RECLANATION Managing Water in the West

Executive Summary

Water and Energy Efficiency Program for Commercial, Industrial, and Institutional Customer Classes in Southern California

Volume 1 of 5





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Executive Summary

Water and Energy Efficiency Program for Commercial, Industrial, and Institutional Customer Classes in Southern California

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Project Advisory Committee

Reclamation worked with a Project Advisory Committee (PAC) to obtain guidance and feedback on designing and undertaking the Water and Energy Efficiency Program (WEEP) Study. PAC members consisted of representatives from water districts, energy utilities, wastewater sanitation districts, an academic institution, and federal, state and local agencies in southern California.

Reclamation would like to thank all PAC members for participating in this effort and contributing many ideas that shaped the results of the study. Special thanks to Meena Westford, former Reclamation Southern California Area Office Planning Officer, for her guidance, leadership, and vision.

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1.0 Overview of the Water and Energy Efficiency Program (WEEP) Study

1.1 Purpose and Scope

For many years, water districts and energy utilities in southern California have independently promoted water efficiency or energy efficiency within the broad categories of commercial, industrial, and institutional (CII) customers. Although these programs have been relatively successful, current regional water and energy projections indicate there is an urgent need to address water and energy efficiency in an integrated manner. Such an approach would allow water districts and energy utilities to take advantage of opportunities to leverage their limited resources and coordinate resource management efforts to meet future needs.

As a major water provider for southern California, Reclamation, in partnership with the California Energy Commission (CEC) and the Metropolitan Water District of Southern California (MWD), commissioned an innovative study in 2007 to bring together energy utilities, water districts, wastewater sanitation districts, and state and local agencies to study the potential for integrated water and energy efficiency programs.

The study accomplished the following:

- Identified and selected CII customer classes to target for participation in water and energy efficiency programs in southern California.
- Summarized savings potentials for CII customer classes targeted for participation in water and energy efficiency programs.
- Developed guidelines and tools for undertaking integrated audits to identify water and energy efficiency improvements and recommend opportunities for enhancing practices at CII customer sites.
- Identified marketing and outreach practices that are best suited for promoting water and energy efficiency in southern California.
- Developed a sample method for evaluating the costs and benefits associated with water and energy efficiency improvements.

• Identified potential barriers to an integrated water and energy efficiency program, and the types of incentives and recommendations needed to successfully implement integrated programs in southern California.

1.2 Report Organization

The results of the study are presented in a five-volume report called the *Water and Energy Efficiency Program for Commercial, Industrial, and Institutional Customer Classes in Southern California.*

Volume 1, Executive Summary, presents the conclusions of the WEEP Study, recommendations, and executive summaries covering each of the five volumes of the report. A compact disc is included with this Volume. It contains the electronic versions of Volumes 1 - 5 and an Excel spreadsheet for calculating cost-benefit analyses and tracking gains in water and energy efficiency by CII customers.

Volume 2, Cataloguing Commercial, Industrial, and Institutional Customer Classes, summarizes data on regional water and energy use and savings. It covers the identification and selection of CII customer classes targeted for water and energy efficiency programs, presents information about their potential water and energy savings, and outlines an analytical framework for evaluating the financial impacts of water and energy efficiency incentives.

Volume 3, Water and Energy Efficiency Audit Field Guidance Document, provides guidance for conducting audits to identify potential water and energy efficiency opportunities. It gives examples of audit notification letters, an audit report format, and checklists for evaluating water and energy efficiency improvements associated with equipment and operational practices at CII customer sites.

Volume 4, Water and Energy Efficiency Marketing and Outreach Practices Review, summarizes a review of integrated marketing and outreach practices implemented by energy utilities and water districts in southern California. It also identifies practices best suited for promoting water and energy efficiency programs and includes a number of recommendations for developing more robust marketing approaches.

Volume 5, Barriers and Incentives Analysis, presents proposed incentives and other recommended actions to address barriers to implementing integrated water and energy efficiency programs in southern California.

2.0 WEEP Study Conclusions and Recommendations

The conclusions and recommendations reported here are a consensus of the PAC and southern California area stakeholders. They represent a combined effort to identify successful water and energy efficiency components that may be implemented by local water districts and energy utilities.

