Water-Wastewater Program Best Practices: Lessons from the Field

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ABSTRACT

Energy efficiency savings potential in the wastewater sector is significant and has been largely untapped. In 2007, the Bonneville Power Administration (BPA) commissioned a study to identify water/wastewater (W/WW) program "best practices", and to recommend a program design based on findings of the study. Findings from a series of in-depth interviews with managers of four leading W/WW programs in California, Wisconsin and New York formed the basis for these W/WW best practices. One of the programs studied was the California Wastewater Process Optimization Program (CalPOP) program, which has been operating since 2000. The CalPOP program process has set a standard of continuous improvement for itself over this period, by focusing on lessons learned in the field and on recommendations for improvement from evaluations conducted in successive program cycles. This paper will compare and contrast industry-wide W/WW best practices and recommended program approaches in the BPA study with the specific experiences and evolution of the CalPOP wastewater program. The paper will also detail successful W/WW program delivery and incentive strategies typically promoted through these programs. The comparison will be used to provide insight into the critical elements of a successful W/WW program, based on both an industry-wide template, and actual field experience.

Introduction

Energy efficiency savings potential in the water/wastewater (W/WW) sector is significant and has been largely untapped. This paper presents one program's approach to capturing this potential in California's wastewater (WW) market and provides a comparison to W/WW program "best practices" that were identified in a 2007 study produced by Itron for the Bonneville Power Administration (BPA). Findings from this study are detailed in the first half of this paper.

One of the programs explored in the 2007 BPA study was the California Wastewater Process Optimization Program (CalPOP) program. This program is a third party program, implemented under a performance contract with Pacific Gas and Electric (PG&E) to serve only existing facilities in the WW sector. The customer base of this program is dominated by municipally-owned WW facilities, though it also covers facilities in the agriculture and food processing industry with WW pre-treatment operations. While water reclamation systems are served by CalPOP, the freshwater water supply market is not. This paper focuses on the WW market because the range of energy efficiency measures is greater and a large segment of potential measures are more complex due to the biological aspects of WW treatment processes. The municipal customer base of the WW market also tends to present greater challenges in terms of market penetration as facility operators tend to be more risk averse to change in established WW treatment processes.

Since its inception in 2000, CalPOP has continuously evolved over four successive program cycles having served clients that include the California Energy Commission (CEC), the California Public utilities Commission (CPUC), Southern California Edison (SCE) and PG&E. The Program's evolution has relied on translating lessons learned in the field into practical modifications to key operational components of the program. The latter half of this paper will identify key attributes of CalPOP, noting the more significant changes that have occurred in the program's evolution.

The final section of this paper will compare the industry-wide W/WW program best practices as recommended in the 2007 BPA study with the actual field experiences and evolution of CalPOP. In this comparison, the exploration of successful W/WW program design, delivery and incentive strategies will be explored as a means to provide insight into the critical elements of a successful W/WW program. However, an exploration of best practices in terms of actual energy efficiency W/WW measures is beyond the scope of this paper.

Energy Saving Potential and Market Barriers in the Water / Waste-water Sector

Energy Efficiency Technical Potential in the Water-Wastewater Sector

Over 60,000 Water Systems and 15,000 Wastewater Systems in U.S. consume approximately 75 Billion kWh annually, and account for about 3% of annual U.S. electricity consumption[i]. On average, energy costs represent 7% of the nation's W/WW utilities' operating budgets[ii], although there is significant regional variation both in energy use in the W/WW sector and in the proportion of energy used in WW treatment relative to water supply and treatment. In California, pumping loads in this sector account for 5 percent of peak load and 7 percent of California's total energy consumption [iii], and WW treatment facility in California can spend more than $500 million annually, representing 50 to 70 percent of an agency's total costs [ii]. By comparison, the W/WW sector comprises only 2 percent of total energy consumed in the Pacific Northwest (WA, OR, ID, MT), and WW energy consumption in the Pacific Northwest is nearly three times that of the water treatment/supply market [iv].

