TAXONOMY OF
UTILITY OUTSOURCING MODELS
Final

Public Version

March 5, 2017

Pacific Gas & Electric Company

Table of Contents

List of Tables

List of Figures

1 INTRODUCTION

PG&E and other IOU Program Administrators in California have been ordered to outsource 60% of its Energy Efficiency (EE) spend by 2020. There are different definitions of the terms "outsource" and "3rd Party Programs", both with stakeholders and within PG&E. We don't address the definition of "3rd Party Programs" in this current effort, since "3rd Party Programs" we don't use the term in the assessment other than to acknowledge the CPUC's perception of the benefits of "3rd Party Programs" in Section 5.

For the purpose of this assessment outsourcing is defined as the use of an outside supplier to provide services or goods. This definition may differ from what many in the utility industry use where outsourcing has evolved to refer to programs implemented by third parties. Our definition is somewhat broader and includes contracting that sometimes might be considered simply hiring a vendor. This broader definition allows the assessment to address the entire outsourcing spectrum.

PG&E has engaged DNV GL to examine a significant sample of utility outsourcing practices, develop a taxonomy / category of typical outsourcing models, develop case studies of utilities within each example, and then to define the work functions between the utility staff and the outsourcing entity, and assess how utilities bring new measures and technologies into the EE portfolio and what resources do this work.

In Section 2 we developed a taxonomy of utility outsourcing models. Information was gathered on the outsourcing practices of over 20 utilities. Five outsourcing model descriptions were developed that span the range of approaches to outsourcing. The spectrum ranges from a model where the utility has complete management control to a model where the utility has little control or influence over the contractor.

Section 3 provides a categorization of the outsourcing practices of the subject utilities according to the five outsourcing models.

Section 4 provides a discussion of pricing strategies used in utility outsourcing

Section 5 is an assessment of the impacts of the outsourcing models on utility staffing.

Section 6 is a discussion of how the utilities interviewed bring new measures into their portfolios.

Section 7 presents case studies of selected utilities. The case study briefs provide an overview of a range of outsourcing models and highlight variations within each model.

A summary of the taxonomy of utility outsourcing models is shown in Table 1.

Table 1. Taxonomy of Utility Outsourcing Models and Key Attributes

	Minimal Outsourcing	Project or Activity Outsourcing	Integrated Program Outsourcing	Integrated Portfolio Outsourcing	Arm's Length Resource Acquisition
Typical Outsourced Scope	Peak load staffing, licensed contractors,	Project: Program evaluation, SaaS, outreach, marketing campaign mgmt., market research, Activity: Field inspections, engineering reviews, advertising,	Program Implementation with significant utility oversight and integration with various utility core functions	Implementation of a portfolio of programs, often with subcontractors serving as implementers and reporting to the contractor, with significant utility oversight and integration with various utility core functions	Program Implementation with little or no utility involvement, resource acquisition (kW, kWh and therm impacts)
Utility Staff Involvement in Program Design	100%	95%	75%	60%	10%
Common Utility Role	All management and most staff assignments. Outsourcing limited to short term needs, technical capability gaps, and cost reduction opportunities	All management responsibilities, including program design, with selective outsourcing of non-core or non-regular projects	Close management oversight, program design approval, integration of core utility functions such as regulatory management, call centers, customer management, data management and marketing, and required coordination with other program implementers	Close management oversight with integration of core utility functions such as regulatory management, customer management, and marketing. Contracts with fewer "master" implementers that then contract to various other providers. Program design is more collaborative but utility has final approval.	Contract management
Brand	Utility	Utility	Mostly Utility	High Utility/ Some Contractor	High Contractor / Some Utility
Competitive Index (From the End Customer Perspective)	Very Low	Very Low	Low to Moderate	Low to Moderate	Moderate to High (some exclusivity is possible) May compete with utility's core programs and other Res. Acquisition Programs.
Data Management Systems Leadership	Utility	Utility	Hybrid	Contractor with Utility Warehousing	Mainly Contractor
Data Ownership	Utility	Utility	Utility	Utility	Contractor
Relative Number of Direct Contractors	Few	Moderate	High	Moderate	High
Value-based Pricing	Rarely	10% Retention	10% to 30% KPI	20% to 50% KPI	50% to 100% Resource Value

2   TAXONOMY OF UTILITY OUTSOURCING MODELS

This section describes the taxonomy of utility outsourcing models based on nine dimensions. These dimensions were selected to characterize the balance of program control between utility and contractor. They represent leverage points where the utility manages its programs. These dimensions are:

- **Typical Outsourced Scope.** The activities or program elements that are outsourced.

- **Utility Staff Involvement in Program Design.** The extent that the utility conducts and has management control (i.e., approval authority) over program design.

- **Common Utility Role(s).** Can range from full program implementation in house, to full program design with close management and oversight of contractors encompassing all activities, to very limited roles in areas of program design and operations.

- **Branding.** The extent that the utility corporate brand is incorporated into the program.

- **Competitive Index (from the end customer perspective).** An indicator of the competition for customers between different contractors or between contractors and the utility.

- **Data Management Systems Leadership.** The degree that program/portfolio tracking systems are managed by utility and contractor.

- **Data Ownership.** Who owns the program data, the utility or contractor?

- **Relative Number of Direct Contractors**.

- **Value-Based Pricing.** Whether value-based pricing is employed. Value-based pricing can be based on performance indicators (e.g., application processing time) or on resource value (e.g., $/kWh savings delivered).

The outsourcing taxonomy comprises the following models:

- Minimal Outsourcing

- Project or Activity Outsourcing

- Integrated Program Outsourcing

- Integrated Portfolio Outsourcing

- Arm's Length Resource Acquisition

No utility uses one model exclusively. Rather, utilities exhibit tendencies that fall on a spectrum of these models, with some variation from the model norm in different respects. We explore the models in the following subsections.

2.1   Minimal Outsourcing

Some utilities perform all or most tasks associated with their programmatic activities. They have staff to perform the required functions of the program. They outsource only when necessary and maintain direct control over the scope of the service, and how, when, and where it is implemented. Outsourcing is used, for

example, when there's a peak work load situation, where short term help is needed to meet a deadline or goal, and when laws and regulations require special licensing. These outsourced engagements tend to be short term in nature. The utility contracts directly with the service provider or uses temporary employment agencies to provide staffing. There are times when a task or job requires a licensed contractor, e.g., an electrician, to do the work. Rather than hire a staff electrician full time, the utility will outsource the job to an electrical contractor. In addition to providing labor for the job, outsourcing to a licensed contractor reduces the risk and liability to the utility.

There are no significant program design decisions that are made with Minimal outsourcing. Nor are there any branding issues since the utility branding is used.

The utility has complete control over all aspects of the engagement.

Small utilities, and municipal utilities (munis), often fall in this category as they have limited budget to accomplish their program objectives.

There's generally no significant program data generated through these outsource activities, but if there is, the data is usually provided to the utility on a form that is then filed and managed by the utility.

Pricing for Minimal Outsourcing engagements is transactional (e.g., Time & Materials, fixed price).

2.2 Project or Activity Outsourcing

Utilities use Project or Activity Outsourcing for projects or activities and program components to support its programs. For example, a market research or a DSM planning study falls into this model as a project. Program activities that are outsourced individually, such as, technical support or engineering review of program applications are also in this model.

When outsourcing activities or program components the utility uses this type of outsourcing to augment its staff and/or capabilities. For example, technical expertise beyond that offered by utility staff may be needed to properly review applications from a distinct niche industry, e.g., refrigerated food processing. For these activities, the utility outsources to engineering companies with the necessary experience. Other examples of these types of activities are: field inspections, outreach, backroom processing, and advertising. Many utilities use Master Services Agreements (MSA) to facilitate contracting.

The length of these contracts is specific to the project. When ongoing program support activities, like technical support, are procured, the contract term may be longer, e.g., two or three years.

The utility maintains close control over these engagements. However, they are often looking to the expertise of the contractor to help guide the activities. In the end, though, the utility has ultimate control over the contractor and work products. Utility staff develops specifications for the project or activity. The level of specificity will vary depending on the type of project and the experience of utility staff.

The role of the utility is typically that of a project manager, with full responsibility over all contractor activities. The utility project manager will establish a schedule for status reports. These may be weekly, monthly or quarterly depending on the project or activity. The project manager ensures the utility's requirements are met by the contractor.

Branding in Activity Outsourcing is always under the utility label.

Pricing for Project and Activity Outsourcing is done on a transactional basis, usually some form of time and materials (T&M), unit pricing, or fixed price, sometimes in combination. These are pay for services rendered arrangements.

2.3 Integrated Program Outsourcing

Utilities outsource integrated programs under this model, with all or most program activities under a single contract. Often these are turnkey programs, where there's one contractor for each program (program refers to subprograms in CA). The contractor is responsible for implementing the program but the utility has control over:

- **Program design:** Responsibility for program design is a shared responsibility with the utility maintaining overall management control. With the activity outsourcing model the utility has complete control over program design, including developing the final design. When moving to the Integrated Program model program design is more collaborative between the contractor and utility. The contractor proposes a program design, based on the information in the RFP or through communications with the utility. The utility will approve the program design, ensure consistency with other programs and work with the contractor to revise the design to better fit the utility's needs. The utility must communicate program requirements or constraints, including regulatory constraints to the contractor. This is usually done through the RFP, but may also be done through direct communications, as is often done with existing programs.

- **Branding:** Branding is usually done under the utility's brand. The contractor may propose a unique sub-branding for the program, but its use is at the discretion of the utility.

- **Integration:** The utility manages the integration of the program with the utility's core functions including customer management discussed in the following paragraph. Through the integration process the utility will avoid confusion internally, among the utility's departments, as well as the utility's programs.

- **Customer Management:** The utility determines how customers are targeted and who engages customers. For example, the procedures for how program outreach interacts with the utility's key account managers (KAMs) is established by the utility.

Utility staff acts as the program manager and oversees the management of all aspects of the program, including program design, integration of core utility functions such as regulatory, call centers, customer management, data management, and marketing. It is the utility staff that is responsible for the integration of the program with the other programs in the portfolio. The utility coordinates marketing and outreach with the portfolio of programs to maximize benefits to the utility brand and minimize customer confusion.

The program data management system is often a hybrid, where the contractor may have its own tracking system and manages the program through this system, and provides the utility with extracts so its own systems are updated. Often this updating takes place through the invoicing process. The utility usually owns all program data under this model, except if they outsource a program to an implementer who uses a proprietary software program (see below).

Pilot programs and programs that are based on proprietary software programs (OPower, RECAP, Nest Rush Hour Rewards) are included in this model.

Pricing can be transactional (T&M, fixed price, activity) and value-based (based on KPIs or delivered kWh, kW or therm impacts). The value-based approach is sometimes called "pay for performance" or performance payment. With increasing frequency, hybrid payment schemes are being employed, where the payment is divided into two parts, including a performance or value-based element. For example, the first payment may be made on the installation of the measures, and the second payment is made after the savings can be measured. This sort of model is being looked at, with the pay for performance approaches that are being developed using AMI data. Refer to Section 4.3 for examples of how the performance approaches are being used and the steps be taken to be able to use pay for performance approaches on a broad basis. Value-based pricing is currently being used with 10% to 30% paid for achievement of KPIs.

2.4 Integrated Portfolio Outsourcing

Utilities outsource an integrated portfolio of programs under this model, or a single large program that employs significant subcontractors that are managed by the prime contractor. These contractors are sometimes call "master implementers." The utility is involved in the management of the portfolio, ensuring the integration of the portfolio with the core function of utility, e.g., regulatory, marketing, branding, and customer management. The contractor does more of the planning work to determine the mix of programs and program designs. The utility will either take an active role in the planning process or review and approve the plan. The contractor usually uses a combination of its staff and subcontractors to implement the portfolio of programs. The contractor may use subcontractors to implement programs on a turnkey basis, or to perform specific activities, much as a utility would.