2.1 Increases in Water and Energy Efficiency in Southern California can be Fostered through Integrated Resource Management Programs

The WEEP Study confirmed that integrated resource management programs can foster gains in water and energy efficiency among targeted CII customer classes in southern California. This conclusion is based on the following:

- The savings potentials extracted from the literature for CII customer classes targeted for participation in an integrated resource management program include a broad range of opportunities for reducing water and energy demands.
- Observations made during audits of CII customer sites suggest that there are many opportunities for enhancing water and energy efficiency.
- CII customers confirmed there are opportunities for reducing water and energy demands and advocated the implementation of audits to help identify improvement opportunities.

2.2 Integrated Water and Energy Efficiency Programs Require Coordinated Management Efforts and Partnerships

Successfully implementing water and energy efficiency programs will require increased coordination among water districts, energy utilities, and wastewater sanitation districts. Partnerships are recommended to:

• Establish systems to gather comparable usage data for CII customer classes targeted for program participation. Water districts, energy utilities, and wastewater sanitation districts define CII customers differently. Evaluating water, wastewater, and energy savings on a comparable basis requires a common approach for defining customers and

recording usage data. Based on the data processing efforts undertaken during this study, an approach was developed for consideration by water districts, energy utilities, and wastewater sanitation districts. This approach identifies CII customer classes on the basis of three-digit North American Industry Classification System (NAICS) codes and aligns these customer categories with usage or metering data.

- Conduct audits to assess opportunities to increase water and energy efficiency and report the costs and benefits in a consistent manner.

 Energy utilities and water districts in southern California are in the early stages of conducting integrated water and energy efficiency audits.

 Integrated audits were deemed an important next step by PAC members and CII customers. These types of audits serve a number of purposes including the identification of efficiency options, the transfer of water and energy rebate information to CII customers, and communication of the benefits associated with integrated resource management.
- Engage in joint marketing and outreach activities targeted at CII customer classes. A review of energy and water marketing and outreach activities identified practices that should be developed to more effectively promote water and energy efficiency in southern California. Targeting these practices at CII customers will help raise awareness about the range of options available to reduce resource demands.
- Coordinate administration of water and energy rebates. CII customers report that they would prefer an integrated approach to rebate management instead of submitting forms to several agencies. PAC members are aware of this request, understand the concerns, and identified several examples where integrated water and energy rebate management was successfully undertaken and can be further implemented in southern California.

2.3 Integrated Water and Energy Incentives as a Way to Increase Participation in Water and Energy Efficiency Programs

PAC members and CII customers provided feedback on the types of incentives with the greatest potential for success to encourage water and energy efficiency improvements. An integrated set of incentives and recommendations was identified to increase participation in water and energy efficiency programs. These include the following:

 Building customer-level water and energy efficiency expertise to facilitate understanding of the range of rebates available to support upgrade projects, the technical aspects characterizing water and energy efficiency improvements, and the financial returns associated with increased efficiency.

- Offering technical assistance to address customer time management and cost-of-labor constraints associated with undertaking engineering analyses and administrative tasks to implement water and energy efficiency projects.
- Selectively enhancing the value of rebates to motivate CII customers to implement water and energy efficiency projects.
- Making it easy for CII customers to participate in water and energy
 efficiency activities through customized incentives that address financial
 constraints, management approvals, and regulatory requirements.
- Publically recognizing and rewarding customers who implement measures for water and energy efficiency.

2.4 The Financial Attractiveness of Water and Energy Efficiency Projects Increases when all Resource Savings are Included in Cost-Benefit Analyses

Through a series of examples, the WEEP Study affirmed that when all available resource savings and incentives are included in cost-benefits analyses, the attractiveness of water and energy efficiency projects increases. This conclusion was based on the following:

- Payback periods for large-scale water and energy efficiency projects decrease when water and energy incentives are bundled for CII customers.
- As the cost of imported water increases, the greater the potential for financial returns to the customer in implementing efficiency measures.
- Combining water and energy rebates for sprinklers, pH conductivity controllers, and kitchen equipment upgrades, for example, influences the outcome of a project's cost-benefit analysis.