Overall, the technical potential for energy efficiency in the W/WW sector is enormous and is largely untapped by utility and government-sponsored DSM programs. Generally speaking, energy efficiency codes applicable to the design and operation of W/WW facilities are non-existent. The EPA's Energy Star industrial program efforts have just begun to take a focus on the W/WW sector and are seeking to establish networks of industry partners, develop rating and benchmarking systems, and establish guidelines to help organizations set goals, determine action steps and finance projects [v]. However, the status of EPA program efforts suggests that the market for W/WW energy efficiency programs is at a relatively nascent stage of development.

The potential for significant energy efficiency improvements in equipment and treatment processes in W/WW facilities but is often not recognized or exploited. Few were designed with an energy efficiency criterion. Consequently, many facilities are over-designed with redundant processes and oversized equipment with the objective of mitigating risks of operational failures and meeting the future capacity needs of the growing communities they serve. In other cases, W/WW facilities are aging and have reached capacity constraints, and are now in need of plant expansions and upgrades to meet the needs of growing communities. Plant upgrades create significant opportunities for capturing the energy efficiency potential in both existing and new

plant treatment processes. Very often, energy efficient process optimization of existing or expanded plant systems also solves a host of other problems (e.g. high O&M costs, better control of biological processes), and this often appeals to facility operators to a greater extent than the pursuit of energy cost savings.

Types of Market Barriers to Energy Efficiency in the Water-Wastewater Sector

The pursuit of energy efficiency in the W/WW sector is subject to many types of market barriers common to the broader industrial sector. Yet, it has been QuEST's experience that certain types of market barriers tend are significant and somewhat unique to the WW sector, which is rife with "late-adoptors" that impede the market penetration of new, more efficient treatment technologies.

Financial barriers. While significant, financial barriers to W/WW projects are fairly typical, including prohibitive first costs, capital improvement barriers and a general lack of access to capital. Municipal W/WW projects often must compete for capital funding with other projects that already have funding commitments. W/WW operators typically have established long-term capital budgets that may already be earmarked toward other, more pressing projects. While many W/WW facilities can fund projects and are open to more aggressive energy efficient process optimization alternatives, there are other types of market barriers that are characteristic of the W/WW sector.

Organizational barriers. The mandate of W/WW facility operators is to treat water supplies and wastewater to stringent treatment standards established by State and Federal pollution control laws. Hence, they are extremely averse to permit violations and disturbing the status quo in operations. This means that W/WW treatment is a conservative trade, and municipal facilities are generally hesitant to implement new process technologies even when motivated to find cost savings. Many plants simply do not explore treatment alternatives serving energy efficiency and other objectives once facility construction is completed and operations perform as designed. Energy savings opportunities usually only emerge when expansion is required or a problem arises that cannot be solved by manipulating the existing operations. When problems arise, operators rarely conduct a systematic evaluation of all treatment options, and often adopt the first potential solution to present itself. In addition, municipal customers' decision and budgeting cycles are long, as it typically takes 2 or 3 years to complete a project. Facility operators are not easily influenced by engineering studies or lab test results; most are wary of performance uncertainty and are unwilling to be test cases. Yet another dimension to organizational barriers is the lack of regular communications between the operations staff (that may be aware of the energy efficiency opportunity), and the accounting staff (that pay the energy bill) and the governing board (the final decision maker on capital improvement projects).

Informational barriers - lack of awareness. The low awareness of energy efficient technologies is a barrier widely applicable to the W/WW sector. Facility managers, especially those operating smaller plants, often lack a systematic process to explore and analyze energy-efficiency options. When plant operators do seek to control energy costs, they often lack information on existing and emerging energy efficient technologies and encounter high search costs in the pursuit of reliable information and data. When made aware of equipment treatment

alternatives, operators often lack resources to bridge the gaps in technical knowledge, assistance, and advanced training. W/WW consulting engineers tend to concentrate on serving larger facilities and tend to focus on addressing pressing permit issues. Few W/WW engineering consultants actually have a broad understanding of emerging energy efficient process optimization options. Furthermore, wastewater treatment facility operators and engineers want the technologies they adopt to be proven in "real-life" situations and be documented by independent and credible sources. The dissemination of case studies and other in situ demonstrations of alternatives are an effective way to address this barrier, although facility operators are often only comfortable searching for examples only as far away as neighboring facilities within their immediate region.