The contractor is responsible for significant planning and all or most implementation of the program portfolio. It is constrained by:

- **Portfolio Composition and Program Design:** Responsibility for program design is a shared responsibility with the utility maintaining overall management control. In addition, the contractor develops the portfolio composition plan for approval by the utility. The portfolio composition and program design are based on the information in the RFP or through communications with the utility. The utility will approve the portfolio composition plan and program design, or work with the contractor to revise the design to better fit the utility's needs. The utility must communicate its requirements or constraints, including regulatory constraints to the contractor. This is usually done through the RFP, but may also be done through direct communications, as is often done with existing programs.

- **Branding:** Branding is still done under the utility's brand. The contractor may propose a unique sub-branding for the program, but its use is at the discretion of the utility.

- **Integration:** Under the integrated Portfolio model the contractor carries a greater role in integration. Since the contractor manages the programs in its portfolio it is in the best position to perform the integration function across program. The utility continues to manage the integration other areas of the utility's core functions.

- **Customer Management:** As with Integrated Program Outsourcing, the utility determines how and who engages customers. For example, the procedures for how program outreach interacts with the utility's key account managers (KAMs) is established by the utility.

Utility staff acts as the program manager and oversees the management of all aspects of the portfolio and associated programs, including portfolio composition, program design, integration of core utility functions such as regulatory, call centers, customer management, data management, and marketing and outreach. The contractor assumes greater responsibility for the integration of the program with the other programs in the portfolio. The utility coordinates marketing and outreach with the non-portfolio programs and activities to minimize customer confusion.

The data management system used to support the portfolio is usually the contractor's own tracking system. The contractor manages the program through this system and provides the utility with extracts so the utility may warehouse these data in its own system. Often this updating takes place through the invoicing process.

To avoid double payment of incentives some utilities require program implementers to check the customer in the utility's payment verification platform, which is typically built on CRM software. The platform retrieves prior program participation for the customer and the program implementer determines whether the project is eligible for payment. Another approach that is used is where the program implementer submits a list of candidates to the utility. The utility does a search on the list to determine is the project is eligible.

The utility usually owns all program data under this model, except if they outsource a program to an implementer who uses a proprietary software program.

Pricing for Integrated Portfolios is usually a hybrid of transactional (T&M, fixed price, activity) and value-based (based on delivered kWh, kW or therm impacts, or other KPIs). These types of pricing schedules include:

- Fixed price payments for well-defined tasks or activities, e.g., start-up and monthly service fees.

- Fixed price per unit for program accomplishments, such as audits and deemed measure installations.

- Payments per calculated kWh, kW or therm impact for custom programs.

- Payments for achieving KPIs.

The Integrated Portfolio Outsourcing Model was more common a few years ago than it is today. Utilities that used to employ the Integrated Portfolio have shifted, or are shifting, their outsourcing towards Integrated Programs. Through this shift to the Integrated Program model, the utilities are able to manage their portfolios more directly.

The Integrated Portfolio model is more attractive to utilities with smaller staffs and energy efficiency budgets, as their budgets are often not large enough to split among multiple contractors. Utilities with larger budgets tend not to use the Integrated Portfolio model, because they are often looking for more specialization to leverage expertise.

2.5 Arm's Length Resource Acquisition

The Arm's Length Resource Acquisition model (Resource Acquisition) is focused on acquiring kW, kWh and therm impacts. These types of programs are sometimes called Third Party Programs (note that these are different from CA Third Party Programs), but not all Third Party Programs are the same. Most programs that are called Third Party Programs are actually a form of Integrated Programs that are full turnkey; where the utility has a great deal of influence over program design and outreach. For Resource Acquisition programs,

the utility has little or no involvement in design of the program nor its operations. Resource Acquisition programs may reside in two different parts of a utility. It may be part of the utility's energy efficiency program portfolio, or part of its procurement portfolio, where it competes against other energy resources such as generation, renewables, Distributed Energy Resources (DER). The requirements for a procurement portfolio are aligned with Energy Procurement and CAISO requirements.

Resource Acquisition programs use the Resource Acquisition program's branding, messaging, and in most cases, takes responsibility for managing "its" customers. There may be limited use of a utility logo or reference to the utility. The utility has little leverage over the Resource Acquisition program's customer management. There is potential for competition for customers with other programs, both the utility's and other Resource Acquisition programs. This competition can lead to confusion of the customer resulting in a lost opportunity for all programs.

The role of utility staff is largely as contract managers, where their responsibility is to ensure the contractor is in compliance with the terms of its contract. The Resource Acquisition program usually has a number of milestones in its contract that must be met. The utility contract manager ensures these milestones are met, or take corrective measures that are specified in the contract.

Data management systems and processes used to support the program are often hybrids, where the contractor has its own tracking system and manages the program through this system. The contractor provides the utility with extracts so the utility can update its systems and can warehouse these data, which are used for a variety of purposes including DSM planning and grid planning. Often this updating takes place through the invoicing process. The Resource Acquisition program owns the program data under this model.

Value-based pricing is the norm for Resource Acquisition programs. An integral part of the pricing mechanism is a measurement methodology that will be used to measure the impacts of the program for payment purposes. Most RFPs (energy efficiency/DSM) or RFOs (energy procurement) for Resource Acquisition programs include a requirement for an M&V plan in the proposal. The M&V plan is subject to the utility's approval. The advent of AMI and M&V 2.0 methods will have a profound effect on how M&V is done in the future.

There are variations on the Resource Acquisition program types. The California IOUs have been implementing Third Party Programs for a number of years. However, the difference between most of those programs and Resource Acquisition programs is that the utility has direct influence and management of the program design and branding for Third Party. Several utilities have issued RFOs under a Local Capacity Requirements procurement process. These are directed to target specific geographic areas. The requirements of RFOs tend to be more stringent than RFPs for energy efficiency programs.

An example of an Resource Acquisition program that is in use today is the EnerNOC demand response system, which provides the utility with kW avoided when it's needed by the utility. EnerNOC acquires its own customers. The utility or grid operator then notifies EnerNOC of a resource need and EnerNOC acquires the kW through its customers through its system.
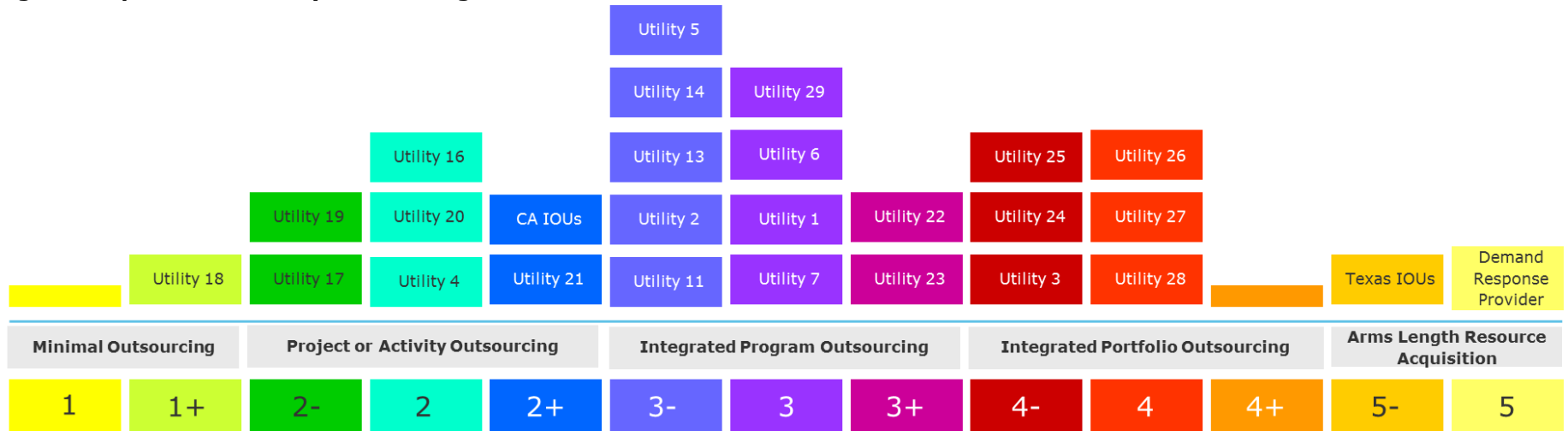
3 SPECTRUM OF OUTSOURCING

A total of 25 utilities (excluding California IOUs) were reviewed for inclusion in this analysis. We gathered information on these utilities programs and outsourcing practices. It's important to note that no utility uses only one model. Utilities use outsourcing as a tool to manage its work, and will use the best tool available. They do, however, tend to have a philosophy that governs how the bulk of their outsourcing for EE efforts is done.

Using this information, we classified each utility within one of the five Outsourcing Models. Each of the five models was further divided to show finer levels of distinction without changing models. This has proven helpful when showing a change in outsourcing philosophy. For example, Utility 3 is an Integrated Portfolio utility, however, it is moving towards Integrated Programs as it has started to separate programs from the portfolio and put them to bid them as Integrated Programs. Thus, Utility 3 is a Level 4-, moving towards Integrated Programs. We are seeing similar shifts with others, such as Utility 14.

Figure 1 shows a mapping of the utilities to the spectrum. We see that there most utilities fall somewhere in the middle of the spectrum, with 92% in Levels 2-4, only 4% in Minimal (Level 1) and Arm's Length Resource Acquisition (Level 5), the two most extreme models. Thus, the vast majority of utilities exhibit a high level of management control over program design, branding, and customer management.

An observation, that may become a trend, is where DSM can be included in rate base, where the utility's authorized rate of return can be earned. Under this scenario the utility would be motivated to keep as much of the work in-house and outsource less work.

Figure 1. Spectrum of Utility Outsourcing Models

				Utility 5							
				Utility 14	Utility 29						
		Utility 16		Utility 13	Utility 6		Utility 25	Utility 26			
	Utility 19	Utility 20	CA IOUs	Utility 2	Utility 1	Utility 22	Utility 24	Utility 27			
	Utility 18	Utility 17	Utility 4	Utility 21	Utility 11	Utility 7	Utility 23	Utility 3	Utility 28		Texas IOUs	Demand Response Provider

Minimal Outsourcing		Project or Activity Outsourcing			Integrated Program Outsourcing			Integrated Portfolio Outsourcing			Arms Length Resource Acquisition	
1	1+	2-	2	2+	3-	3	3+	4-	4	4+	5-	5

*Program element outsourced as arms-length resource (component of utility activity)   **Outsourcing Level**

4 PRICING STRATEGIES

Pricing strategies vary for different types of activities.   In this section pricing strategies are categorized into the following:

- Fixed price

- Time and Materials

- Metric Based Pricing

- Resource Based Pricing

Each of these strategies is discussed in this section. Fixed price and Time and Materials are called transactional pricing, as they are based on completing transactions. The pricing strategies and how they're used for the outsourcing models is shown in Table 2.

4.1 Fixed Price

Fixed price contracts are used when the scope and costs are well characterized and are negotiated between the utility and the contractor. Fixed price contracts offer the utility the maximum cost control, but represent risk on the contractor in the event the project requires more resources than estimated when the contract was executed. Fixed price contracts offer little flexibility for either party in the event changes are required.

Under the fixed price category is a variant that is fixed price per unit. This form of pricing is often used when the costs can be characterized for a single unit, but it's not known how many units will be needed. Examples of how this form of pricing is used includes processing program applications and conducting audits, where the contractor is paid a set price per application or audit multiplied by the number of applications processed or audits completed.

4.2 Time and Materials

Time and Materials (T&M) contracts are used for projects where it is not possible to accurately estimate the size and scope of the project, or in instances where it is expected that the project requirements would most likely change. The utility pays the contractor for the actual cost of labor (usually number of hours at a pre-specified hourly billing rate) plus the cost of material and expenses.

There can be obvious problems with T&M contracts where the contractor charges exorbitant numbers of hours or inflated material costs. To allow the utility control over costs a limit on the value of the contract, or parts of the contract, may be included. These types of contracts have various names, including: "T&M Not To Exceed", "T&M with a Cap" and "T&M with a Limit." This transfer risk from the utility to the contractor.