2.5 Several Mechanisms Exist to Fund Future Water and Energy Efficiency Programs

To successfully implement future water and energy efficiency programs in southern California, a number of activities will need to be funded. These include developing training programs, planning and implementing marketing and

outreach activities, conducting audits, and financing rebates and other incentives. To fund these activities, consideration should be given to the following:

- Adopting tiered water rate structures for CII and/or increasing the cost of water to generate revenue for financial incentives and rebates.
- Applying for funding from all sources to finance process improvements to help reduce water and energy demands.
- Applying for funding from all sources to develop training materials and/or the establishment of a directory of information.
- Engaging in dialogue to further discussions about including water in energy utility cost-effectiveness calculations to fund water efficiency rebates and incentives.
- Accessing engineering staff resources within energy utilities to assist CII
 customers in understanding the technical features characterizing water and
 energy efficiency upgrades.

3.0 Executive Summaries

3.1 Volume 2: Cataloguing CII Customer Classes

A primary objective of the WEEP Study was to identify CII customer classes in southern California to target for future integrated water and energy efficiency programs including incentives, audits, marketing and outreach activities, and retrofits.

To establish a process for defining customer classes for inclusion in integrated efficiency programs, classification schemes used by the California Urban Water Conservation Council, the CEC, the California Department of Water Resources, energy utilities, and water districts were examined. These classifications define customers at a high level such as commercial, industrial, and institutional. They also define customers on the basis of NAICS codes, end uses such as rinsing and cooling, efficiency measures, and physical or accounting units (i.e., number of meters or billing locations).

To evaluate water, wastewater, and energy savings on a comparable basis, a common approach for defining customers and recording usage data was developed. This approach was based on three principles.

- First, customer classes should be based on meter-level data to best assess resource use patterns and measure the effectiveness of efficiency measures.
- Second, to facilitate understanding and adoption, the names and common sector categorizations used should be familiar to water districts, wastewater sanitation districts and energy utilities, and they should be based on existing categories in NAICS, the Standard Industrial Classification System, and billing codes.
- Third, customer classes suitable for joint marketing should be grouped in order to market water and energy efficiency programs and develop common technologies and measures to promote efficiency.

The CEC and several water and wastewater sanitation districts provided electricity, natural gas, water, and wastewater use and account data. The data were merged and sorted to identify CII customer classes for water and energy efficiency programs. PAC members recommended that the WEEP Study focus on CII customers that are large water, wastewater, and energy users with multiple accounts in southern California. The CII customer classes that met the PAC's recommendations are listed in Table 3.1.

Table 3.1: CII Customer Classes with Accounts that Rank High in Electricity, National Gas, Water, and Wastewater Use in Southern California $^{\rm I}$

NAICS Code	Customer Class
531	
722	Real Estate
221	Food Services and Drinking Places Utilities
445	Food and Beverage Stores
611	Educational Services
622	Hospitals
334	*
721	Computer and Electronic Product Manufacturing
452	Accommodation General Merchandise Stores
541	Professional, Scientific, and Technical Services
332	Fabricated Metal Product Manufacturing
313	Textile Mills
325	Chemical Manufacturing
999	Unassigned
713	Amusement, Gambling, and Recreation Industries
311	Food Manufacturing
336	Transportation Equipment Manufacturing
326	Plastics and Rubber Products Manufacturing
423	Merchant Wholesalers, Durable Goods
621	'
928	Ambulatory Health Care Services
	National Security and International Affairs
922	Justice, Public Order, and Safety Activities
424	Merchant Wholesalers, Nondurable Goods
327 813	Nonmetallic Mineral Product Manufacturing
921	Religious, Grantmaking, Civic, Professional, and Similar Organizations
324	Executive, Legislative, and Other General Government Support
	Petroleum and Coal Products Manufacturing
561	Administrative and Support Services
441	Motor Vehicle and Parts Dealers
812	Personal and Laundry Services
448	Clothing and Clothing Accessories Stores
333	Machinery Manufacturing
512	Motion Picture and Sound Recording Industries
339	Miscellaneous Manufacturing
331	Primary Metal Manufacturing
453	Miscellaneous Store Retailers
623	Nursing and Residential Care Facilities
488	Support Activities for Transportation
811	Repair and Maintenance
493	Warehousing and Storage
451	Sporting Goods, Hobby, Book, and Music Stores
111	Crop Production
312	Beverage and Tobacco Product Manufacturing
624	Social Assistance

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¹ The order reflects CII customer classes with the highest weighted percent of market volume (i.e., number of accounts in southern California) and high energy, water, and wastewater use.