Hassle or transaction costs. W/WW plants, particularly smaller ones, are consumed with day-to-day operations and avoiding permit violations. They do not have the resources to oversee equipment replacements that they view as discretionary. W/WW consulting firms may say they have energy concerns, but rarely actually express these in their deliverables as they do not want to be responsible for untested equipment and treatment processes.

Findings from the Bonneville Power Administration Study – W/WW Best Practices

To meet its energy efficiency goals, BPA determined that it needed to increase the implementation of W/WW treatment measures within its service territory. To accomplish this, BPA directed Itron to develop a Wastewater Action Plan that outlined an approach for implementing an effective W/WW energy efficiency strategy in BPA's territory. One of the areas addressed by this Action Plan was an identification of W/WW Best Practices, including program features, incentive strategies, effective approaches for program staffing, marketing and outreach, project screening, facilitation and a process for utilizing W/WW engineering consultants. The programs studied were disproportionately WW programs, as these are relatively more numerous, presumably because water supply market is often served by more generic motor and pump efficiency programs.

The W/WW program best practices research was conducted in March and April 2007, and included both secondary and primary data collection efforts. *Secondary data collection* efforts largely consisted of web-based research on leading W/WW programs or initiatives offered by energy efficiency providers, whereas *Primary data collection* consisted of a series of in-depth interviews conducted with managers of the following four selected W/WW programs:

- California Wastewater Process Optimization Program (CalPOP) implemented by QuEST in Pacific Gas and Electric's and Southern California Edison's territories.
- Wastewater Plant Efficiency Improvement Initiative Program (WWPEI) implemented by KEMA in Pacific Gas and Electric's service area.
- Wastewater component of Wisconsin Focus on Energy's Industrial Program
- NYSERDA's Wastewater Initiative

Summary of W/WW Program Best Practices

Table 1A and 1B provide a summary list of Best Practices across all the programs reviewed in the BPA study, as relates to program design and set-up (Table 1A) , and implementation practices (Table 1B):

Table 1A – BPA Study / Program Best Practices Summary

PROGRAM DESIGN AND SET-UP	
Implementation Approach	▪ Use a performance-based contract with the implementation contractor. This provides Implementer with a strong incentive to pursue projects with viable candidates.
Program Management	▪ If possible, have a dedicated program manager that is knowledgeable about W/ WW operations and well-networked ▪ Provide a W/ WW expert that serves in an independent oversight role.
Contractor Selection	▪ Provide the flexibility to allow customers to either use their own engineering contractor or one under contract to the program ▪ Maintain a cadre of well-qualified contractors to provide technical assistance as needed.

Table 1B – BPA Study / Program Best Practices Summary

PROGRAM IMPLEMENTATION	
Marketing and Outreach	▪ Use training workshops to educate the market actors and end-users. In addition to building market awareness, this can serve as a lead-generator for the program. ▪ Perform outreach via industry conferences and trade association meetings. ▪ Demonstrate the measure's viability via case studies, preferably those that are local or regional.
Project Identification / Leads	▪ Rely on the market actors to identify and refer candidates to the program.
Project Screening	▪ Vet candidates by performing site visits and collecting intelligence from trade allies. ▪ Carefully screen candidates, to identify organizations that are proactive and therefore more likely to implement projects.
Project Facilitation	▪ Provide frequent follow up to ensure the project is moving and not "stalled". ▪ If possible, use a personalized approach to follow-up with the candidate, ideally with a W/ WW ▪ Target initial efforts toward operations staff, and later to high-level municipal and public finance authorities.
Project Funding / Viability	▪ Provide access to independent funding sources for organizations that do not have sufficient capital to fund projects. ▪ Emphasize non-energy benefits as part of the project justification.

Incentive Approach

All W/WW programs researched use a custom incentive formula to calculate the project incentive. W/WW program incentive levels are fairly similar across the four programs researched. Incentives in the $0.10 to $0.125 per kWh range are common. Most of the W/WW incentives paid reduce project paybacks by approximately one year. Table 2, below summarizes the incentive levels currently offered.