Table 2. Pricing Strategies and Outsourcing Models

Outsourcing Model	Typical Outsourced Scope	Pricing Strategies
Minimal Outsourcing	Peak load staffing, licensed contractors	Primarily T&M or Fixed Price
Project or Activity Outsourcing	Project: Program evaluation, SaaS, outreach, marketing campaign mgmt., market research, Activity: Field inspections, engineering reviews, advertising	Pricing for Project and Activity Outsourcing is done on a transactional basis, usually some form of time and materials (T&M), unit pricing, or fixed price, sometimes in combination. These are pay for services rendered arrangements.
Integrated Program Outsourcing	Program Implementation with significant utility oversight and integration with various utility core functions	Pricing can be transactional (T&M, fixed price, activity) and metrics based (based on accomplishment of metrics) or resource based (delivered kWh, kW or therm impacts). With increasing frequency, hybrid payment schemes are being employed, where the payment is divided into multiple parts, usually a transactional element and a metric or resource based element. For example, a monthly fee for program operations can combined with a resource based approach where the first resource payment may be made on the installation of the measures, and the second resource payment is made after the savings can be measured.
Integrated Portfolio Outsourcing	Implementation of a portfolio of programs, often with subcontractors serving as implementers and reporting to the contractor, with significant utility oversight and integration with various utility core functions	Pricing for Integrated Portfolios is usually a hybrid of transactional (T&M, fixed price, activity) and metric based (based on accomplishment of metrics) and/or resource based (based on delivered kWh, kW or therm impacts). These types of pricing schedules include: • Fixed price payments for well-defined tasks or activities, e.g., start-up and monthly service fees. • Fixed price per unit for program accomplishments, such as audits and deemed measure installations. • Payments for achieving metrics. • Payments per calculated kWh, kW or therm impact for custom programs.
Arm's Length Resource Acquisition	Program Implementation with little or no utility involvement, resource acquisition (kW, kWh and therm impacts)	Resource based pricing is used for Resource Acquisition programs, as well as part of hybrid approaches for Integrated Program and Portfolios. An integral part of the pricing mechanism is a measurement methodology that will be used to measure the impacts of the program for payment purposes. Most RFPs (energy efficiency/DSM) or RFOs (energy procurement) for Resource Acquisition programs include a requirement for an M&V plan in the proposal. The M&V plan is subject to the utility's approval.

4.3 Metric Based Pricing

Under Metric Based pricing the contractor is paid based on the actual performance of the program relative to a set of defined metrics. This is a form of performance pricing, which we narrow to include non-energy metrics. Program performance can be measured on a variety of different metrics, including but not limited to: meeting the goal for audits or measures installed, customer satisfaction, and application turnaround time. Two metrics that were reported but, not commonly used, exemplify the concept that the metrics should reflect what is of value to the utility are: (1) Keeping the program operating year-round; and (2) Having a goal of a given percentage of savings attributed to a given measure. These two metrics ensured that the program would be open 12-months of the year to ensure continuity for the customers and the program put extra effort promote and install the specified measure which the utility was trying to move along the product adoption curve. Metrics and their measurement are agreed upon in the contract. The utility pays only for the accomplishments of the program. Metric Based pricing is almost always used in a hybrid arrangement where Fixed Price or T&M is used for various elements of the program in conjunction with the Metric Based elements. The hybrid approach is discussed further in Section 4.5

Funding for Metric Based pricing can be an explicit part of the budget with a separate line item. A common approach being used in a Metric Based pricing approach is the use of a retention where a percentage of the amount to be invoiced is placed in a retention account, where it sits until the utility determines that the metrics have been achieved and the payment is made.

Some metrics that have seen increasing use in Metric Based pricing are customer satisfaction and application processing times. These reflect the landscape where utilities are placing the customer first and the customer experience is important to the utility and these types of pricing reinforce the importance of satisfied customers and that the implementer plays a key role in ensuring customer satisfaction for the utility. Thus, application processing can influence customer satisfaction, especially if the processing time is longer than expected. By including this metric in the pricing the implementer is likely to take steps to ensure processing times fall within an acceptable range helping to ensure that events don't occur that could negatively impact customer satisfaction.

4.4 Resource Based Pricing

Resource Based pricing in the utility is seen most often when Arm's Length Resource Acquisition outsourcing strategies are used, and when hybrid pricing methods are used where a transactional approach (e.g., T&M or Fixed Price) is combined with Resource Base pricing.

Resource Acquisition programs may reside in two different parts of a utility. It may be part of the utility's energy efficiency program portfolio, or part of its procurement portfolio, where it competes against other energy resources such as generation, renewables, distributed energy resources (DERs). Similar to Metric Base pricing, there are few instances of program pricing that are 100% Resource Based. Today, Resource Based pricing is usually used in a hybrid framework with T&M or Fixed Price elements.

In a Resource Based based pricing scenario, the utility defines the terms and requirements for the program in the request for proposal (RFP) or request for offer (RFO). An integral part of the pricing mechanism is an M&V plan that is usually a required element in the proposal or offer that specifies how the delivered energy savings will be verified. The M&V plan specifies not only methodology but the frequency of the verification process.

When used in an RFO for energy procurement additional specific energy efficiency eligibility criteria must be met. Some of these criteria are: incrementality and resource adequacy[1]. Resource adequacy is a mandatory CAISO planning and procurement process to "ensure resources are secured by load serving entities to meet the ISO's forecast system, local and flexible capacity needs."[2] Meeting the incrementality requirement of the RFO ensures that the program is incremental to programs and plans that the utility had and there's no double counting of the program's measures/impacts; thus, the program is incremental to the activities the utility is already undertaking. Incrementality continues to be discussed in the CPUC's competitive solicitation framework working group (CSFWG).

Payments under Resource Based Based pricing is based on a $ per unit of verified energy savings, i.e., kWh, kW or therm.

Recent legislative and regulatory actions are driving some of the programs in California towards pay for performance (P4P) approaches. P4P approaches are a form of Resource Based pricing with a number of steps and tools specified in advance. SB 350 authorized pay for performance for energy efficiency that is directly tied to measured energy savings. It also authorized P4P programs where a portion of the incentive would be set aside for payment based on post project measurement.[3]

One of the challenges for P4P pricing to work is how savings shall be measured. High resolution data from smart meters (AMI) and advanced data analytics are being used in combination to develop systems that can estimate appropriate baselines and verified energy savings efficiently and effectively. Ultimately these systems will perform the verified energy savings automatically (automated M&V) at relatively low cost. These tools need to be validated to ensure accuracy and consistency of the results.[4] LBNL is continuing to explore the appropriate application of automated M&V tools.[5] Some automated M&V tools are commercially available and open-source tools can be used to develop new tools. As new tools emerge their performance must be validated. LBNL and others have been developing standards and testing protocols to do this validation. conducting tests on a number of these tools and is developing protocols to validate the accuracy of verified energy savings from these types of models.

Pay for performance is being seen with increasing frequency. One utility issued an RFP for a program where two payments are made: the first payment is made on the installation of the measure(s); and the second payment is made after the savings have been measured after at least one year of operation. If AMI data are available the second payment is based on the temperature and time-of-week (TTOW) model protocols developed by LBNL[6]. Otherwise monthly data could be used using an approved M&V protocol prescribed in the RFP. Seattle City Light has been conducting pilots of performance based contracting with four projects in implementation as of October 2016[7]. These pilots include different building types (multifamily, large and medium office, and commercial mixed use) and varying incentive structures, including flat payments for two or three years to multiple incentives levels for up to six years. The Energy Trust of Oregon has a Pay for

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[1] CAISO's "Flexible Resource Adequacy Criteria and Must-Offer Obligation", Market and Infrastructure Policy Revised Draft Final Proposal of March 7, 2014

[2] CAISO. Regional Resource Adequacy, Issue Paper, December 9, 2015, p 5.

[3] SB 350, Sec. 16(d)(2).

[4] http://eis.lbl.gov/auto-mv.html

[5] Granderson, J. etal. *Industry and R&D Needs: Defogging Key Issues in M&V 2.0*, NEEP EM&V Forum, June 2016.

[6] Matthieu, J.L., P.N. Price, S. Kiliccote, and M.A. Piette, *Quantifying Changes in Building Electricity Use, With Application to Demand Response*, IEEE Transactions on Smart Grid, 2:507-518, 2011.

[7] Moen, L. and Rodenhizer, D. *Performance-Based Pilots*, Seattle City Light, at NW Energy Coalition, Pay for Performance Workshop, October 24, 2016.

Performance – Commercial program[8] where incentives are paid annually over three years based on measured, delivered savings. This program has two options: (1) O&M and behavioral measures with incentives paid over three years; and (2) projects where at least 50 percent capital measures comprise the incentives that are paid over three years. Incentives are paid annually.

4.5 Hybrid Pricing

In many cases hybrid pricing approaches are used, where several pricing strategies are used for a given program. For example, some programs will charge a fixed monthly fee for administrative and core functions, and be paid on a metrics basis for accomplishing specified metrics, acquiring customer participation or energy savings.

In fairly complex implementation agreements there might be elements of fixed price, T&M, and performance elements (Metric Based and/or Resource Based). The following scheme is an example of a complex hybrid pricing scheme where the utility wants to promote designated measures for installation; these may be new measures or some that have desirable characteristics:

- Administrative fee
    - o Fixed fee
    - o Paid monthly
- Marketing
    - o T&M (with utility approval prior to each campaign)
- Outreach and Direct Implementation (audit based)
    - o Fixed price per completed audit
- Direct Implementation – Measure Installation
    - o Deemed measures – Fixed Price per Unit
    - o Custom measures – Price per Verified kWh Saved
        - ▪ Includes verification of energy savings
        - ▪ Payment can be split
            - • Part at time of measure installation
            - • Remainder following verification of savings, with the amount based on the measured savings
- Performance Bonus
    - o Fixed amount for meeting program goals
        - ▪ Audit, measures, kWh savings

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[8] Walker, S. *Pay for Performance (PfP) – Commercial*, Energy Trust of Oregon, at NW Energy Coalition, Pay for Performance Workshop, October 24, 2016.

- ▪ Customer satisfaction target (JD Powers score)
  - o Variable amount based on verified energy savings from designated measures (intended to promote the measure)

This type of pricing scheme has a lot of features in it, each with a purpose. The fixed administrative fee ensures the implementer will be able to "keep the doors open." The marketing effort will only be done if approved by the utility. The T&M structure allows the marketing to utilize the most effective channels for the campaign. Audit-based payment for outreach and DI is fixed price per completed audit to ensure the implementer produces results. Fixed price per unit for deemed measures ensures the customer receives the incentive for installing these deemed measures, while the split payment for custom measures provides the customer a partial payment at the time the measure is installed, before waiting a year or so for the savings to be verified. The performance bonus for meeting program goals provides the implementer the incentive to perform in a productive manner. Lastly, the variable bonus for the installation of designated measures helps ensure the implementer focuses on this measure.

Pricing strategies are important to both the buyer and seller, i.e., utility and implementer. The use of appropriate strategies can ensure that programs and projects are completed in a satisfactory manner for the utility and the implementer would say they had a successful program.

4.6 Pay for Performance from the California Perspective

SB 350 directed the California Public Utilities Commission (CPUC) to develop or update energy efficiency policies to, among other issues, "authorize pay for performance programs that link incentives directly to measured energy savings."[9]

Where SB 350 led to the authorization of programs that use pay for performance to link incentives to measured energy savings, AB 802 directed the CPUC to consider using normalized metered energy consumption (NMEC) as a measure of energy savings.[10]

The CPUC responded to SB 350 and AB 801 in its guidance decision for Business Plan filings (D.16-08-019) where the CPUC recognized that pay for performance (P4P) is "not a one-size-fits-all solution for every program", that it wants to "encourage the program administrators to ensure risk-sharing and performance emphasis by utilizing pay-for-performance contracts in all contracts where savings measurement will be performed and where risk can be shared and not solely placed on ratepayer funding."[11]

What is P4P as it pertains to the Rolling Portfolio? From SB 350 there needs to be a direct link between incentives and measured energy savings, and AB 802 encourages the use of normalized metered energy consumption to measure energy savings. The HOPPS Ruling[12] provides some insight into the elements of a payment strategy that is acceptable to the CPUC: *"We expect only that the payment strategy reflect an accurate valuation of the savings:*

1) *Where savings claims are based on normalized metered energy consumption, customer payment must be at least in part based on ex post data from changes in normalized metered energy consumption.*

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[9] SB 350,Sec 16. (Amended Public Utilities Code, paragraph 399.4(d)(2))

[10] AB 802. Sec. 6. (Amended Section 381.2 of the Public Utilities Code)

[11] D.16-08-013, Section 5.3.