PAC members were asked to evaluate and rank the customer classes listed in Table 3.1 to recommend those that should be targeted for future water and energy efficiency programs. The 15 CII customer classes listed in Table 3.2 were considered by PAC members as viable candidates for an integrated program including water and energy incentives, audits, marketing and outreach activities, and retrofits in southern California.

Table 3.2: CII Customer Classes Recommended for Future Water and Energy Efficiency Programs

Customer Class

Accommodation

Amusement, Gambling, and Recreation Industries Chemical Manufacturing

Computer and Electronic Product Manufacturing

Educational Services

Fabricated Metal Product Manufacturing

Food Manufacturing

Food Services and Drinking Places

Hospitals

Personal and Laundry Services

Petroleum and Coal Products Manufacturing

Professional, Scientific, and Technical Services

Real Estate

Textile Mills

Utilities

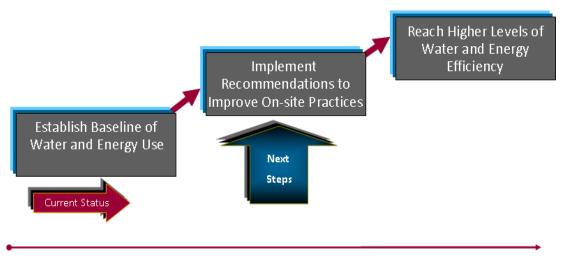
To further catalogue CII customer classes for audit scoping and marketing and outreach purposes, research was conducted to identify water and energy savings potentials. This information is presented in a series of tables in Volume 2. The referenced savings potentials, coupled with audit observations and PAC input, substantiated that the CII customer classes listed in Table 3.2 should be targeted first for future water and energy efficiency programs.

Volume 2 also contains an Excel spreadsheet that was developed to assess the costs and benefits associated with water and energy efficiency upgrades. This spreadsheet calculates the net present value of a project and its payback period. It also includes a tracking sheet to record reductions in water and energy use by CII customers in order to evaluate the effectiveness of water and energy efficiency programs in southern California.

3.2 Volume 3: Audit Field Guidance Document

An audit framework was created as part of the WEEP Study to codify an approach for gathering information and evaluating opportunities to improve water and energy efficiency. The performance improvement pathway underlying the audit framework is shown in Figure 3.1.

Figure 3.1: Integrated Audit Performance Improvement Pathway

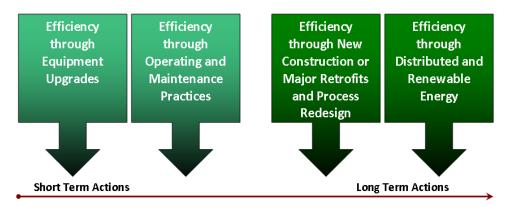


Performance Improvement Pathway

The framework focuses on evaluating four types of improvement opportunities that are described below and depicted in Figure 3.2:

- *Equipment upgrades* (i.e., replacing existing equipment with new equipment characterized as more water or energy efficient) eligible for water or energy rebates and incentives.
- *Operating and maintenance practices* to ensure that site equipment is used as intended and consistent with load demands.
- Design, expand, or change new or existing processes and facilities to achieve greater levels of water and energy efficiency in building designs and manufacturing related activities.
- *The use of distributed and renewable energy sources* to decrease the use of energy purchased from power generators.

Figure 3.2: Water and Energy Efficiency Options



Water and Energy Efficiency Market Transformation

To assist water districts and energy utilities in undertaking integrated audits, guidance materials were developed including a pre-audit questionnaire, a field assessment tool, and a report format. These guidance materials were designed to be easily modified to reflect changes in incentives or the addition of other types of equipment or processes to be examined during an audit.

3.3 Volume 4: Marketing and Outreach Practices Review

A review of integrated water and energy efficiency marketing and outreach practices was undertaken to identify activities needed to establish a more robust approach for promoting water and energy efficiency programs. The following recommendations were developed to advance an integrated approach to water and energy efficiency:

- Expand the use of partnerships among water districts, energy utilities, and wastewater sanitation districts to promote water and energy efficiency in southern California.
- Establish an awards program to encourage CII customers to implement water and energy efficiency activities.
- Leverage existing customer segmentation research to determine the best communication channels for reaching CII customers and the types of messages that motivate customers to take action.
- Develop clear, simple messages that appeal to the broad range of CII customer classes and use them when updating Web sites, brochures, and

other promotional materials.