Table 2 – BPA Study / Incentive Rate Comparison

Program	Description	Incentive Rate for kWh Savings	Incentive Rate for kW Savings	Incentive Caps
CalPOP	Third-party program for PG&E WW customers	$0.11/ annual kWh	---	Capped at project cost.
WWPEI	Third-party program for PG&E WW customers	$0.10/ annual kWh; VSDs & motors: $0.05-$0.07 / annual kWh	---	---
NYSERDA W/ WW Program Component	W/ WW strategy, leverages FlexTech and Enhanced C&I Performance Program	$0.10 per annual kWh for motors/ VSDs	---	Up to 30% of project cost.
WI FOE W/ WW Program Component	W/ WW target, leverages custom incentives and technical assistance	$0.06 / kWh for emerging technologies; $0.04 / kWh for common technologies,	$125/ kW for common technologies; $200/ kW for emerging technologies	---
CA Statewide Savings-by-Design	Non-residential New Construction Program, Systems Approach, Process Measures	$0.08 annual kWh	---	Up to 50% of incremental costs
ETO - Production Efficiency Program	Industrial Efficiency Program	Up to $0.20/ annual kWh	---	Up to 50% of project costs

CalPOP Program Description & Evolution

Program Summary

The CalPOP program is a "niche" third-party wastewater program that has been in place since 2000. Over its 7 year duration, spanning 4 successive program cycles, it has been funded by two of the major California utilities, the CPUC and the CEC. Between 2000 and 2005, CalPOP served more than 50 municipal WW facilities and has obtained firm savings of more than 25 total GWh.

The current 2006-08 program is implemented by QuEST via a performance contract with PG&E. The program provides no-cost funding of technical studies, extensive project facilitation during installation, and incentives for completed projects. It is anticipated that the 2006-2008 program goal of 4.5 annual GWh will be doubled.

The program focuses on process optimization in existing facilities which spans a wide range of energy saving measures, depending on the design and processes at each particular site. Process optimization in wastewater treatment facilities typically involves improved control on equipment and biological processes, physical and chemical treatment process changes for efficiency, and the installation of high efficiency treatment equipment. There are multiple examples of proposed measures that do not require any new equipment, but only adjustments to the treatment processes (e.g. changes to aeration and mixing processes, sludge retention time or dissolved oxygen levels).

Program Strategy and Process

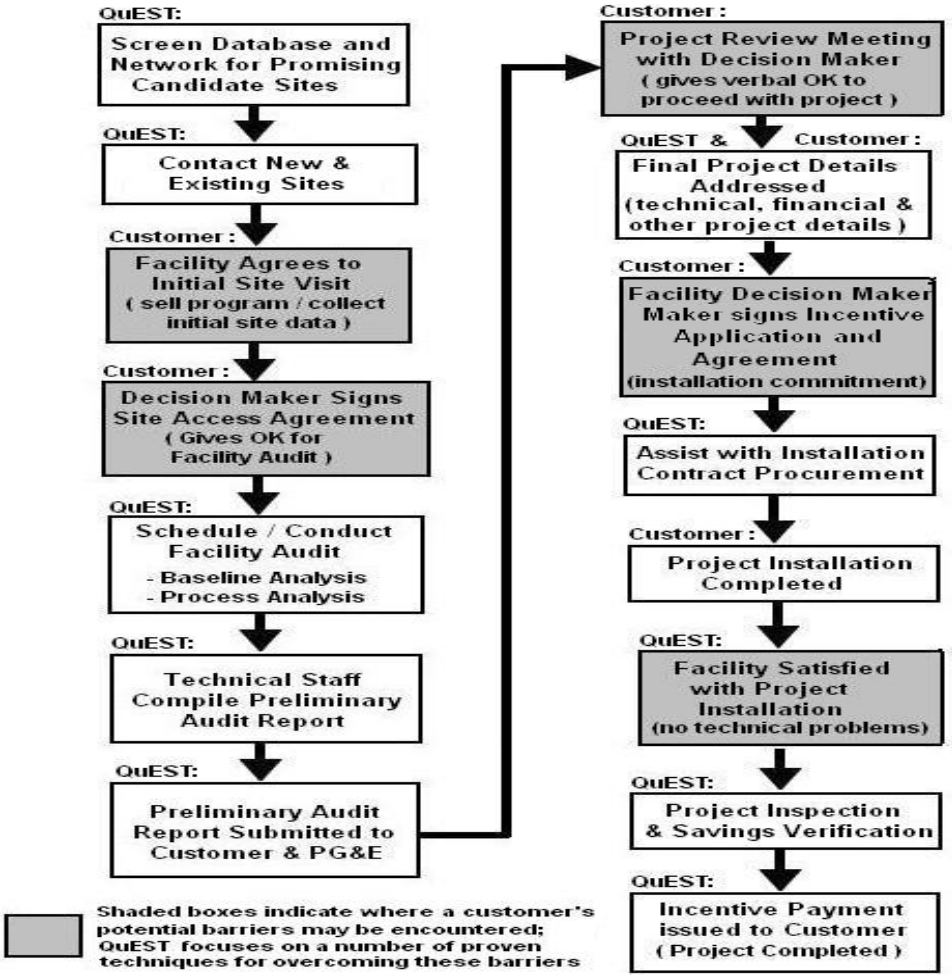
The program process is explained in the program's *Policies and Procedures Manual*. This is a guide to the program implementation process for all parties engaged in the program. Figure 1 is a general reference for the program strategy and process described in this section; it outlines the CalPOP implementation process for screening and recruiting customers, vetting projects, and moving projects through to completion.