[12] Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (HOPPS), December 30, 2015, p 10.

2) *Pay for performance incentive designs must:*

   a) *Use at least one year of pre installation usage data to establish a usage baseline:*

   b) *Provide for at least one year of ex post measurement, and,*

   c) *Account for the length of time the savings are expected to persist.*

3) *Payment structure should mitigate the risk of up-front payments exceeding the value of actual savings.*

4) *For proposals basing savings claims on net metered energy consumption, we will not require projects to demonstrate that they are early retirement, or to adjust baselines to account for replace on burnout.*

5) *Standard building repair and maintenance need to be accounted for, with baseline savings adjustments specified to reflect the customary customer activity in the absence of the program intervention."*

P4P in the strictest definition is consistent with the Fixed Price-Resource Based Pricing model where all associated costs are reflected in a unit price ($/kWh, $/kW or $/therm) that is paid following the ex post measurement of energy savings; the payments may be made over a period of years depending on the measure. The measurement of savings must follow a set of pre-defined measurement protocols. NMECS is the measurement approach preferred by the CPUC. Systems have been, and are being, developed to provide implementers with NMECS tools that been vetted for use in EE programs using a P4P pricing strategy. Other approaches may be employed where NMECS isn't feasible. Alternate approaches need to be approved prior to final contracting with the Implementer.

The implementer faces a variety of risks in P4P that ex post measured savings will be lower than was expected, yielding lower payment than planned. Similarly, the Program Administrators (Ratepayers) incur risk that they are paying for resources that are not delivered, or overpay for resources. Implementers and Program Administrators will take steps to minimize their respective risk elements.

To mitigate their risk Implementers will take steps to ensure they are properly compensated. This may include selecting the measures that give the greatest certainty of savings, adding excessive costs, perhaps contingencies. They will also seek to gain efficiencies in their program that reduce costs. In most cases the incentive would be paid out over a period of years increasing the volatility of revenues to the implementer.

The CPUC seems to be providing oversight to ensure the Program Administrators are not assuming risk on behalf of Ratepayers. For example, the HOPPs Ruling Program Administrators ensure "gaming" where the implementer is overpaid for the energy savings where there is an upfront payment. Similarly, the PAs are to mitigate "gaming" where ex ante savings are under-estimated that could result in higher than expected energy savings, thus higher than expected payments.

In its guidance decision for Business Plan filings (D.16-08-019) the CPUC indicated it wants to "encourage the program administrators to ensure risk-sharing…where risk can be shared and not solely placed on ratepayer funding"[13] Under the premise that risk be shared between ratepayers and implementers, a hybrid pricing strategy can be employed. Using a hybrid strategy can modify the risk profile by shifting some costs

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[13] D.16-08-013, Section 5.3.

from the resource price, e.g., $/kWh, to another category that is paid, often on a T&M basis. One item that is a candidate to be shifted is the site assessment, or audit, used to develop the measures. Other activities that can be moved are administrative tasks such as reporting and forecasting. The result of shifting costs from the resource price ($/kWh) to a T&M or fixed price per task is that the risk to the Implementer is reduced while the risk to Ratepayers is increased, i.e., the risk of a project where assessments have been completed are not installed. If the CPUC finds this sort of risk-sharing acceptable then hybrid pricing becomes a potential pricing alternative for P4P pricing.

Some practical experience that may be gained from the recent Local Capacity Requirement RFO and Preferred Resources Pilot processes that Southern California Edison and San Diego Gas & Electric have undertaken for the energy efficiency components of the LCR and PRP RFOs for energy efficiency.

5 IMPACTS OF OUTSOURCING MODELS ON UTILITY STAFFING

This section examines the impacts of the five outsourcing models on utility staffing. In general, as the level of outsourcing increases, i.e., move from Minimal Outsourcing (Level 1) to Arms' Length Resource Acquisition (Level 5), utility staffing is reduced. Figure 2 shows relative staffing levels for programs for the five outsourcing models. From Figure 2 we can see that with:

- Minimal Outsourcing (Level 1)

    o utility staff performs virtually 100 percent of the activities

    o contractors do minimal work

- Integrated Program Outsourcing (Level 3)

    o utility staff performs about 60 to 80 percent of the program activities

    o implementers do 40 to 20 percent

- Arm's Length Resource Acquisition (Level 5)

    o utility staff performs 10 to 20 percent of the program activities

    o implementers do 90 to 80 percent

For the most part there's a finite amount of work that is done for a program and we have a zero-sum game when it comes to who does the work. If a contractor does some work on a program then the utility's work is reduced by a corresponding amount. Along the continuum of outsourcing models (Level 1 through Level 5) this work is split between the utility and the implementer. The type of outsourcing model influences the split of work effort between the utility and implementer.

The impacts of outsourcing models on utility staffing are shown in Table 3. This table shows the relative utility staff work effort, roles of utility staff and the overall impact on staffing for each outsourcing model. The utility has some core functions that will exist regardless of the type of outsourcing, unless these functions are outsourced. These are discussed in Section 5.2.

5.1 Is The Outsourcing Replacing An Existing Program or Portfolio?

A question that needs to be asked to more fully understand the impact of outsourcing on utility staff is whether the outsourcing is a new program or if it is replacing an existing program. If it is a new program then the outsourcing may actually increase the responsibilities and work load of existing staff, potentially indicating a need to increase staff in certain core areas. However, if the outsourcing is replacing an existing program then the result will be a reduction of staff.

5.2 Core functions

Several core functions need to be maintained by the utility regardless of type of outsourcing is used. These functions are necessary for the normal operation of the utility. Examples of these core functions include:

- Solicitation and procurement

- Contract management
    - Contract compliance
    - Verification
- Regulatory
    - Filings
    - Reporting
    - Management
    - Technical analysis
- Planning
    - Resource planning
    - Interface with grid managers, CAISO, DERs
- Key Account Managers
    - Program marketing and outreach
    - Customer service roles
        - Billing
        - Connections

5.3 Staff Impacts by Outsourcing Model

5.3.1 Minimal Outsourcing (Level 1)

Under a minimal outsourcing model the utility uses its own staff to implement its programs. All facets of the program are under the direct control and management of the utility, from program design to issuing incentive checks. Occasionally, certain tasks may be outsourced. For example, it's not uncommon to use outsourced labor to help with peak load staffing situations, such as at the end of the program year or when a marketing campaign lead to an influx of new participants. Contractors may be outsourced for tasks that require licenses, e.g., electricians or plumbers, due to state or local codes requiring licensed contractors to do certain work.

There is little or no impact on the level of utility staffing.

5.3.2 Project or Activity Outsourcing (Level 2)

Project or activity outsourcing is used when the utility has a well defined project or a specific activity that needs to be addressed. Types of projects where outsourcing is commonly used include program evaluations, software as a service (SaaS), outreach, marketing campaigns, and market research. Each of these projects requires specific expertise that can be obtained through the solicitation process. Typical activities that are

outsourced include field inspections, engineering reviews, and advertising. One of the advantages of this type of outsourcing is that the utility acquires expertise. For example, through outsourcing with a number of contractors the utility can gain a breadth of expertise that would be difficult staff internally.

Project or activity outsourcing can be viewed as staff augmentation, i.e., the extension of staff work capacity or capability. Utility staff maintains all management responsibilities, including specification of the project or activity, and is ultimately responsible for the work products.

There is little or no impact on the level of utility staffing.

5.3.3 Integrated Program Outsourcing (Level 3)

As described in Section 2.3 through the integrated program outsourcing model utilities integrate all, or most, program activities and tasks under a single contract. Under this model the utility has control over:

- Program design

- Branding

- Integration

- Customer management

Utility staff serves the role of project manager and oversees all aspects of the program. Staff is responsible for integrating the program with other programs in the utility's portfolio.

When a utility outsources an integrated program the impact on staff depends on whether the outsourced program is a new program or is replacing an existing utility program.

If the outsourced program is a new program there will be relatively little impact on staff. Staff will continue to conduct project management, integration with core utility functions, and coordinate with other program implementers. There may be a need for additional staff due to the increased activity from Through the solicitation process staff will convey key program design elements to the prospective bidders, and finalize program design either during contract negotiations or during the early stages of program implementation.

If the outsourced program is replacing an existing program then much of the existing program staff will be impacted resulting in staff reduction.

In either case the utility needs to maintain staffing in key areas, such as regulatory, technical, contract management

Figure 2. Impact of Outsourcing on Utility Staffing
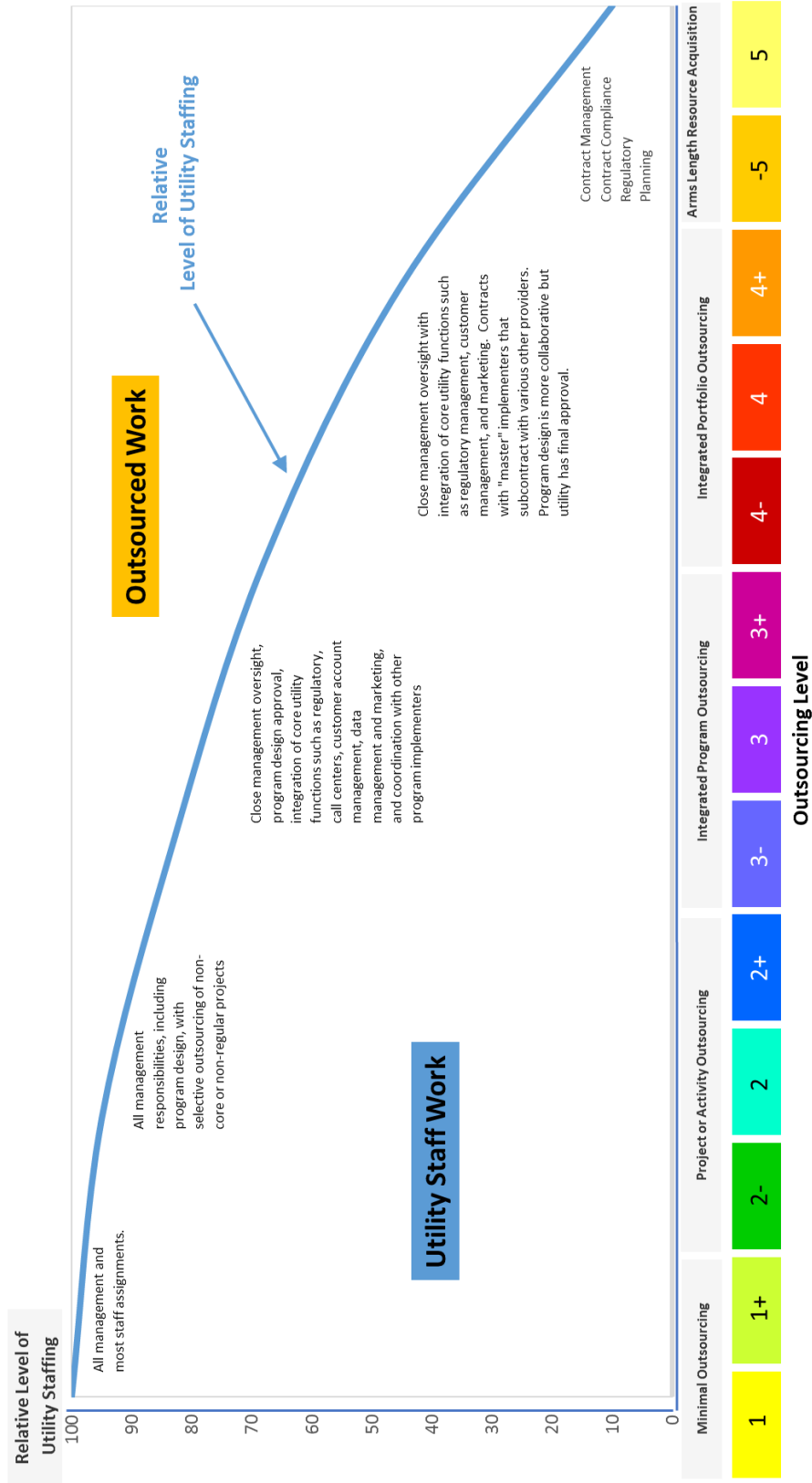
Table 3. Outsourcing Models and Utility Staff Impacts

