

## FRAMEWORK FOR ANALYSIS

This Framework for Analysis (Framework) is intended to form the basis of the research and analytical process for the Avoided Costs project. The intent of this Framework is not to limit the scope of research or analysis, but to provide guidance regarding the goals and ultimate deliverables of the Avoided Cost Project.

### Background

The Council was created by the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), first signed in 1991 by a group of urban water suppliers, environmental interest groups, and other interested parties. Water suppliers signing the MOU agree to develop and implement comprehensive conservation Best Management Practices (BMPs) using sound economic criteria. Since 1991 over 170 urban water suppliers across California have signed the MOU.

The BMPs and the criteria for their implementation are contained in the MOU, a copy of which is available through the Council's website ([www.cuwcc.org](http://www.cuwcc.org)). There are currently 14 BMPs addressing residential, commercial, industrial, landscape, system loss and leak detection, education, public information, and pricing conservation practices. Not all signatories are expected to implement all BMPs. Wholesale water suppliers, for example, are not expected to implement BMPs requiring direct end-user interventions. Similarly, retail water suppliers are not expected to implement BMP 10, which is specific to wholesalers.

Signatory water suppliers are expected to implement an applicable BMP only when it is cost-effective to do so. For purposes of the MOU, cost-effective BMP implementation means that the present value of expected benefits (including water and wastewater utility avoided costs and environmental benefits or avoided environmental costs) from implementation equal or exceed the present value of expected implementation costs. Exhibit 3 of the MOU provides the governing language for determining whether a BMP is cost-effective to implement.

Exhibit 3 of the MOU also gives the Council the task of "developing guidelines that will be used by all water suppliers in computing BMP benefits and costs." In 1996, the Council adopted its "Guidelines for Preparing Cost-Effectiveness Analyses of Urban Water Conservation Best Management Practices." These guidelines provide a general analytic framework from which to assess BMP benefits and costs, guidance on analysis time horizons, use of discounting and selection of discount rates, perspectives of analysis, use of sensitivity analysis, and a cursory treatment of certain avoided costs. In July, 2000, the Council published its *BMP Costs and Savings Study*, a reference document summarizing the best available estimates of BMP-related program costs and water savings.

### Purpose

The guidelines developed in 1996 do not address utility avoided cost calculations in detail or provide water suppliers with the theoretical underpinnings and practical methods for making such calculations. Likewise for environmental benefits and costs. The Council is now seeking to extend the coverage of its guidelines to directly address questions regarding estimation of BMP-related avoided utility costs and environmental benefits and costs.

The California Urban Water Conservation Council is sponsoring this project to conduct research and provide guidance on methods to estimate avoided water and wastewater utility operating and capital costs of production, transport, storage, water treatment, wastewater treatment, water supply distribution, and wastewater collection associated with implementation of urban water conservation Best Management Practices (BMPs), as specified in the *Memorandum of Understanding Regarding Urban Water Conservation in California*, as amended (MOU). Such methods must be theoretically sound but capable of implementation by both small and large water and wastewater utilities in California.

The following is a partial list of guidelines for development of the Methodology and Model:

- a) *Define accounting perspective (e.g. utility, society) and develop a model to evaluate from multiple perspectives.* The most important accounting perspective for this project is that of the utility, with and without cost-sharing with other program beneficiaries that may be other agencies or institutions, and societal. This approach shall follow the approach defined in the *Urban MOU*. The model shall also consider the consumer perspective to help evaluate where consumer and societal perspectives diverge, and determine what incentives might be required for widespread implementation.
- b) *Provide a common set of definitions and terminology to be used for this type of analysis in the industry.*
- c) *Make the underlying assumptions transparent to the degree possible to limit controversy.*
- d) *Focus on what can be quantified and the range of values.* Use scenarios and sensitivity analyses to narrow the range of issues that have an actual impact on the outcome.
- e) *Develop a hierarchy of uncertainty about data, models, assumptions and forecasts.* The dimensions of uncertainty include:
  - Physical measures, both of quantities and impacts
  - Economic measures of values and costs
  - Forecasted outcomes including temporal variability
  - Political and legal issues
- f) *Describe how the avoided cost analysis and model fits into the BMP planning evaluation process, and an integrated resource planning (IRP) process.*
- g) *Develop a usable guidebook and identified data sources that can be updated readily.*
- h) *Prepare training sessions:* Consider the gains from education to allow more complexity versus simplicity of use as a stand-alone tool.
- i) *Make data input easy.* Clearly identify what data is required and where it might be acquired most easily by a water agency. Develop input data templates, and prepare data defaults, preferably with “red flag” data boundaries that identify when further analysis may be required on the data being used.