The first component of the CalPOP program strategy is an aggressive recruitment and customer screening process to identify customers that are most likely to implement. After preliminary screening is conducted, initial marketing efforts emphasize actual site visits to determine viable program participants. Customers that are willing to move forward sign a *Site Access Agreement* (SAA). This form grants the implementer (QuEST) access to the facility and its utility data, but it also serves as a project milestone indicating the customer's interest and initial commitment to the project. Once signed, the SAA typically warrants ongoing face-to-face contact with customers to guide their participation and assure steady progress toward project installation.

The second key component in the CalPOP process is the detailed *Facility Audit Report*, provided at no cost to customers. The Audit Report identifies project recommendations, associated energy and non-energy benefits, and a financial analysis of the project including incentives offered for the recommended measures. A complete and accurate projection of project performance, including parameters surrounding performance uncertainty, and a comprehensive accounting of project costs and benefits allows facility managers to fully understand the project potential and become more comfortable with project assumptions prior to making any financial commitment. The Audit Report is delivered as a package along with an *Incentive Application and Agreement*, and a summary of continuing project installation assistance that QuEST is willing to provide, should the customer elect to commit to project installation.

The Audit package is the basis of the third key component of the CalPOP strategy: QuEST has refined an active process to mitigate the customers' barriers to implementation once energy efficiency measures have been recommended. At the critical juncture when a customer considers the recommended measures and program incentives presented in the Facility Audit Report, QuEST then provides essential project decision support, project management and technical assistance. Years of program experience has shown that these auxiliary services, adapted to the customer's unique set of needs and implementation barriers, are often critical to showing customers that they can, with confidence, take on the recommended projects. Project assistance may entail a mix of tasks that may span technical, design and project management assistance, and if necessary, installation services with or without a separate turnkey contract. By providing the required technical resources and demonstrating that site staff will not be significantly burdened by the project, QuEST can successfully move projects past most barriers to installation. This strategy works to "close the deal" by emphasizing that the added value proposition of ongoing, no-cost implementation assistance is tied to the customer's commitment to the project as indicated by a signature on the Program Incentive Application.

Figure 1 - CalPOP Program Process



Additional Best Practices from CalPOP - Lessons from the Field

The CalPOP Implementer (QuEST) offers the following additional summary program best practices in Table 3. The Implementer appends these best practices to those established in the BPA study, in consideration of CalPOP's field experiences spanning over several program cycles. Further discussion of the implementer's experiences that gave rise to these additional summary best practices are discussed in the remainder of this section.

Evolution of CalPOP - Changes Since Program Inception

Over seven years of implementation experience, multiple changes have been made to the program strategies and processes. Some of these simply reflect a better, more direct way of serving program goals and objectives, whereas others resulted from changes in overall energy market conditions, the funding utility's requirements, or conditions in the WW industry. CalPOP was first implemented during the California energy crisis of 2000 and 2001, and a number of market conditions and barriers have since shifted. While these are not the focus of this paper, the following identifies key changes to the program that characterize its evolution.