Outsourcing Model	Typical Outsourced Scope	Utility Staff Work Effort	Common Utility Roles	Impact of Outsourcing on Utility Staffing
Minimal Outsourcing	Peak load staffing, licensed contractors	100%	All management and most staff assignments. Outsourcing limited to short term needs, technical capability gaps, and cost reduction opportunities	No significant impact
Project or Activity Outsourcing	Project: Program evaluation, SaaS, outreach, marketing campaign mgmt., market research, Activity: Field inspections, engineering reviews, advertising	95%	All management responsibilities, including program design, with selective outsourcing of non-core or non-regular projects	Low level of impact
Integrated Program Outsourcing	Program Implementation with significant utility oversight and integration with various utility core functions	75%	Close management oversight, program design approval, integration of core utility functions such as regulatory management, call centers, customer management, data management and marketing, and required coordination with other program implementers	If a new program utility staff performing core functions may experience increased work. If replacing an existing program, reduced staff work effort.
Integrated Portfolio Outsourcing	Implementation of a portfolio of programs, often with subcontractors serving as implementers and reporting to the contractor, with significant utility oversight and integration with various utility core functions	60%	Close management oversight with integration of core utility functions such as regulatory management, customer management, and marketing. Contracts with "master" implementers that subcontract with various other providers. Program design is more collaborative but utility has final approval.	If a brand new portfolio that didn't exist previously, then the utility will, at a minimum, have a contract manager, compliance, management and planning oversight, e.g., portfolio oversight, regulatory support, legal, technical, EM&V. If replacing an existing portfolio then most program staff, some/part core support functions, would be eliminated.
Arm's Length Resource Acquisition	Program Implementation with little or no utility involvement, resource acquisition (kW, kWh and therm impacts)	10%	Contract management	If a brand new resource acquisition program that didn't exist then the utility will, at a minimum, have a contract manager, staff with technical oversight, e.g., portfolio oversight, regulatory support, legal, technical, EM&V. If replacing an existing portfolio then most program staff, some/part core support functions, would be eliminated.

5.3.4 Integrated Portfolio Outsourcing (Level 4)

Utilities outsource an integrated portfolio of programs under this model, or a single large program that employs significant subcontractors that are managed by the prime contractor as discussed in Section 2.4.

- Portfolio Composition and Program Design

- Branding

- Integration

- Customer Management

Utility staff acts as the program manager and oversees the management of all aspects of the portfolio and associated programs, including portfolio composition, program design, integration of core utility functions such as regulatory, call centers, customer management, data management, and marketing and outreach. The contractor assumes greater responsibility for the integration of the program with the other programs in the portfolio. The utility coordinates marketing and outreach with the non-portfolio programs and activities to minimize customer confusion.

5.3.5 Arm's Length Resource Acquisition (Level 5)

Under the Arm's Length Resource Acquisition (Resource Acquisition) model virtually all program activities are shifted to the implementer. The utilities role is largely one of contract management, including contract compliance, and verification. The utility also continues to operate its core functions. One area that is unique is how the utility's key account managers are engaged in Resource Acquisition programs.

If the outsourced program is a new program, then the impact on utility staff is likely to be a slight increase. However, if the program is replacing a similar existing program, then work done be program staff will be eliminated and the contract management function will continue to operate.

6 HOW NEW MEASURES ARE DEVELOPED AND BROUGHT INTO THE PORTFOLIO

Utilities are constantly looking for new measures to add to their portfolios to improve the selection of EE measures available to their customers. In the business sector, most companies have a research and development (R&D) or product development department that creates new products for market. How do utilities develop new measures and bring them to their customers? To find out the project team conducted interviews with contacts with a number of utilities and agencies that operate utilities. These interviews are summarized in Table 4. Some key findings are:

- New measure ideas come from two primary sources

  o Implementers

  o Utility staff whose job it is to identify new measures and program concepts

- New measures usually go from the utility to the PUC/PSC for approval

  o Measures need to pass a cost effectiveness test prior to approval

  o Some utilities will test the measure through pilot activities including monitoring and measurement to collect data on measure performance

  o Utilities communicate with the PUC/PSC to seek approval, sometimes through a formal process, such as through a state-level board, sometimes on an ad hoc basis

- Some utilities have a structured system to develop and launch pilot programs

  o One has a $2.5 million annual budget for pilots

  o Several utilities have a process in place where RFPs for 3rd Party Programs are used to procure programs that are outside the utility's portfolio

  o Stage and gate processes are used to develop pilots, where a measure needs to pass various stages before going to the field test stage, where the pilot is implemented

- About half the states maintain a state-level Technical Resource Manuals (TRM) and/or technical databases serve as clearinghouses for new measures

  o Provide access to the measures to all utilities in the state

  o California's DEER Database has often been cited as the source for measure information from utilities outside the state

  o If there is no TRM or database most of these utilities file measure information similar to a TRM with their EE application to the PUC/PSC; the Arizona utilities file their measure data with the EE applications

- Most states have a state regulator, e.g., a PUC or PSC, that needs to review and approve the measure, especially if it's to be a deemed measure. There are a few

- NYSERDA's Emerging Technology and Accelerated Commercialization for the Commercial/Industrial Sector (ETAC) offered a unique opportunity to utilize NYSERDA's support to commercialize program concepts. The ETAC has been shut down, but NYSERDA does offer a similar process on a shared cost basis with the utility.

Table 4. How New Measures Are Brought Into Programs

Utility	How Are New Measures Developed and Brought Into Programs	How are Pilot Programs Developed and Tested?
Utility 1	The utility's pilot team develops measures and adds them to the *state's* Energy Measures Database (sEMD). Other *state*-based utilities can also add measures to the sEMD, which can be adopted by all utilities, as needed.	The utility's pilot team has a stage and gate process for developing pilot programs.
Utility 2	New measure ideas and concepts can be brought forward by implementers or utility program managers. Measures developed by implementers need to be approved by the utility. The measure is often used in a pilot program. A budget is set and the pilot is conducted. After the pilot monitoring period, the implementer develops the final measure specifications, deemed savings and incentives and add to the standard program measures.	New measures ideas can be brought by implementers or the utility's program managers. Implementers develop the measure to be approved by the utilities rep. A pilot program and budget are set for the new measure, if needed. After the pilot monitoring period, implementers develop the final measure specifications, deemed savings and incentives and add to the standard program measures.
Utility 3	Implementer develops new measures with ongoing input from the utility. The utility and implementers mine custom measures for potential new prescriptive measures. Ultimately the utility signs off on the measure and forwards to the *state* Public Service Commission for approval for the measure savings. sPSC works with the implementer, but primarily is the check and balance on savings estimates.	The utility harvests ideas from any source possible. Has a $2.5M/year budget for pilots. The utility works collaboratively with customers to select and design the pilot so it is valuable and useful to the customer. The two parties are very involved in the design of the pilot and work together to flesh the concept out into a full pilot program.
Utility 5	Each Program Administrator (utility) has a Management Committee that is responsible for incentive design. *s*tech (*state* Technical Collaborative) can suggest innovative designs and measures. Existing relationships between the Management Committee and vendors allows vendors to suggest new ideas directly to the utility. The larger utilities have staff where measure design is their job description. The larger utilities use demonstration projects to try different innovative ideas: one will try it, and then share it with the other utilities.	Pilot programs aren't usually done, although there is the option to do so. A program offering can be narrow enough to act as a pilot. Instead of pilot programs a lot of demonstration projects are done. The Management Committee selects demonstration projects. Ideas and concepts for demonstration projects usually come from vendors.

Utility	How Are New Measures Developed and Brought Into Programs	How are Pilot Programs Developed and Tested?
Utility 6	Utility conducts R&D on measures, as do program implementers. Review committee meets periodically to review R&D activities and work products.	Pilot programs are developed by the client and then managed by the 3rd party implementer that specializes in pilot projects until they can be transitioned to the main 3rd party implementer
Utility 7	Generally offered by 3rd party contractors to the Utility as Pilots	<No input>
Utility 9	Generally, this was done at the suggestion of the vendor and in concert with the project teams through the Design Assistance Agreement (DAA) process. The DAA was the commitment between the program and the end customer that outlined responsibilities for each party. There is an "other" category, which would be selected for new measures and analysis needed for a project.	Innovative Program Solicitation Process and other mechanisms
Utility 10	Must be created using strict *state* workpaper format. Draft work papers are submitted to the utility PM for review, then sent to utility's engineering department for internal review, then is submitted to *s*PUC for their review and approval.	Innovative Program Solicitation Process and other mechanisms
Utility 11	If they come across something that's not in the Technical Resource Manual (TRM) that has potential, it is evaluated for cost-effectiveness, and included in TRM as a deemed measure or approved for the custom program by the agency's review committee. Vendors are always pushing technologies, sometimes customers. Cost-effectiveness evaluation is one tool used for screening measures.	Pilots are pursued if someone "sponsors" the concept and pushes it through approval.
Utility 12	New measures are reviewed and adopted by utility staff.	Pilot programs are developed and implemented by the utility.
Utility 13	The utility works with its implementer and consultant to develop potential new measures and then submits a request to the *state* Corporation Commission (*s*CC). The *s*CC needs to review and approve any new measures. Measures must pass a Societal Cost Test to be eligible to become incentivized. The consultant provides savings for measures and all analysis.	Program managers work with outsourced contractors to develop and implement pilots.
Utility 14	The utility has an R&D budget for new technologies, delivery channels, and potential studies. Implementers suggest new measures. Statewide Technical Resource Manual (TRM), paid for by utilities, is updated annually. It was developed by a consultant. Most new measures come from the TRM.	The R&D budget pays for pilot programs. Third party *state* Power Agency (*s*PA) programs are proxy for pilot programs. The *s*PA issues RFPs for third party programs that "additional cost - effective energy efficiency that could be obtained from eligible customers.

Utility	How Are New Measures Developed and Brought Into Programs	How are Pilot Programs Developed and Tested?
Utility 16	The development of new measures has typically been done by the utility, with pilot projects approved by the PSC. The utility may receive ideas for new measures from any number of sources, including implementation contractors and vendors. Pilot projects were usually run by existing implementation contractors, though that may change as the utility brings more implementation in-house. A unique process used to be in place in New York up until two years ago, NYSERDA's Emerging Technology and Accelerated Commercialization for the Commercial/Industrial Sector (ETAC) was an incubator for new measures and was used to vet these emerging technologies, with third party evaluation. Then the technology could be offered by any utility with custom or standard incentives. NYSERDA will still do a similar process but with a 50-50 cost share with the utility for a demonstration of non-commercialized technology, upstream of ETAC, at a single building scale. ETAC developed the concept for mass commercialization. It's now up to NYSERDA's market mechanisms to serve that role: Advanced Clean Energy Exploratory Research Funding.	Some ideas developed internally, then hire someone to implement the pilot. They receive a lot of unsolicited proposals from vendors for pilot programs. Commission approves pilot. NYSERDA still a source of innovation for technology R&D.

7 CASE STUDIES

Case studies were developed to exemplify how the outsourcing models can be applied to actual utilities.

7.1 Utility 3 Case Study

Model: Integrated Portfolio Outsourcing

Utility 3 provides electric service to more than 1.5 million customers and natural gas to more than 1.5 million customers." Total annual electricity sales were more than 30 TWh. Its EE goals are approximately 1% of total consumption.

Utility 3 uses an Integrated Portfolio Outsourcing model for its nonresidential programs, while its residential programs are closer to an Integrated Program Outsourcing model. On the non-residential side, there are core and niche programs managed by the outsourced portfolio manager, while limited niche activity is bid out separately. On the residential side, Utility 3 outsources to a few main contractors. Consistent with the Integrated Portfolio Outsourcing model, integration happens within the program, but much less so between the program and other utility activities. The exception is marketing, which is fully integrated with corporate activities.