- Maximize the "transaction point" during audits. That is, use the
 face-to-face meetings as opportunities to explain the incentives available
 to CII customers and the options for helping customers obtain approval for
 implementing water and energy efficiency improvements.
- Establish a water and energy efficiency marketing and outreach committee
 to advance an integrated approach to water and energy efficiency and
 enlist the PAC to facilitate the committee.

3.4 Volume 5: Barriers and Incentives Analysis

According to PAC members and CII customers,² many of the incentive programs established to promote water or energy efficiency in southern California have not consistently "pulled" customers to take action and implement efficiency improvements.

To address this issue, feedback was obtained from PAC members and their customers about potential barriers to water and energy efficiency programs and the types of incentives that may be needed to foster greater opportunities for water and energy conservation. Based on the feedback received, a proposed set of recommended incentives was developed to address potential barriers to an integrated water and energy efficiency program and encourage implementation of improvements.

A summary of the barriers, proposed incentives, and other recommended actions can be found in Table 3.3. The recommended incentives are structured to facilitate and fund implementation of integrated water and energy efficiency programs. They will encourage CII customers to participate in integrated programs by building their knowledge, providing additional financial and administrative incentives, and recognizing them for their accomplishments.

As integrated water and energy programs are implemented in southern California, the scope of the incentives may need to expand to include the outcomes of the California Public Utilities Commission's "Embedded Energy in Water" pilots. For example, training seminars and incentives offered to CII customers may need to be modified to include embedded energy.

³ "Pulled" refers to actions and incentives that motivate a customer to implement water and energy efficiency improvements to reduce overall demand.

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² CII customers were invited by several PAC members to offer input on current and future water and energy efficiency programs in southern California. These stakeholders evaluated a proposed set of incentives and offered additional recommendations for consideration.

Table 3.3: Summary of Proposed Incentive Goals and Recommended Actions for Overcoming Barriers to Integrated Water and Energy Efficiency Programs

Barriers	Proposed Incentive Goals and Recommendations
Limited Program Coordination Among Water Districts, Energy Utilities, and Wastewater Sanitation Districts to implement integrated water and energy efficiency activities.	Create a Partnership Framework for Program Implementation among water districts, energy utilities, and wastewater sanitation districts. Specifically, focus the partnerships on providing CII customers with comprehensive information about the benefits for engaging in water and energy efficiency programs, and obtaining comparable data to measure water and energy reductions within CII.
Gaps in CII Customer Knowledge about rebates, incentives, and the technical aspects associated with designing and implementing water and energy efficiency improvements.	Build CII Customer Expertise by offering training sessions, conducting audits, establishing a directory of information, and installing meters.
Limited Availability of CII Engineering and Administrative Support to evaluate the technical feasibility of implementing water and energy efficiency opportunities.	Provide Technical Support to CII Customers in undertaking water and energy efficiency project planning and implementation activities.
CII Capital and Financial Limitations that impact the availability of funds to finance efficiency improvements.	Selectively Enhance Financial Incentives for CII Customers by offering on-bill financing, rewarding participation in audits, and offering additional financial incentives and credits on water bills to help encourage implementation of water and energy efficiency projects.
CII Institutional Issues related to management approvals, regulatory requirements, and availability of funds to finance projects, which create delays in implementing efficiency projects.	Facilitate Participation in Water and Energy Efficiency Programs by offering customized incentive programs to address institutional issues characteristic of selected CII customer classes, and engage in dialogue with CII management to explain the benefits associated with water and energy efficiency projects.
Limited Availability of CII Recognition Programs for customers implementing water and energy efficiency activities.	Publicly Recognize and Reward CII Customers Implementing Efficiency Measures by establishing a program for CII customers that reflects reductions in GHG emissions based on the implementation of water and energy efficiency improvements.
Identifying Water and Energy Efficiency Program Funding Sources to support the development and implementation of integrated programs.	Explore Existing Mechanisms to Fund Water and Energy Efficiency Programs such as adopting tiered rate structures for CII, increasing the cost of water, applying for grants, accessing in-kind resources, and engaging in discussions about the scope of cost-effectiveness calculations.

Appendix A Acronyms

CEC California Energy Commission

CII Commercial, Industrial, and Institutional

MWD Metropolitan Water District of Southern California

NAICS North American Industry Classification System

PAC Project Advisory Committee

Reclamation Bureau of Reclamation

WEEP Water and Energy Efficiency Program