Table 3 – Additional Recommended Best Practices of CalPOP

PROGRAM DESIGN AND SET-UP	
Program Duration	▪ Establish a program cycle of three or more years to allow for long project lead times; Allow marketing and implementation to bridge between program cycles.
Program Processs	▪ Establish a simplified, stepwise program process with flexibility to address a wide range of customer circumstances; Use simplified program forms to track milestones and solidify customer commitment to project.
Target Markets and Technologies	• Serve a broader market segment. Include new and existing water supply, wastewater and water reclamation facilities, but only if the program team includes appropriate W/ WW engineering talent. • Allow for a broad set of measures spanning equipment replacement, process optimization, and plant or capacity expansions for existing sites; also include newer on-site generation technologies including fuel cells, cogeneration driven by anaerobic digesters using recovered fats, oils and grease.
PROGRAM IMPLEMENTATION	
Measure Identification	▪ WW Facility Audit can focus on a full menu of measures, only what the customer is interested in, or something in between. Under a performance contract, attempts should be made to limit measures only to what the customer is likely to implement.
Marketing and Facilitation	▪ In serving municipal customers, efforts should be made to market to, and support the emerging prolifieration of greenhouse gas reduction strategies. Private customers are also increasingly interested in documenting emission reductions.
Project Facilitation	▪ Focus should always be on addressing customer's barriers to implementation; provide no-cost Facility Audit, followed by ongoing project technical assistance following commitment.

- *Target Facilities and Measures***.** Early on, CalPOP focused on small, resource-constrained facilities that tended to be concentrated in rural areas. With increasing sophistication in the WW engineering capabilities of the program team, the targeted facilities and optimization measures have shifted to larger, urban facilities, and more cost-effective measures. Early on, measures focused on lagoon-based treatment systems with surface aeration, dissolved oxygen (DO) sensors and controls, motors, pumps and operations training. Later in the program, the focus expanded to include larger-scale projects affecting activated sludge systems and blower controls.
- *Targeted Marketing and Outreach.* CalPOP also recognizes an emerging best program practice in marketing and outreach that is worthy of note. There is an ever-expanding number of municipalities served that have adopted greenhouse gas reduction strategies or climate change policies. Energy projects in municipal wastewater facilities often represent a significant, if not dominant, segment of the technical energy savings potential among host municipalities. Program marketing and implementation efforts can be easily oriented to support the proliferation of municipal greenhouse gas reduction strategies.
- *Expansion of Market Scope for CalPOP.* The implementer of CalPOP (QuEST) would prefer to expand the program scope to include additional categories of customers and technologies in future program cycles if allowed by the client utility. In short, program expansions are recommended CalPOP to serve water supply, treatment and distribution customers in addition to WW customers. The implementer would also like to serve customers that are considering plant and capacity expansions, or the new plant construction. The implementer would also like to provide incentives for distributed generation technologies, including fuel cells, cogeneration systems driven by digester

gas, etc. Currently, only a solar-driven mixing and aeration technology is allowed as on-site generation as it supplants mixing and aeration horsepower.