Utility 3 has maintained management approval of program design and marketing materials. Program design is done primarily by the implementer and approved by the utility. At the beginning of the engagement, the process is somewhat iterative, where the implementer designs the program plans, which are reviewed by utility, adjusted based on utility comments and approved. Currently, all planning is done in a collaborative manner, in which the utility and the implementer offices develop the plan together. Utility 3 gives final approval while the implementer has a high level of autonomy on detailed elements of the design. Innovation is collaborative between the utility and the implementer, with the implementer often suggesting ideas and working to flesh out design and implementation through the pilot program. One of the benefits of the outsourcing model for Utility 3 is that they can benefit from the national expertise of major program implementation contractors.

Utility 3 outsources virtually all program activities to the portfolio manager, including inspections, marketing and outreach, technical services, application processing and M&V, R&D, and market research. EM&V is also outsourced to another contractor.

A key focus of marketing and outreach is on improving customer satisfaction. As a result, all branding is centered around the Utility 3 corporate brand. Utility 3 explored an efficiency sub-brand, but has settled on full integration of efficiency activities within the corporate brand. In some cases, they use a sub-brand that targets commercial and industrial customers. Marketing is the area where Utility 3 maintains the greatest control over program design, and while implementation contractors develop marketing materials, all marketing materials are approved by the utility to ensure brand consistency. Utility 3 has over 1,000 accounts that comprise over 50 percent of total usage. These customers are served by Utility 3's key account managers, who are involved in outreach activities. Coordination with key account managers is the primary involvement of Utility 3 in outreach.

The contract structure uses both transactional and value-based, with a mix of fixed price, KPI-based performance and pay for resource.

New measures are brought into the program primarily by the contractor, who maintains ongoing dialog with Utility 3. The utility may suggest a new target market, and measure(s) are mined from other sources or developed by the contractor. New measures must be approved by the regulator.

Flexibility in compensation and staffing is a key driver for Utility 3 to outsource its commercial portfolio. The utility can keep a bonus profit if they hit their targets, and they pass most of the risk for achieving that 15 percent bonus on to the implementation contractor. It is easier for Utility 3 to adjust program expenditure to match profit-dependent revenue when implementation is outsourced. Utility 3 sees the potential for changes in the regulatory environment and prefers to have the flexibility to adjust its staffing levels through outsourcing rather than internal staff.

7.2 Utility 4 Case Study

Model: Project or Activity Outsourcing with significant elements of Integrated Program Outsourcing

Utility 4 provides electric service to over 2 million customer accounts with a legislative goal for reduction in electricity consumption." The programs are funded by customer riders that all residential and non-residential customers pay into through their electric utility bills.

EE program activities play an important role in Utility 4's overall planning efforts, beyond meeting the primary objective of contributing toward the state energy reduction goals. Evaluated savings achieved from EE programs are integrated back into their IRP for future years, to reduce requirements for additional capacity. Evaluated savings achieved from EE programs are bid into the regional transmission organization (RTO), as a resource to reduce grid congestion.

Consistent with the EE programs' integration into utility planning activities, Utility 4 maintains tight control over program design. This approach places Utility 4 in the Project or Activity Outsourcing model. Utility 4 uses contractor assumptions and models when it designs incentive structure and performs cost effectiveness analysis. All EE programs are prescriptive. Utility 4 considers input from stakeholders, externally sourced potential studies, EM&V results, and some program design consulting when developing new measures.

Utility 4 does outsource significant program elements to the same contractor, but not enough program implementation and management responsibility is outsourced to consider them as employing a true Integrated Program Outsourcing model. There are several contractors who implement a variety of smaller programs. For a few years, Utility 4's program design contractors were different than their program implementation contractors. When possible, Utility 4 leans toward spending rider dollars internally rather than on contractors, and much of the implementation is performed in house. Significant portions of marketing, outreach, inspections, and application validation are led or performed by Utility 4 staff. Technical services, training of the vendor network, and application processing and payment are outsourced. All marketing is performed under the utility brand.

Utility 4 regularly proposes new programs to their regulators for approval with mixed success. Some programs are approved, others are rejected, and some are approved with major reductions (upwards of ½) to their original proposed budget.

7.3 Utility 5 Case Study

Model: Integrated Program Outsourcing

Regulations require savings of over 2 percent for electricity and 1 percent for natural gas, decouple revenues from sales, and provide performance incentives for exceeding targets.

Because regulations require all utilities in the state to offer the same programs to all their customers, program design is strongly concentrated within a utility consortium. The consortium's committees are made up of internal staff from the constituent utilities, and two main committees are responsible for design of the Commercial & Industrial program and the Residential program.

Some upstream programs are administered through statewide contracts, but more of the implementation is done through contracts with individual utilities. Consequently, individual contractors have limited leverage to drive changes in program design, which happens through a collaborative process involving all the utilities. The consortium's committees will involve contractors in tweaking existing program design and look to the implementers to bring suggestions for new ideas, such as a recent niche outreach offering. In addition, there is an stakeholder organization that serves as a venue for vendors to suggest innovative designs. The EM&V contractor does market studies that the utility uses to inform program design. In addition, the consortium's committees receive some guidance from an independent oversight board.

Utility 5 implements its Commercial & Industrial program in house, with some "project expediters" hired primarily as extension of utility staff for sales outreach in targeted programs and customer segments (Activity Outsourcing model). Utility 5 contracts out nearly all Residential program implementation, but is heavily involved in directing the contractors, slicing up and coordinating implementation responsibilities between a large number of contractors. In some cases the implementation of offerings by contractors is not integrated, meaning that the different activities (e.g., outreach, technical services, application processing) for a given offering can be allocated to different implementers (a cross between Project Outsourcing and Integrated Program Outsourcing models). The contract structures vary significantly in terms of how much compensation is performance based, resource based, T&M, or fixed price. Evaluation is outsourced for Commercial & Industrial and Residential programs.

Reporting happens at the level of the two programs, Commercial & Industrial and Residential, and rolled up at a unified statewide level, meaning that Utility 5 is responsible for integrating the reports of individual implementers. Although, there is currently not much integration between EE and RE programs, it appears the utility consortium is moving in that direction.

There are not formal lines between R&D and design; pilot projects are implemented through smaller scale offerings within the programs. In addition, Utility 5 selects demonstration projects to try innovative ideas.

EE activities have their own sub-brand typically co-branded with the utility name.

7.4 Utility 6 Case Study

Model: Integrated Program Outsourcing

Utility 6 provides electricity to over 1 million customers. Utility 6 reported over 200 GWh of energy savings, with a spend of over $40 million.[14] Utility 6 offers standard commercial and industrial program with prescriptive and custom measures; niche C&I offerings; and targeted residential offerings.

Utility 6 outsources EE program implementation using an Integrated Program Outsourcing model. The bulk of C&I program implementation activities are contracted to a single large implementation contractor. Utility 6 has broken off a few small parts of the larger C&I implementation contract, somewhat increasing Utility 6's responsibility for managing and coordinating different components of program implementation (primarily with respect to reporting). The residential program implementation is less complex than the C&I program implementation, and Utility 6 outsources each of the main residential program offerings to a different contractor.

The implementation contractors are responsible for the integrated delivery of the various components of their respective programs, including marketing and outreach, technical services, monitoring and verification, application processing, and inspections. Program evaluation is also outsourced. The regulator provides guidance on how the program evaluation is implemented.

Marketing is led by the implementer with significant direction and oversight from Utility 6. In addition, Utility 6 provides utility-level marketing that covers multiple programs, which is cost effective for broad targeting. Outreach is primarily provided by the main implementation contractor, with guidance from the utility. For the largest customers, the implementer provides one-on-one outreach, typically in close coordination with Utility 6's key account managers. Typically, the implementer will reach out to the key account manager prior to contacting a larger customer. For smaller customers, more of the program outreach is done through trade allies. Utility 6 provides close oversight on marketing and outreach in order to leverage the benefits of energy efficiency offerings into its overall strategy for achieving customer satisfaction and brand recognition.

The Program Outsourcing model gives Utility 6 access to a complex skill set that they do not want to re-create and provides greater staffing flexibility. The model simplifies management for the utility, generates greater innovation using third-party expertise, provides their programs with close links to the contractor community, and standardized processes according to national best practices, leading to high quality outcomes from program implementation. For example, a national implementer will have a broad experience of managing regulatory risk in many different contexts, which can help guide Utility 6's regulatory strategy. Another benefit of the model for Utility 6 is that their contractors manage the risk of staffing adjustments that might be necessitated by changes in regulatory requirements, EE goals, other policy objectives, or business needs.

Utility 6 does not push significant integration between the EE programs and its renewables programs or other utility activities, with the exception of ensuring that marketing and outreach are consistent with Utility 6's branding and customer satisfaction strategies. Utility 6 recently unified branding for all of its DSM

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[14] ESource

programs under a single sub-brand. The regulatory requirements for EE programs do not predispose the utility to a certain model for program implementation.

Compensation is a combination of fixed price with a resource acquisition element based on kWh or kW savings delivered. Performance metrics like application processing time and customer satisfaction are generally not part of compensation arrangements.

Utility 6 has primary responsibility for program design, with significant input from the implementation and evaluation contractors. Utility 6 establishes the framework for the program design, and the implementation contractor then develops a detailed proposal for meeting those requirements, in coordination with the evaluation contractor. Utility 6 revises and approves the final design, subject to regulatory requirements.

To develop new measures, Utility 6 has a specialty engineering contractor who develops and implements pilot projects, in coordination with Utility 6 and the main implementation contractor, both of whom may suggest technologies. Pilot programs may be implemented by the main program implementation contractors or by specialty contractors hired specifically for the pilot programs. In general, the decision to undertake pilot programs is made by Utility 6 to test new technologies that can help customers reduce and manage their energy use. Utility 6 views new technologies as a way to partner with customers, provide them a valuable resource, and improve customer satisfaction.

7.5   Utility 11 Case Study

Model: Integrated Program Outsourcing

Utility 11 provides over 150 TWh of electricity. Utility 11 uses the Integrated Resource Plan process to evaluates its EE programs and DR programs together with generation assets. Thus, the cost of EE is embedded in the electricity rate. Utility 11 aims to achieve over around 5% savings versus projected demand in 15 years. Utility 11 projections indicate that capacity is not a significant constraint.

Utility 11 offers a variety of custom and prescriptive EE measures under a sub-brand, for commercial, industrial, and residential customers.

Utility 11 outsources EE program implementation using an Integrated Program Outsourcing model, with some elements outsourced as individual projects or activities and some functions performed in-house. For example Utility 11 does technical evaluation, monitoring, and verification on large custom projects for the largest customers, while the program implementer provides technical services on the rest of the projects. This division of responsibility allows Utility 11 to maintain close control over customer service and satisfaction with their largest customers. The implementation contractor is responsible for application processing. Utility 11 regularly uses in-house short-term staff, and will occasionally outsource short-term staffing. Utility 11's internal staff has shrunk a little, and as a result they are increasing the use of implementation contractor staff as an extension of Utility 11's technical staff and as a source of insight and national best practices.

The Integrated Program Outsourcing model, with fairly close control over the various contractors, supports Utility 11's desire to guide their own EE program design while maintaining access to a variety of qualified external staff quickly. Utility 11 uses expertise from their contractors to get ongoing third-party opinions on current program performance and planning for strategic decisions. Utility 11 also relies on their contractors to organize and structure arguments in support of planning decisions that Utility 11 has made.

Utility 11 generally controls program design, either directly or through specific program design consultants, with some input from the main implementation contractors. Utility 11 has used a program design consultant for its residential programs, while the design of the commercial programs were primarily in-house. Utility 11's evaluation contractor has also supported TRM design. Recommendations from contractors are analyzed and evaluated by Utility 11's in-house planning group. Modeling of program design options is typically in-house, though may use support from consultants, such as provision of software. For example, the evaluation contractor performs impact analysis and modelling to produce 8,760 hourly energy savings and demand impacts for measures, and Utility 11 utilizes the data to run system planning and financial models.

