established and managed, which has removed the ability of some pools, including the California Water Reuse Finance Authority, to take on new borrowers or finance additional debt. JPA bond pools may, however, still be created, as long as all participating borrowers are identified before the establishment of the JPA, and other requirements are met.

Another potential form of financing partnership that could be useful for water resource investments involves the use of the private sector to finance, design, construct, and/or operate a

⁵ For further information, see “Maintaining Momentum on California Water Issues: Business Leaders’ Findings”, May 1996.

⁶ California Attorney General Opinion No. 98-807, November 18, 1998.

public service facility⁷. The use of **public/private partnerships** has become more controversial in recent years, particularly following the California energy crisis and with the ongoing litigation over Stockton's wastewater management, but there could still be potential to use adequately regulated forms of private sector participation to help finance water projects. The most widely identified advantages of public/private partnerships is greater efficiency brought about by competitive market forces and the incentive to innovate business practices. Private sector groups have also been shown to establish lower operating costs than public systems, and can provide more accessible financing for local agencies. Although many factors have been identified as the cause of the Californian energy crisis, the fallout from the event suggests the need for strong regulatory oversight with public/private partnerships. In addition, the fact that many forms of public/private partnerships exist with varying levels of private sector participation shows that there may be potential for smaller-scale private involvement, such as using developer financing to allow private sector financial assistance while maintaining public management and oversight.

Final Thoughts

Beyond the step-by-step procedures involved with water project financing, there are some broad-perspective, policy-related issues that are also important for decision-makers to consider when developing funding strategies.

One aspect of financing decisions to consider is how to balance fiscal and institutional realities against proposals to change and improve conditions in the future. For example, current State water law includes several instances where State and local cost share levels for water resource projects are explicitly identified. A thorough finance investigation might, however, suggest that a different cost share split would more equitably and accurately link benefits and costs to beneficiaries in a beneficiary-pays approach. Similarly, funding investigations may identify large cost requirements that, even with the resulting benefits, could be very difficult to justify given current fiscal conditions. Decision-makers may be forced to choose whether to suggest changes to the legal framework and funding targets that may require new funding sources, or whether the existing framework and fiscal realities should serve as rigid constraints in their funding analyses. On one hand, suggesting changes to current policies could result in attacks that the planners failed to consider actual conditions in their investigation, and as a result ignored the "real world" in the process. On the other hand, by only considering current conditions and existing law, planners may be accused of not thinking "outside-the-box," lacking innovative and creative ideas, and failing to be proactive in seeking out additional funding sources.

Another factor is the use of **transparency** in the financing process. In a transparent process, negotiations can take place in a way that may help minimize or prevent the potential for back-door deals and surprise tactics. Transparency involves direct access to the funding discussions by the public, and ensures that all the participating parties are known and held accountable for their actions. While there may be points during the development of a financing strategy where ongoing negotiations require that certain funding discussions take place outside of the public arena, transparency requires that these instances be limited and only allowed when absolutely necessary, and that before any financing decisions are finalized, all allocation and cost sharing arrangements are known and understood.

⁷ This definition is taken from Beecher, J.A., Mann, P.C., & Stanford, J.D., "Meeting Water Utility Revenue Requirements: Financing and Ratemaking Alternatives" (The National Regulatory Research Institute), 1993.

In the same way that transparency may help with the funding process, **clarity** can also play a key role, by identifying the limitations of the plan or strategy developed and expressing how far along the financing activities have come. Finance plans that are in an early stage should clearly be identified as such, since these preliminary efforts often contain gross assumptions and placeholders that could be very different from what is in the final form. Being clear about a plan's degree of completion, particularly in a transparent process, may help reduce the chance that early benefit and cost information is misused and misinterpreted – even though that possibility cannot be eliminated. It is almost inevitable that some preliminary number will be pulled out and used by an interest group to make a particular argument, but being explicit about the number's preliminary status can reduce the significance of these occurrences. Being clear about the intent and limitations of a funding strategy can help ensure that the plan is used and evaluated as intended. For financing efforts aimed at developing a framework that is a tool, and not an end, to be used by policy-makers in making funding decisions, making this fact clear may reduce the chance for misunderstandings. For more finalized finance plans that serve as a more rigid directive for distributing costs and benefits, it will also be beneficial for everyone to understand the plan's scope and intent. In these and other ways, clarity can be a vital and effective part of successfully funding water resource projects.

There is no single strategy for successfully financing water resource projects. There are, however, some lessons that can be learned from the past, and guidelines that may be useful in making effective future decisions. Given the importance of water to the State of California, the large-scale infrastructure projects now being evaluated, and current fiscal conditions, it will be especially important for decision-makers to consider these factors in the years ahead.