## Process

In consultation with the PAC, A & N will finalize the project **Workplan**. At this stage, A&N will present the conceptual framework developed in the AwwaRF project, a draft list to identify and prioritize key issues in direct utility avoided cost estimation, and conduct a conference call with the PAC as to the perceived importance of these issues. After the draft project deliverables have been presented to the PAC, A&N will follow-up with another conference call with the PAC to see determine if clarification on key issues is necessary or if the PAC's priorities have changed.

The BMP avoided cost analysis shall focus on identifying when a BMP is NOT cost effective to implement since the "default" action is to implement the BMP. If a utility can demonstrate a BMP is not cost-effective as specified in the MOU, then the utility is not required to implement that BMP.

Based upon work in the AwwaRF research project, A&N will present a proposed conceptual framework (**Methodology**) for calculating direct utility avoided costs in an integrated resources management approach. A common accounting framework—based upon prior CUWCC experience and precedence—will be provided to assist utilities in identifying the data sources that are available to them, both internally and externally. A&N will produce a compilation of data resources that are available at the regional and state level that utilities can use for inputs. This common accounting framework will be broad and will include the perspectives required by the Council. These include:

- Societal or total resource cost;
- Utility or agency cost with and without cost-sharing as defined in Section 4.5(a) of the *MOU*; and
- Consumer costs.

The first perspective determines the social desirability of BMP implementation. The utility perspective determines the level of rational utility investment. The customer perspective informs design of incentives to encourage customer BMP adoption. The positive difference between any of the first and the latter two represent excess societal value that is available to subsidize utility investment or consumer adoption decisions.

In using the **Model**, the utility will need to identify the water resources being relied on by watershed, and the conveyance facilities shown from the watershed to point of entry for the utility. The utility will also need to identify the distribution and water treatment facilities as well as the wastewater discharge receiving watershed. For each utility, the annual estimate of the percentage of purchases from each watershed shall be identified, and ranked by which are the most likely marginal or incremental resources.

- Estimating environmental benefits requires identification of the supply and infrastructure investments that would be deferred and/or downsized due to conservation, while estimating environmental benefits associated with actual operations requires specification of the marginal supply source that will meet demand at different times and under different conditions. *These cannot be quantified without first identifying how the temporal pattern and geographic distribution of water supplies is modified by implementation of the BMPs.*
- To the extent that the avoided capital costs of a particular supply project already include some environmental mitigation costs, it might well be double counting to also include avoided environmental costs associated with not having to develop

that supply project. The Methodology and Model will carefully delineate this issue.

The data and **data sources** needed to apply the Methodology would be identified and discussed as well as the development of component estimates. Uncertainty problems with such estimates would be addressed and areas in particular need of additional data or estimation would be identified.

A&N shall implement the Model developed in Task 5 in a spreadsheet format referencing the data sources listed in Task 4. The Model shall have a user-interface that allows for easy input and reading of output by utility staff. To the extent possible, A&N shall identify data sources for common or “default” assumptions about cost components, such as the cost of deliveries from the State Water Project, and utility energy rates. The Model shall incorporate these default values, but must be able to accommodate modifications to those values. The user guide also shall describe the appropriate methods for changing these values. The estimated environmental benefits shall be ranked by confidence in the estimates of effects and values, and the initial range of values included. The model shall report these ranges in a manner that can be incorporated into the integrated analysis.

In consultation with the PAC, A&N shall establish a set of priorities to guide utilities and agencies in determining which values should be revised with utility-specific information based on:

- (1) the importance of a value in the avoided cost calculation and
- (2) the variability among utilities for those values.

The direct utility avoided cost and environmental benefits models shall be integrated to produce a single avoided cost range output. The cost of the BMP shall be screened against the aggregate range of avoided costs and environmental benefits for the relevant range of the resource portfolio as reported by the integrated model. The decision criteria incorporated into the model shall use the following logic:

- If the cost of the BMP is less than the lower bound of the avoided costs ( $AC_L$ ) without considering the added environmental benefits, then the BMP must be implemented:  $BMP < AC_L$
- If the cost of the BMP minus the lower bound of the environmental benefits for the BMP ( $EB_L$ ) is less than the lower bound of the avoided costs ( $AC_L$ ), then the BMP must be implemented:  $BMP - EB_L < AC_L$
- If the cost of the BMP minus the upper bound of the environmental benefits for the BMP ( $EB_H$ ) is greater than the upper bound of the avoided costs ( $AC_H$ ), then the BMP is not required to be implemented:  $BMP - EB_H > AC_H$
- If the cost of the BMP minus the range of environmental benefits falls within the range of the avoided costs, then model shall identify the amount of overlap of the two ranges to assist the analyst and stakeholders in determining what action to take.

For this final criterion, the model shall calculate the value of added information to the utility system of narrowing the range of uncertainty about avoided costs and/or environmental benefits, and this value of added information should be used to determine if further study can cost-effectively narrow that range. The BMP will be selected for implementation or rejection based on the decision criteria specified in the *MOU*.