- *Shift to Performance Contract*. The program has a sharper focus brought about by the use of a performance contract to compensate QuEST for completed projects. During the California energy crisis, obtaining savings was a higher priority than cost-effectiveness. With the passing of the energy crisis, program cost-effectiveness has re-emerged as a central principle in program design and evaluation. Performance-based compensation has caused QuEST to focus its efforts on cost-effective prospects that are more likely to implement, and to focus customer assistance efforts on removing barriers to implementation. However, QuEST realizes that that performance based-contracting may not be an option for all clients and implementers. One alternative is to structure a fixed or time-and materials-contract with frequent intermediate milestones that must be completed before new work is awarded. In effect, implementation work would be awarded in stages, based on performance.
- *Increased Sophistication of WW Engineering Capabilities.* QuEST has utilized several subcontractors for its WW engineering capabilities. The set of subcontractors used in the current program were established in part through selection by trial and error, and are considered to be optimal given the current program structure. They are highly competent, responsive, and have been given expanded roles to include marketing, and project management assistance to customers. They are free to contract with customers for additional work outside of CalPOP. One caveat offered with the recommendation to expand target markets and technologies, it is essential that the engineering services offered with the program can support these additions. It is not at all recommended that a program should expand beyond its engineering capabilities.
- *Program Simplicity & Flexibility*. Simplification of program delivery processes is always helpful for customers, yet it isn't always clear what can be effectively simplified in a newly established program without endangering program checks and balances. Deep program experience has allowed for appropriate scrutiny in the process of simplifying program processes. Increased flexibility in program delivery has been made possible in part by performance contracting, and it allows CalPOP to more readily adapt to unique customer circumstances and needs.
- *Program Forms as Customer Commitment Milestones*. Early in the program, customers were asked to sign a letter of commitment to a project once measures had been identified and analyzed. From an administrative standpoint, devising more standardized program forms is useful in executing tasks associated with key program reporting and tracking project milestones. However, they are also useful in gauging and garnering a customer's commitment to a project. By signing a Site Access Agreement (SAA), the customer (and the client Utility) understands that the project is underway, and that a tentative commitment has been made to the project, in return for a no-cost Facility Audit. Included in the Audit Report Package, the Incentive Application and Agreement (IAA) is designed to solidify the customer's commitment to implementation as they are consenting to legal terms and conditions for carrying out the project. There are no examples of customers who have signed an IAA without completing installations.

A Comparison of Best Practices from the BPA Study and CalPOP

This section presents a brief comparison of program best practices as discerned through the BPA study and through the CalPOP implementation experience. Tables 4 and 5, below, present the comparison of best practices related to program design and implementation, respectively. While it is not the intent of this section to discuss each itemized best practice as presented in these tables, selected practices are discussed along with a number of overarching observations that offer insights into how best practices are to be interpreted and applied in program design and implementation.

The first of these observations is that the program best practices of the BPA study and CalPOP presented in Tables 4 and 5 are generally well aligned. It is noted that CalPOP was among the programs examined in preparing best practices of the BPA study, although many other programs were reviewed. Typically, the comparison of program best practices starts with a more generalized practice as identified in the BPA study, which is developed further in the CalPOP version, either by providing refinements, variations, or occasionally, a deviation from the identified BPA practice. The refinements, variations, and deviations in effect represent essential "notes from the field" that the CalPOP implementer believes are necessary caveats to the original BPSA study best practice that evolved out of seven years of implementation experience.

Table 4 – Comparison of Program Design Best Practices

PROGRAM DESIGN AND SET-UP		
	W/WW Best Practices	**CalPOP Program Practices**
Implementation Approach	▪ Use a performance-based contract with the implementation contractor. This provides Implementer with a strong incentive to pursue projects with viable candidates.	▪ Use a performance-based contract with the implementation contractor. This provides Implementer with a strong incentive to pursue projects with viable candidates.
Program Management	▪ If possible, have a dedicated program manager that is knowledgeable about W/ WW operations and well-networked. ▪ Provide a W/ WW expert that serves in an independent oversight role.	▪ Program Manager has working knowledge of WW operations; focuses on program administration, marketing and project coordination. ▪ Provide customer with a WW engineering consultant that is responsible for identifying measures, preparing audit and providing project management assistance
Contractor Selection	▪ Provide the flexibility to allow customers to either use their own engineering contractor or one under contract to the program. ▪ Maintain a cadre of well-qualified contractors to provide technical assistance as needed.	▪ Provide customer with a WW engineering consultant; use of customers' prefered engineering contractor is potentially problemmatic. ▪ Identify & maintain a cadre of well-qualified WW engineering contractors to recruit customers, conduct analysis, provide technical assistance and project management

Many of the implementer's caveats in the CalPOP best practices merely reflect the direction that the program took under the program design constraints imposed by the client utility or by the existing market actors and market structure within the program service territory. Interestingly, many of the CalPOP caveats pertain to the roles of the WW engineering consultants. Throughout its existence, CalPOP has drawn heavily upon a reliable cadre of WW engineering subcontractors, and has maintained only limited in-house WW engineering capabilities. This is but one specific implementation management structure among the many viable alternatives examined in the BPA study.