New measure development is an organic process at Utility 11 with input from multiple sources. Utility 11 has their own R&D department. Companies often approach Utility 11 with new technologies. Utility 11's evaluation contractor also provides advice on the energy efficiency impacts of new technologies. If there is sufficient interest, Utility 11 may decide to fund a pilot project, often based on advice from stakeholders. Utility 11 evaluates new technologies for cost-effectiveness, and based on the results may include it in the TRM or approve it for custom incentives. Utility 11 also allows authorized entities to develop their own energy efficiency programs and submit them for approval. Utility 11 will decide if they will approve the program on a general basis and have their evaluation contractor calculate potential savings impacts so they can determine the payment they will provide to the authorized entity.

7.6 Utility 13 Case Study

Model: Integrated Program Outsourcing

Utility 13 provides electricity for 1 million commercial and residential customers The regulated energy efficiency requirement is two percent annual electricity savings, with a lost revenue adjustment mechanism (LRAM). Utility 13 reported 500 GWh of energy savings, with a spend of over $50M. Utility 13's EE programs are funded through an environmental surcharge on the electricity bill. Utility 13 runs two main incentive programs for business and residential customers, plus a multifamily program.

Utility 13 outsources EE program implementation using an Integrated Program Outsourcing model for the commercial and industrial program, while the residential is closer to a Project and Activity Outsourcing model. The bulk of C&I program implementation activities are contracted to a few large contractors, but even in C&I, Utility 13 has shifted closer towards a Project or Activity Outsourcing model as it gains EE experience and program designs mature. This shift manifested in breaking off some parts of the larger implementation contracts, so that Utility 13 has more responsibility for managing and coordinating different components of program implementation. The residential program implementation is less complex than the C&I program implementation, and Utility 13 performs more of the tasks in-house while outsourcing elements of the overall responsibilities to a variety of different contractors.

Utilty 13 has been particularly involved in the management of marketing and outreach. Utility 13 switched from marketing specific programs to marketing that promotes awareness of Utility 13 and the general availability of its EE programs. The marketing contracts are compensated in part based on their ability to raise awareness of Utility 13 and customer satisfaction scores. For marketing, Utility 13 uses input from the implementation contractors to determine specific segments for target markets. Utility 13 has divided the outreach contracts into specific segments assigned to several different outreach contractors. Utility 13 has called for specialized outreach efforts tied to different segments. Utility 13 EE program offerings are all branded under the Utility 13 name, rather than the implementer.

The Program Outsourcing model is a successful balance of allowing Utility 13 control over certain elements of program implementation, while accessing the process and technical expertise of contractors who specialize in program implementation. The main program implementer may be called on to provide specific program design expertise that the utility lacks. Another benefit of the model for Utility 13 is that their contractors manage the risk of staffing adjustments that might be necessitated by changes in regulatory requirements, EE goals, other policy objectives, or business needs. Utility 13 does not push significant integration between the EE programs and its renewables programs or other utility activities. Without this integration as a goal, Utility 13 may not have an interest in assuming greater management control over program implementation (i.e., shifting farther along the outsourcing spectrum to Project or Activity Outsourcing).

Utility 13 largely outsources responsibility for the majority of program implementation activities, including: R&D, marketing and outreach, engineering services, application processing and payment, and inspections. Program evaluation is also outsourced.

As is typical with the Program Outsourcing model, compensation is a mix of T&M, fixed price, and performance pay.

Utility 13 outsourced the original program design. Updating the program design is now a shared responsibility between Utility 13, a program design contractor who is also the program evaluation contractor, and the implementation contractors. Utility 13 may benefit from combining design and evaluation under a single contractor because the contractor has a deeper understanding of how the program operates. Utility 13 sets the framework for goals and budgets, considering feedback from its contractors, and then the program design contractor develops the more detailed design modifications from year to year in collaboration with the implementation contractors and Utility 13, subject to Utility 13's final approval. Utility 13 is closely involved with program design throughout the process. In addition to program design, Utility 13 program managers have responsibility for oversight of the budget, contract management, and running solicitations.

To develop new measures, Utility 13 works with its implementation and evaluation contractors, and then submits a request to the regulator. The regulator reviews and approves any new measures. Measures must pass a Societal Cost Test in order to be eligible to become incentivized. The evaluator provides savings for measures and all analysis. Pilot programs may be implemented by the main program implementation contractors or by specialty contractors hired specifically for the pilot programs. The evaluation contractor also conducts R&D on new technologies that Utility 13 is interested in promoting.

7.7 Utility 14 Case Study

Model: Integrated Program Outsourcing

Utility 14 serves over 3 million customers. In 2016, Utility 14 delivered 90 TWh of electricity, most of which is delivered to customers who participate in EE programs (very large customers do not participate in EE programs). Utility 14 is allowed to rate base energy efficiency investments at the full rate of return if goals are met.

Utility 14 offers the following commercial and industrial programs: Standard, Custom, and several niche programs. For residential customers, Utility 14 offers a variety of targeted programs.

Utility 14 outsources EE program implementation using an Integrated Program Outsourcing model for the majority of its EE programs. The implementation contractor is responsible for inspections, application processing, and outreach. Utility 14 and the implementation contractor split responsibility for marketing (implementer drafts language, and it then gets edited by Utility 14, and then sent out by Utility 14) and engineering. Utility 14 performs a significant amount of EE engineering in-house (for custom analysis, larger projects). Utility 14 also has staffing agreements with smaller firms that provide staff who function as if they were Utility 14 employees. Assessments (audits) are done in-house, but Utility 14 outsources the overflow demand and assessments for smaller customers. Utility 14 outsources program evaluation to one contractor for C&I and residential programs. These programs were formerly marketed under a sub-brand, but now the branding is as the "Utility 14 Energy Efficiency Program."

There are around ten main contracts for C&I programs and five for residential programs. Breaking up the contracts for different programs to different implementation contractors means that Utility 14 has significant program design and contract management responsibilities, and allows Utility 14 to stay close to the operations of each program. Utility 14 has significantly more staff performing design and management than the implementers do, while the implementer has many more people running the actual execution (engineers, admin, outreach).

Utility 14 procures a small set of "third party" programs following the Arms Length Resource Acquisition model. These third-party programs fill gaps that the standard Utility 14 portfolio does not cover. Vendors pitch technologies and / or customer segments that they believe Utility 14 is not adequately participating in. These programs are not marketed under Utility 14's branding, and they represent a very small portion of total energy savings.

For the programs implemented using the Integrated Program Outsourcing model, the implementation contractor has significant responsibility for design and management of implementation, within the framework established and maintained by Utility 14. Utility 14 specifies the goals and funding available, and gives direction on program design. The implementation contractor makes recommendations for program design within Utility 14's guidelines, and the result is subject to review and approval by Utility 14. Utility 14 has ongoing involvement in the implementer's program design process, and in the implementation once the programs are running.

For third party programs, Utility 14 reviews the concepts, an advisory committee approves the concepts, and then Utility 14 performs contract management, but not program design.

Compensation for implementation contractors (excluding third party programs) is a mix of time and materials, fixed price, and performance-based pay on the basis of metrics like customer satisfaction, safety, data security, reporting, invoicing, and processing time. The third party program implementers are paid on the basis of verified resource delivered.

Under the previous cost recovery legal structure for EE programs, EE was not an engine for corporate growth, and not central to Utility 14's overall business operations. As a result, Utility 14 has outsourced program implementation, while maintaining control over design and management, branding, and customer data. EE has been coordinated with other utility functions, particularly outreach with key account managers, but not operationally integrated, even with renewable energy offerings. It is unclear how the new legislative framework for EE programs will change Utility 14's outsourcing model.

There can be competition for customers over the third-party services, but for the most part Utility 14 minimizes that competition.

Utility 14 has an R&D budget that pays for pilot programs to test new technologies, delivery channels, and perform potential studies, many of which are outsourced under the direction of Utility 14. The third party programs may be a proxy for pilot programs. The statewide TRM is paid for by utilities, updated annually, and developed by a consultant. Most new measures come from the TRM, though often at the suggestion of program implementers.

7.8 Utility 16 Case Study

Model: Project or Activity Outsourcing

Utility 16 provides electric service to over 3 million customers and gas service to over 1 million customers. Total electric sales in 2015 were over 50,000 GWh, with gas sales of over 1M Therms. In 2015, Utility 16 reported over 150 GWh of electric savings with a spend of over $50M, and over 2.5M Therms of gas savings with a spend of over $8M. The regulatory structure includes decoupling mechanisms and a system benefits charge. The charge finances a variety of energy efficiency programs including commercial, industrial, residential, and niche, as well as research and development efforts. Utility 16 offers a typical range of custom and prescriptive measures, with programs targeting residential (including single and multi-family, with a strong product rebate component), large commercial, and small commercial customers.

Utility 16 has maintained a fairly tight control over program design and implementation to better align DSM offerings with Utility 16's specific interests, including reliable distribution system performance, and the characteristics of its customer base. The regulatory regime mandates certain programs, supplemented by programs specific to each utility's customer base. Design was led by the regulator, with their own consultants, with more detailed program design done by Utility 16 staff.

Utility 16 used the Integrated Program Outsourcing model, in which a majority of program implementation was handed to a limited number of large implementation contractors, plus a larger collection of contractors with small scopes of work that do not require program management, such as market potential studies and surveys. Utility 16 was generally responsible for incentive design within the framework of the state Technical Resource Manual (TRM), with likely some input from implementation contractors. The TRM in turn is developed through a collaboration between the utilities and the regulatory. Utility 16's main implementation contractors received the incentive design and then had primary responsibility for design of marketing and outreach to support the incentive design, as well as implementation of application processing, engineering, and inspections. Utility 16 coordinated regularly with its implementation contractors on all aspects of program design and implementation.

After recent regulatory changes, utilities were directed to design and submit an annual plan to articulate an integrated approach to planning, investment and operations. Utility 16 decided not to renew its main implementation contracts, and is in the process of switching to a Project Outsourcing model, in which most design and management is in-house, but some significant activities are outsourced on an individual basis. Because the future role of DSM in the utility's operations is uncertain, Utility 16 believes they are better served managing their programs largely in-house, rather than setting up a long-term implementation contract that is likely to change significantly with future regulatory changes. The most notable change is that marketing and outreach strategies are now designed and managed in-house. Utility 16 has retained some

services from previous implementers on an interim basis to provide continuity during the transition to in-house program implementation. While Utility 16 has increased staff in some areas, they have not incorporated staff wholesale from the previous implementation contractors.

Historically, Utility 16's DSM programs were managed independently from the rest of utility operations, but DSM did have a feedback loop into broader system planning. Under the new regulatory structure, incentive-based programs are just a remaining legacy element in an overall approach for managing grid distribution service and the utility's overall carbon footprint. Utility 16 is expected to allow greater open market participation in energy transactions, and in turn gradually shrink the DSM approach of "buying down" electric use and demand through economic incentives. The tighter integration of DSM with market operations may be another reason that Utility 16 has chosen to bring more of its DSM program implementation in-house, so that it can better coordinate DSM with other activities.

Throughout all these changes, Utility 16 has maintained DSM program branding under their own name and maintained control of customer information that derives from program implementation. Program evaluation continues to be outsourced to multiple different contractors to ensure independent assessments. Utility 16's outsourcing of potential studies includes specialized studies of EEDR potential, reporting for regulatory record, intensive data analysis, and often high level program design (e.g., measure definition, definition of customer segments). For these studies, Utility 16 provides input and final approval, with initial study formulation by a consultant, though Utility 16 will sometimes direct the conclusion.

Compensation for the main implementation contractors has likely followed a standard approach combining fixed base pay with variable compensation based on number of customers served and other performance metrics. However, Utility 16 has taken a Third Party – Resource Acquisition approach to significantly ramping up DR and EE implementation, including a locational effort targeting additional resources within a defined geographic area that would soon require a new substation installation in order to meet demand. In this context, Utility 16 is willing to pay significantly more for DSM resources in this geographically constrained area than the system average. Utility 16 has opened the market up to a wide variety of innovative implementers who are paid based on performance. Their offerings complement and exceed the base program through new and innovative service or product offerings. Implementers may be allowed to compete with each other for customer participation. These niche implementation contractors still use Utility 16 branding, but in general have control over the design and implementation of their offerings, subject to monitoring and verification of actual resource acquisition (kW and kWh). Performance-based resource acquisition is a good way of providing additional resources to a specific location to offset capital investment, paying more per kW or kWh than the average for a limited time.

The development of new measures has typically been designed by Utility 16, with pilot projects approved by the regulator. Utility 16 may receive ideas for new measures from any number of sources, including implementation contractors and vendors. Pilot projects were usually run by existing implementation contractors, though that may change as Utility 16 brings more implementation in-house.

7.9 Utility 17 Case Study

Model: Project or Activity Outsourcing

Model: Project Outsourcing

"Utility 17 generates and provides electricity to over 1.5 million customers. The regulator recently decreased the level of energy efficiency the utility will provide its customers."[15] The DR goal is about 10 percent of total load.

Utility 17 performs the vast majority of its DSM programs in house. The structure of the DSM recovery clause applied to volumetric sales per kWh means that the utility uses customer facing DSM programs to satisfy regulatory requirements and as an opportunity to achieve corporate objectives. Many of the DSM program activities are embedded in mainstream utility operations. Low EE goals make it easy to keep the activity in house. Improving customer satisfaction in line with corporate marketing strategies is paramount, and the utility is not comfortable outsourcing customer facing activities like DSM programs. Use of the RIM test discourages significant energy consumption savings, and makes capacity programs much more attractive, but these must be managed carefully to maintain customer satisfaction.

DSM staff are also used to support other corporate activities when needed, such as emergency response to natural disasters. It would be much more difficult to share DSM resources across other functions if they were outsourced.

When Utility 17 does outsource, it usually issues contracts on a project basis, maintaining tight control over management and design. The number of contracts is limited, since most work is performed in house, and the contracts are made directly with service providers, rather than with a management organization that engages subcontractors. The contracts are typically for limited scope and limited duration, rather than integrated different types of activities into a single, multi-year contract.

Typical outsourced activities include: market research (e.g., potential studies), marketing (which is integrated with corporate strategy, allowing DSM efforts to support building the corporate brand), and program evaluation (which requires uneven level of activity throughout the year, and thus is difficult to maintain in house). Pilot or niche programs may be outsourced on an integrated basis (multiple activities under the same contract), since they typically require specialized skills or activities, but are brought in house if they scale up and are mainstreamed. When the work requires them, licensed contractors are used for inspections and installations, to limit liability and the need to maintain specialized skills.

The contract structure is typically fixed price, with some contracts for specialized studies employing T&M with a cap, and a niche program contracts combine fixed price and pay for resource performance.

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[15] http://aceee.org/sites/default/files/pdf/state-sheet/2016/*state*.pdf

7.10 NYSERDA Case Study

New York has undergone major regulatory changes since deregulation in 1996[16], which include dramatic changes in the way that DSM programs are designed and implemented by New York utilities. After deregulation and prior to 2006, the New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation, was responsible for DSM programs. In 2006 New York utilities successfully petitioned the New York State Public Service Commission (PSC) to implement their own DSM programs under separate funding sources while NYSERDA continued its own portfolio of DSM offerings under SBC. Over time, the utility offerings began mirroring more of the technologies that NYSERDA also supported through incentives, and a public perception grew that both entities (i.e. NYSERDA and the local service provider) had competing offers.

In February 2015, the PSC issued the Reforming the Energy Vision initiative (REV). This included a retirement of SBC, replaced by a new 10-year funding model called the Clean Energy Fund. Under REV, NYSERDA's primary role is supporting acceleration of the clean energy economy in the private sector, with emphasis on increasing market awareness, understanding, and adoption of proven business models and technologies, and market tools and mechanisms to reduce "soft costs", that is, the cost of sale for customer acquisition by manufacturers, providers, vendors, and service firms in the clean energy economy. NYSERDA no longer offers product incentives, and is gradually winding down its legacy programs that provide project subsidies. In turn, REV allows utilities to continue traditional project-based incentive programs as part of their overall DSM planning and management. However, by 2018, the utilities are expected to produce plans to integrate DSM activities much more closely into strategies for meeting overall demand needs along with price and carbon emissions goals. Instead of service area-wide incentive programs, New York State utilities are expected to support new business models and technologies that increase reliability, ensure resilience against major storms, reduce congestion, and reduce carbon impacts.

The utilities petitioned and won the right in 2006 to implement their own DSM programs. "In June 2008, the New York Public Service Commission issued an Order Establishing Energy Efficiency Portfolio Standard (EEPS) and Approving Programs."[17] The EEPS mandates certain programs, supplemented by programs specific to each utility's customer base. Design was led by the PSC, with their own consultants, with more detailed program design done by the utilities' staff. The EEPS is now superseded by REV.

In 2012-2015, NYSERDA established a "cradle to adulthood" path for emerging technologies, which were intended, in part, to better allow the open market as well as the utilities to support such technologies within their own DSM programs. The first stage was supported through the Advanced Buildings solicitation, which provided cost-share funding for testing and verification of a new technology. Next, the NYSERDA Emerging Technology and Accelerated Commercialization (ETAC) program fulfilled the next stage in vetting emerging technologies through demonstration projects, using third party evaluation services funded by NYSERDA. Technologies that went through ETAC increased their ability to present vetted third party review materials for utility programs to accept, if pursued by the product/service vendor. With NYSERDA's current shift to market mechanisms, these efforts have been superseded by Advanced Clean Energy (ACE) Exploratory Research Funding, to test, on a single building scale, focused technologies or proof-of-concept research not

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[16] http://webcache.googleusercontent.com/search?q=cache:W71fXwjFLTAJ:documents.dps.ny.gov/public/Common/ViewDoc.aspx%3FDocRefId%3D%257B076F3B08-917D-47FE-83C0-8B2B32822A67%257D+&cd=1&hl=en&ct=clnk&gl=fr

[17] http://database.aceee.org/state/new-york

currently supported by or eligible for NYSERDA funding.[18] The bridging element formally supported through ETAC will be supported by the current or pending offerings that target specific sectors.

After the REV order was issued in 2015, New York State utilities were directed to design and submit an annual Distributed System Implementation Plan to articulate an integrated approach to planning, investment and operations. In turn, the PSC wanted to ensure that energy efficiency efforts are continued but aligned to REV, and the order further directed utilities to submit annual Energy Efficiency Transition Implementation Plans (ETIPs), to address the energy efficiency efforts specifically associated with proposed budgets and targets.

7.11 Texas IOUs Case Study

Model: Arms Length Resource Acquisition

In 2015, Texas IOUs (thus excluding Texas munis, some of whom are large) reported 560 GWh of energy savings, with a spend of $120 million.[19] As of 2013, the Public Utility Commission of Texas (PUCT) requires each utility to "acquire a 30% reduction of its annual growth in demand of residential and commercial customers"[20] through energy efficiency programs, subject to certain triggers. In Texas, funding for EE programs typically comes from the base rate. However, there are provisions for earning profit from EE programs if utilities meet their demand and energy reduction goals. They may receive a performance bonus of up to 10% of the utility's total net benefits with an additional smaller bonus based on performance in Hard-to-Reach programs.[21]

Texas IOUs offer programs that are built around sets of measures from the Texas TRM, with the option for different levels of customized approaches for projects not covered by the TRM's deemed measures. There are programs targeting niche markets and technologies such as data centers, healthcare, retro-commissioning, schools, multi-family, and load management. On the residential side, program lineups include standard residential retrofit programs, plus programs targeting niche markets and technologies such as AC distributors, low-income, swimming pools, new construction, and AC tune-up. A specific set of residential programs including advanced lighting and demand response are delivered by retail energy providers on behalf of IOUs.

Texas state law requires that "electric utilities administer energy savings incentive programs in a market-neutral, non-discriminatory manner, and do not provide competitive energy efficiency services"[22], with limited exceptions. These programs are to be provided through standard offer or market-transformation programs. Administrative costs can be no more than 15 percent of total program costs.

As a result of these policy requirements on EE program implementation, the Arms Length Resource Acquisition model is a beneficial approach for outsourcing program implementation for Texas IOUs. The IOUs are not allowed to deliver EE services themselves, and the cap on administrative costs promotes simplification and automation. This model delegates significant responsibility to the project sponsors who manage qualifying projects and receive incentives from the utility. Project sponsors may be qualified service providers, medium and large commercial customers, community organizations, retail providers, ESCOs, and

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[18] https://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-3249-Advanced-Clean-Energy-Exploratory-Research

[19] ESource

[20] https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.181/25.181.pdf

[21] http://database.aceee.org/state/texas

[22] https://texashistory.unt.edu/ark:/67531/metapth114065/m1/64/?q=programs%20in%20a%20market-neutral

other organizations. Project sponsors provide kWh or kW savings in accordance with the state TRM and other requirements.[23] The incentive they receive is based on fixed price per kWh or kW, as long as they follow the TRM. The ability of project sponsors to select measures from the TRM and receive a fixed incentive per resource generated significantly reduces the administrative cost, but also reduces the direct control that a utility has over their EE programs.

Program implementers are responsible primarily for application processing, while the utility may outsource limited components, such as inspections, to a different contractor than the main implementation contractor. Engineering is performed by the program implementer with limited involvement by the utility, and the streamlined TRM requirements limit the need for engineering support. Project sponsors absorb some of the responsibilities that might otherwise go to a utility or program implementers, since the project sponsors have significant leeway in how they deliver services within the requirements of the TRM. Project sponsors decide which TRM measures generate sufficient incentives to justify program participation, based on the TRM savings calculations, rather than the utilities adjusting incentives for different measures to generate participation for a certain technology.

The implementation area where the utility is likely to maintain the most involvement is outreach, e.g., customer segmentation in order to help target outreach to the customers with the greatest propensity to act. The program implementer does some outreach, and some of that responsibility is shifted to the project sponsors. In a representative example, the connection between EE programs and customer satisfaction with the utility has not been particularly emphasized, but may be a greater focus in the future: currently there are many programs with different implementers, the project sponsors have a strong role, and the utility brand does not always come through clearly in marketing materials, though in theory all marketing is at least co-branded with the utility name. Some retail energy providers market DSM measures under their own brand with limited reference to the IOU. The mix of project sponsors and branding can lead customers to question whether some EE offerings are legitimate,[24] or at least where the incentives are coming from.

While there is not much overlap between programs, since much of program implementation is devolved to the project sponsor, there is significant competition at that level. For example, a number of measures such as AC tuneups and Residential Demand Response BYOD are specifically designed to be implemented by Retail Electric Providers who are in competition with each other.[25]

"The PUCs hires a contractor to perform the third-party evaluation, measurement and verification of Texas utilities' energy efficiency and load management portfolios."[26]

Consistent with the Resource Acquisition model, the area of program design where utilities maintain the greatest control is over the budget allocated to each program and thus to the measures it promotes. The budget provides the framework for the program implementers, who then achieve as much savings as possible within that budget. Program design is centralized and streamlined statewide, through the TRM and the Electric Utility Marketing Managers of Texas (EUMMOT), a voluntary industry organization that coordinates EE activities amongst Texas investor owned utilities. Individual IOU members suggest new measures for the TRM to EUMMOT. If the EUMMOT members agree, EUMMOT then uses a technical consultant to develop the PUCs filing for TRM change. This unified measure design process, across the IOU

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[23] http://www.stateefficiency.com/index.php/utility-programs/program-basics

[24] http://www.stateefficiency.com/index.php/faqs#legit

[25] http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/45675_2_888053.PDF

[26] http://www.stateefficiency.com/index.php/emv

members of EUMMOT, means that program design responsibility is shared across all the utilities, rather than encouraging each utility to design its own programs.

While the utility members of EUMMOT are themselves the main source of the new measures, there are some other typical sources. Program implementers may suggest new measures to their utility. EUMMOT's technical consultant generates ideas for new measures. Each utility may also spend money on R&D for new measures. The PUCs' third-party evaluation contractor is sometimes consulted for guidance on measure design.

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Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.