Table 5 – A Comparison of Implementation Best Practices

PROGRAM IMPLEMENTATION		
	W/WW Best Practices	**CalPOP Program Practices**
Marketing & Outreach	▪ Perform outreach via industry conferences and trade association ▪ Demonstrate the measure's viability via case studies, preferably those that are local or regional. ▪ Use training workshops to educate the market actors and end-users. In addition to building market awareness, this can serve as a lead-generator for the program.	▪ Perform outreach via industry conferences and trade association meetings. ▪ Demonstrate the measure's viability via case studies, preferably those that are local or regional and feature emerging technologies. ▪ While some lead generation was sought through attendance and presentations at industry conferences and meetings, workshops considered a luxury within a performance contract.
Project Identif-ication / Lead Generation	▪ Rely on the market actors to identify and refer candidates to the program.	▪ Rely on the selected market actors who understand program process and screening for lead generation. These include: designated consultant teams, equipment vendors, utility account managers and other trade allies.
Project Screening	▪ Vet candidates by performing site visits and collecting intelligence from trade allies. ▪ Carefully screen candidates, to identify organizations that are proactive and therefore more likely to implement projects.	▪ Vet candidates by performing site visits and collecting intelligence from WW consultant teams, equipment vendors, utility account managers and other trade allies. ▪ Carefully screen candidates, to identify organizations that are proactive and therefore more likely to implement projects.
Project Facilitation	▪ Provide frequent follow up to ensure the project is moving and not "stalled". ▪ If possible, use a personalized approach to follow-up with the candidate, ideally with a W/ WW expert. ▪ Target efforts initially toward operations staff, and later to high-level municipal and public finance authorities.	▪ Provide continuous follow-up throughout project marketing, planning and implementation. ▪ Use a coordinated approach to follow-up with the candidate, working tandem with assigned WW engineering consultant. ▪ Target marketing and planning efforts toward operations staff, and later to high-level municipal and public finance authorities during decision phase; return to provide technical assistance to operations staff during project implementation.
Project Funding / Viability	▪ Provide access to independent funding sources for organizations that do not have sufficient capital to fund projects. ▪ Emphasize non-energy benefits as part of the project justification.	▪ Provide access to independent funding sources for organizations that do not have sufficient capital to fund projects. ▪ Vet measures that solve operational problems in addition to providing energy benefits; Emphasize non-energy benefits as part of the project justification.

Conclusion

The comparison of the BPA study and the CalPOP best practices underscores a key principle in how identified program best practices should be interpreted and utilized as broad guidelines for program design and implementation. While the BPA study best practices represent the "collective wisdom" of an array of W/WW programs, they are very generalized. These best practices were not identified at the inception of CalPOP, but the fact that they are well-aligned with the field experience of CalPOP tends to underscore their validity. However, the various caveats offered for CalPOP's best practices (relative to those of the BPA study) suggest the need for an effective process for interpreting program best practices and translating

them into viable program design strategies adapted to specific market conditions, program circumstances, requirements and constraints.

The process of translating best practices into actual elements of program design for new program start-ups requires more detailed investigation, research and scrutiny of the direct program implementation experience of successful implementers. While a best practices "menu" is helpful in initiating program design, careful consideration must be given to how program components are integrated. In short, problems may arise if best practices are assembled haphazardly, and program components are not well integrated. For example, three of CalPOP's best practices, 1) candidate screening for motivated customers, 2) providing no-cost facility audits, and 3) performance contracting, need to be well coordinated. If there is a failure to screen for motivated customers, too many facility audits will fail to result in project implementation, and the implementer is faced with absorbing audit costs under a performance contract.

CalPOP's additional recommended best practices (Table 3) stem largely from the evolutionary experience of the program spanning several program cycles, as well as emerging circumstances in the target market (e.g. supporting the proliferation of municipal climate change policies). This suggests that the applicability of CalPOP's additional best practices may not be universal, while underscoring the likelihood that certain W/WW best practices may emerge, change or evolve over time in response to changing market conditions and client needs. Program best practices are unlikely to be static, as some may become obsolete, while others gain prominence due to changes within energy and W/WW markets and the changes in the attributes and receptivity of the municipal and other types of customers that host W/WW projects.

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